Health Canada Santé Canada

First Nations and Inuit Health Branch Clinical Practice Guidelines for Nurses in Primary Care

Canada

Our mission is to help the people of Canada maintain and improve their health.
– Health Canada

Published by authority of the Minister of Health

This document is also available on the Health Canada web site:

www.hc-sc.gc.ca/msb/fnihp

Également disponible en français sous le titre

Lignes directrices pour la pratique clinique du personnel infirmier des soins primaires de la Direction générale de la santé des Premières nations et des Inuits

Catalogue Number: H34-109 / 2000E

ISBN: 0-660-18225-4

First Nations and Inuit Health Branch
Clinical Practice Guidelines
for Nurses in Primary Care

Contents

Introduction

These revised *Clinical Practice Guidelines for Nurses in Primary Care* contain information on common health problems and common emergency conditions seen in the adult population. The reviewers have attempted to update the material using an evidence-based approach.

The guidelines consist of 15 sections. Each one includes an assessment (history and physical examination) of the body system in question, along with clinical practice guidelines on common disease entities and emergency situations seen in that system.

The Nurses' Drug Classification System has been incorporated into the drug treatments outlined in the text:

A class drugs are those that a nurse is authorized to prescribe independently.

B class drugs are drugs that may be prescribed only by a physician.

C class drugs are drugs that a nurse may prescribe for one course of treatment.

D class drugs are drugs that a nurse may administer for one dose only, in an emergency situation; any subsequent doses must be authorized by a physician.

Acknowledgments

The First Nations and Inuit Health Branch wishes to acknowledge the assis tance provided by the following people in revising these clinical practice guidelines:

Dr. Siobhan Callaghan, MD, CCFP (family practice consultant)

Carol Sargo, RN(EC), Primary Care Nurse Practitioner (nursing consultant)

Karen Hindle, RNE, Saskatchewan Region

Pauline David, RNE, British Columbia Region

Dorothy Rutledge, RNE, Alberta Region

Marilyn Heinrichs, RNE, Manitoba Region

Carole Martin, RNE, Quebec Region

Karen McColgan, Manitoba Region

Daunett Tucker, RNE, Ontario Region

Preface

These *Clinical Practice Guidelines* are intended primarily for use by qualified and licensed nurses working in nursing stations and treatment health centers located in semi-isolated and isolated First Nations and Inuit communities.

It is important to note that the guidelines contain useful information but are not intended to be exhaustive. Consequently, the manual is to be used for reference and educational purposes only and should not be used under any circumstances as a substitute for clinical judgment, independent research or the seeking of appropriate advice from a qualified healthcare professional.

Appropriate medical advice is to be obtained by telephone in cases where the condition of the client is at all serious or in cases where the condition of the client is beyond the scope of practice and expertise of the nurse to manage autonomously.

Although every effort has been made to ensure that the information contained in the guidelines is accurate and reflective of existing healthcare standards, it should be understood that the field of medical science is in constant evolution. Consequently, the reader is encouraged to consult other publications or manuals. In particular, all drug dosages, indications, contraindications and possible side effects should be verified and confirmed by use of the *Compendium of Pharmaceuticals and Specialties* (CPS) or the manufacturer's drug insert.

Finally, it should be noted that the information in the guidelines may have been superseded by a local policy or other guideline particular to a region or zone or by a common local medical practice. The reader is encouraged to verify as to the existence of these alternative sources of information.

CHAPTER 1 – THE EYES

Table of Contents

ASSESSMENT OF THE EYES

HISTORY OF PRESENT ILLNESS AND REVIEW OF SYSTEM

GENERAL

The following characteristics of each symptom should be elicited and explored:

- Onset (sudden or gradual)
- Chronology
- Current situation (improving or deteriorating)
- Location
- Radiation
- Quality
- Timing (frequency, duration)
- Severity
- Precipitating and aggravating factors
- Relieving factors
- Associated symptoms
- Effects on daily activities
- Previous diagnosis of similar episodes
- Previous treatments
- Efficacy of previous treatments

CARDINAL SYMPTOMS

In addition to the general characteristics outlined above, additional characteristics of specific symptoms should be elicited, as follows.

Vision

- Recent changes
- Blurring
- Halos
- Floaters
- Corrective measures (glasses, contact lenses)

Other Associated Symptoms

- Pain
- Irritation
- Foreign-body sensation
- Photophobia
- Diplopia
- Lacrimation
- Itching
- Discharge
- Ear pain
- Nasal discharge
- Sore throat
- Cough
- Nausea or vomiting
- Urethral, vaginal or rectal discharge
- Pain or inflammation of the joints (or both)

MEDICAL HISTORY (SPECIFIC TO EYES)

- Eye diseases or injuries
- Eye surgery
- Use of corrective eyeglasses or contact lenses
- Concurrent infection of the upper respiratory tract
- Sexually transmitted diseases
- Immunocompromise
- Exposure to eye irritants (environmental or occupational)
- Allergies (especially seasonal)
- Current medications
- Systemic inflammatory disease (inflammatory bowel disease, Reiter's syndrome)
- Diabetes mellitus
- Hypertension
- Chronic renal disease
- Bleeding disorders

PERSONAL AND SOCIAL HISTORY (SPECIFIC TO EYES)

- Occupational exposure to irritants
- Use of protective eyewear
- Housing and sanitation conditions
- School or daycare exposure to contagious organisms (e.g., pinkeye)

GENERAL PHYSICAL EXAMINATION

EYE

Examine the bony orbit, lids, lacrimal apparatus, conjunctiva, sclera, cornea, iris, pupil, lens and fundi. Note the following:

- Visual acuity (which is decreased in keratitis, uveitus and acute glaucoma)
- Swelling
- Discharge or crusting
- Discoloration (erythema, bruising or hemorrhage)
- Lipid deposits
- Arcus senilis (white circle) around iris
- Position and alignment of eyes
- Reaction of pupil and its accommodation to light
- Extraocular movements (which are associated with pain in uveitis)
- Visual field (which is decreased in glaucoma)
- Corneal clarity, abrasions and lacerations
- Corneal light reflex
- Lens opacities (cataracts)
- Red reflex (which indicates intact retina)
- Hemorrhage or exudate
- Optic disk and retinal vasculature

Palpate the bony orbit, eyebrows, lacrimal apparatus and pre-auricular lymph nodes for tenderness, swelling or masses.

Apply fluorescein stain (to test for corneal integrity).

Measure intraocular pressure (by Schiøtz tonometry) (10 to 20 mm Hg is normal).

The ear, nose and throat should also be examined if there are symptoms of an upper respiratory tract infection or if sexually transmitted disease (e.g., gonorrhea) is suspected.

LYMPHATIC SYSTEM

Assess the lymph nodes of the head and neck if a systemic condition, such as a viral infection of the upper respiratory tract or a sexually transmitted disease, is suspected.

Assess for pre-auricular adenopathy, which might indicate chlamydial, viral or invasive bacterial infection of the eye (e.g., gonorrhea).

ABDOMEN

Assess liver for tenderness and enlargement if eye symptoms are associated with symptoms of a sexually transmitted disease (e.g., disseminated gonorrhea) (*see chapter 5, "Gastrointestinal System,"* for details of abdominal exam).

GENITOURINARY SYSTEM AND RECTAL AREA

Assess for urethral, cervical or vaginal discharge if eye symptoms are associated with symptoms of a sexually transmitted disease (e.g., disseminated gonorrhea) (*see chapter 6, "Urinary and Male Genital Systems,"* and *chapter 12, "Obstetrics,"* for details of these exams).

MUSCULOSKELETAL SYSTEM AND EXTREMITIES

Examine the joints to assess for warmth, redness, pain or swelling if eye symptoms are associated with joint symptoms (e.g., disseminated gonorrhea) (*see chapter 7, "Musculoskeletal System,"* for details of exam).

DIFFERENTIAL DIAGNOSIS OF EYE SYMPTOMS OR OCULAR PAIN

- Hordeolum
- Chalazion
- Acute dacryocystitis
- Exposure to irritants
- Conjunctival infection
- Corneal abrasion
- Foreign-body irritation
- Corneal ulcers
- Ingrown lashes
- Abuse of contact lens
- Scleritis
- Acute angle-closure glaucoma
- Uveitis (iritis)
- Referred pain from extraocular sources such as sinusitis, tooth abscess, tension headache, temporal arteritis or prodrome of herpes zoster

COMMON PROBLEMS OF THE EYE

RED EYE

Red eye is common in a wide variety of ocular conditions (Table 1), some of which are a serious threat to vision and require immediate referral to an ophthalmologist.

CAUSES

- Infection: conjunctivitis, keratitis (bacterial, viral [herpetic or non-herpetic] or other)
- Ocular inflammation: uveitis, iritis, episcleritis, scleritis
- Dry eyes
- Blepharitis with secondary conjunctivitis or keratitis (or both)
- Allergy (e.g., allergic conjunctivitis)
- Glaucoma (e.g., acute angle-closure glaucoma)
- Toxic, chemical or other irritants such as topical eye drugs, contact lens solution, acids or alkalis, smoke, wind or ultraviolet rays
- Traumatic injury (e.g., corneal abrasion, foreign-body irritation, hyphema, subconjunctival hemorrhage)
- Pterygium or inflamed pinguecula
- Infection of lacrimal system (e.g., dacryocystitis)

FEATURES OF DANGEROUS RED EYE

The first step is to differentiate major or serious causes of red eye from minor causes. The following danger signs call for referral to an ophthalmologist.

- Severe ocular pain (especially if unilateral)
- Photophobia
- Persistent blurring of the vision
- Proptosis (exophthalmos)
- Reduced ocular movement
- Ciliary flush
- Irregular corneal reflection of light
- Corneal epithelial defect or opacity
- Pupil unreactive to direct light
- Worsening of signs after 3 days of pharmacologic treatment for conjunctivitis
- Compromised host (e.g., neonate, immunosupressed patient, user of soft contact lenses)

Table 1: Partial Differential Diagnosis of Red Eye

	Conjunctivitis*			Corneal Injury or Infection	Uveitis (Iritis)	Glaucoma
	Bacterial	Viral	Allergic			
Vision	Normal	Normal	Normal	Reduced or very reduced	Reduced	Very reduced
Pain	–	–	–	+	+	+++
Photophobia	+/–	–	–	+	++	–
Foreign-body sensation	+/–	+/–	–	+	–	–
Itch	+/–	+/–	++	–	–	–
Tearing	+	++	+	++	+	–
Discharge	Mucopurulent	Mucoid	–	–	–	–
Pre-auricular adenopathy	–	+	–	–	–	–
Pupils	Normal	Normal	Normal	Normal or small	Small	Moderately dilated and fixed
Conjunctival hyperemia	Diffuse	Diffuse	Diffuse	Diffuse with ciliary flush	Ciliary flush	Diffuse with ciliary flush
Cornea	Clear	Sometimes faint punctate staining or infiltrates	Clear	Depends on disorder	Clear or lightly cloudy	Cloudy
Intraocular pressure	Normal	Normal	Normal	Normal	Reduced, normal or absent	Increased

+, present (to various degrees); –, absent; +/–, may be present.

*Hyperthyroidism may cause conjunctival injection.

Some of the diseases associated with red eye are covered in detail in the rest of this section. See Table of Contents of this chapter for topic headings.

BLEPHARITIS

DEFINITION

Inflammation of the eyelid margins.

CAUSES

- Seborrhea or bacterial infection (with *Staphylococcus aureus*); both may be present in some people (mixed form)
- Lice infestation of the lashes

HISTORY

- Burning, itching or irritation of lid margin
- Condition commonly chronic, with frequent exacerbations
- Usually bilateral
- History of seborrhea (of the scalp, brows or ears)
- Loss of lashes

PHYSICAL FINDINGS

- Lid margin red, scaly
- Crusting may be present
- Visual acuity normal
- PERRLA
- Conjunctival redness may be present

Bacterial Form

- Dry scales
- Lid margin red
- Ulceration may be present
- Lashes tend to fall out

Seborrheic Form

- Greasy scales
- Lid margins less red
- No ulceration

Mixed Form

- Dry and greasy scales
- Lid margins red
- Ulceration may be present

DIFFERENTIAL DIAGNOSIS

- Allergic blepharitis
- Hordeolum (stye)
- Chalazion
- Conjunctivitis
- Skin cancer (unilateral) (e.g., sebaceous-cell carcinoma)

COMPLICATIONS

- Secondary bacterial infection common in seborrheic form
- Recurrence

DIAGNOSTIC TESTS

- Swab exudate for culture and sensitivity prn

MANAGEMENT

Goals of Treatment

- Keep lid margin clean and free of scaly buildup
- Prevent infection

Appropriate Consultation

Consult a physician if the inflammation or infection is extensive (i.e., includes more than the lid margins), as in orbital cellulitis.

Treat for several weeks, until the blepharitis is completely gone, to reduce chance of recurrence.

Nonpharmacologic Interventions

Lid Hygiene (to be performed twice daily)

First, apply warm compresses for 5 minutes to soften the scales and crusts. Next, scrub the eyelid margin and the bases of the eyelashes with a solution of water and baby shampoo (90 mL [3 oz] water and 3 drops of shampoo). Rinse with clear water and then remove lid debris with a dry, cotton-tipped applicator.

Client Education

- Counsel client about appropriate use of medications (dose, frequency, application)
- Instruct client in proper hygiene of eyelids
- Recommend that client avoid rubbing or irritating eyelids
- Recommend avoidance of cosmetics, wind, smoke and other irritants

Pharmacologic Interventions

Apply a topical antibiotic eye ointment to the lid margins and into the lower conjunctival sac:

bacitracin ointm ent (Baciguent) (**A class drug**), bid for 1–2 months

or

erythromycin ointment (Ilotycin) (**A class drug**), bid for 1–2 months

or

polymyxin B bacitracin ointment (Polysporin) (**A class drug**), bid for 1–2 months

Identify and manage underlying seborrhea (scalp, eyebrows or other skin areas).

Monitoring and Follow-Up

Follow up in 10–14 days.

Referral

Usually not necessary unless there is no response to therapy or if infection becomes more extensive (e.g., orbital cellulitis).

CONJUNCTIVITIS

DEFINITION

Inflammation of the conjunctiva. Conjunctival erythema is caused by injection and hyperemia of tortuous superficial vessels.

CAUSES

Conjunctivitis is usually one of three types:

- Bacterial: *Chlamydia*, *Hemophilus influenzae*, *Neisseria gonorrhoeae*, *Staphylococcus aureus*, *Streptococcus pneumoniae*
- Viral: adenovirus, coxsackievirus, ECHO virus
- Allergic: seasonal pollens or environmental exposure

Predisposing factors:contact with another person who has conjunctivitis, exposure to a sexually transmitted disease, other atopic (allergic) conditions.

HISTORY

Bacterial Conjunctivitis

- Acute redness and purulent discharge
- Burning, gritty sensation in eyes
- Recent contact with others with similar symptoms

Viral Conjunctivitis

- Acute onset of redness
- Watery discharge
- Foreign-body sensation
- Lasts 1–4 days; infectious for up to 2 weeks
- Systemic symptoms (e.g., sneezing, runny nose, sore throat)
- Recent contact with others with similar symptoms

Allergic Conjunctivitis

- History of seasonal allergies, eczema, asthma, urticaria
- Watery, red, itchy eyes, without purulent drainage

PHYSICAL FINDINGS

- Vital signs normal (unless associated with systemic illness)
- Visual acuity usually normal
- PERRLA; extraocular eye movements normal
- Unilateral or bilateral diffuse conjunctival redness
- Discharge: purulent in bacterial form, thin and watery, possibly purulent in viral form, watery in allergic form
- Crusts on lashes in viral and bacterial forms
- Eyelids red or edematous
- Pre-auricular adenopathy present in gonococcal conjunctivitis

DIFFERENTIAL DIAGNOSIS

- Blepharitis
- Corneal abrasion
- Uveitis (iritis)
- Herpetic keratoconjunctivitis

COMPLICATIONS

- Spread of infection to other eye structures
- Spread of infection to other household members

DIAGNOSTIC TESTS

- Measure visual acuity
- Swab and culture exudate

MANAGEMENT

Goals of treatment

- Identify corneal ulcer
- Rule out more serious infections such as gonorrhea or chlamydial infection
- Prevent household spread

Appropriate Consultation

Consult a physician if any of the following pertain:

- Significant associated eye pain
- Any loss in visual acuity or color vision
- Suspicion of keratoconjunctivitis or other more serious cause of red eye
- Client has periorbital cellulitis
- No improvement with treatment in 48–72 hours
- Client wears contact lenses (and would thus be at high risk for *Pseudomonas* conjunctivitis and keratitis)
- Suspicion of gonorrhea or chlamydial conjunctivitis, either of which requires systemic antibiotics (refer to *Canadian STD Guidelines* [Health Canada 1998]).

Nonpharmacologic Interventions

Apply cool compresses to eyes, lids and lashes as frequently as possible.

Client Education

- Counsel client about appropriate use of medications (dose, frequency, instillation)
- Advise client to avoid contamination of tube or bottle of medication with infecting organisms
- Suggest ways to prevent spread of infection to other household members
- Instruct client about proper hygiene of hands and eyes
- For bacterial form: client may need school, daycare or work restrictions for 24–48 hours after treatment is initiated
- For viral form: contagious for 48–72 hours but may last for 2 weeks
- For allergic form: recommend that client avoid going outside when pollen count is high and that protective glasses be worn to prevent pollen from entering the eyes
- Do not allow client to use an eye patch

Pharmacologic Interventions

Never use steroid or steroid-and-antibiotic combination eye drops, because the infection may progress or a corneal ulcer may rapidly form and cause perforation.

Bacterial Conjunctivitis

Topical antibiotic eye drop:

sulfacetamide 10% (Cetamide) (**A class drug**), 2 or 3 drops q2h for 3 days followed by gradual tapering over the next 4 days

or

polymyxin B gramicidin eye drops (Polysporin) (**A class drug**), 2 or 3 drops qid for 5–7 days if the infection is mild

An antibiotic eye ointment may be used at bedtime in addition to the antibiotic eye drops prn:

sulfacetamide 10% (Cetamide) (**A class drug**), hs

or

erythromycin 0.5% (Ilotycin) (**A class drug**), hs

Viral Conjunctivitis

Boric acid washes often provide excellent symptomatic relief (antibiotics are not helpful and are not indicated).

Allergic Conjunctivitis

Topical antihistamine eye drops are recommended if symptoms are not controlled by oral medications.

Consult a physician before using any of the following:

sodium cromoglycate 2% ophthalmic solution (Cromolyn) (**B class drug**), 1 or 2 drops qid

or

lodoxamide 0.1% ophthalmic solution (Alomide) (**B class drug**), 1 or 2 drops qid

Oral antihistamines may also be tried if symptoms are severe:

triprolidine (Actifed) (**A class drug**), 2.5 mg PO q4–6h prn (maximum dose 10 mg/day)

or

brompheniramine (Dimetapp tabs) (**A class drug**), 4–8 mg PO tid or qid

Monitoring and Follow-Up

Clients with moderate or severe symptoms should be seen for follow-up at 24 and 48 hours.

Referral

Refer to a physician if condition deteriorates, if symptoms persist despite treatment, or if symptoms recur.

HORDEOLUM OR STYE

DEFINITION

Acute infection of a hair follicle of an eyelash, a Zeis (sebaceous) gland or a Moll (apocrine sweat) gland of the eyelid.

CAUSE

Bacterial infection (*Staphylococcus aureus*).

HISTORY

- Pain
- Swelling of eyelid
- Redness of eyelid
- Vision not affected
- Similar eyelid infection in the past

PHYSICAL FINDINGS

- Localized redness and swelling of eyelid
- Mild conjunctival injection
- Possible purulent drainage along the lid margin
- Acutely tender
- Pre-auricular adenopathy may be present

DIFFERENTIAL DIAGNOSIS

- Chalazion
- Blepharitis
- Dacryocystitis
- Orbital cellulitis

COMPLICATIONS

- Conjunctivitis
- Orbital cellulitis

DIAGNOSTIC TESTS

- Swab any drainage for culture and sensitivity

MANAGEMENT

Goals of Treatment

- Relieve symptoms
- Prevent spread of infection to other eye structures

Appropriate Consultation

Usually not necessary for simple stye.

Nonpharmacologic Interventions

Apply warm, moist compresses qid.

Client Education

- Stress importance of not squeezing the hordeolum
- Teach the client eyelid hygiene: wash lid with mild soap and water; use a separate area of washcloth for each eye
- Stress importance of washing hands to prevent spread of infection
- Recommend avoidance of cosmetics during acute phase (current eye cosmetics should be discarded because they may harbor bacteria and cause recurrent infection)
- Client should not wear contact lenses until infection clears
- Counsel client about appropriate use of medications (dose, frequency, application)
- Stress importance of follow-up if symptoms do not improve with treatment or if inflammation extends to involve the periorbital tissues

Pharmacologic Interventions

sulfacetamide 10% eye ointment (Cetamide), (**A class drug**), qid for 7 days

or

polym yxin B bacitracin ointment (Polysporin) (**A class drug**), qid for 10 days

Antibiotic eye drops can be used, but they require more frequent dosing, every 3–4 hours, and are generally less effective.

Monitoring and Follow-Up

Follow up in 3–4 days if symptoms do not respond; follow up sooner if infection spreads.

Referral

Consult a physician if the lesion does not respond to therapy or if there is evidence of infection of the periorbital soft tissue.

CHALAZION

DEFINITION

Chronic inflammatory lipogranuloma of a meibomian gland. It occurs deeper within the lid than a stye.

CAUSE

Results from obstruction of the meibomian gland duct. Secondary bacterial infection from *Staphylococcus aureus* may develop.

HISTORY

- Lump on the eyelid area
- Redness, swelling and pain, if secondary infection develops
- Blurry vision if chalazion is large (pressure on the eye globe may cause astigmatism)
- Conjunctival injection (if associated with conjunctivitis)
- Tearing may be present (if conjunctiva irritated)

PHYSICAL FINDINGS

- Hard, non-tender nodule on the middle portion of the tarsus, away from the lid border; may be pointing to the inner surface of tarsus and causing pressure on the globe
- Inflammation of the lids and conjunctiva may be seen if secondary infection present

DIFFERENTIAL DIAGNOSIS

- Hordeolum (stye)
- Blepharitis
- Sebaceous-cell carcinoma (rare)

COMPLICATIONS

- Secondary infection
- Astigmatism

DIAGNOSTIC TESTS

None.

MANAGEMENT

Goals of Treatment

- Prevent infection and visual disturbances

A small asymptomatic chalazion does not require treatment and usually resolves spontaneously in a few months. If the chalazion is large or if there is secondary infection, treatment is needed.

Nonpharmacologic Interventions

Apply warm moist compresses qid for 15 minutes.

Client Education

- Stress importance of not squeezing the chalazion
- Teach the client eyelid hygiene: wash lid with mild soap and water; use a separate area of washcloth for each eye
- Stress importance of washing hands to prevent spread if infection occurs
- Recommend avoidance of cosmetics during acute phase (current eye cosmetics should be discarded because they may harbor bacteria and cause recurrent infection)
- Client should not wear contact lenses until infection clears
- Counsel client about appropriate use of medications (dose, frequency, application)
- Stress importance of follow-up if symptoms do not improve with treatment

Pharmacologic Interventions

sulfacetamide 10% eye ointment (Cetamide), (**A class drug**), qid for 7 days

or

polymyxin B bacitracin ointment (Polysporin) (**A class drug**), qid for 7 days

Antibiotic eye drops can be used, but they require more frequent dosing, every 3–4 hours, and are generally less effective.

Monitoring and Follow-Up

Follow up in 1–2 weeks.

Referral

Refer to a physician if a large chalazion does not respond to medical therapy. Incision and drainage with excision may be necessary if the chalazion does not resolve spontaneously within 2 or 3 months.

PTERYGIUM

DEFINITION

A triangular winglike growth of tissue that is a proliferation of the nasal or (rarely) the temporal bulbar conjunctiva. It grows toward the cornea and over its surface.

CAUSES

Chronic irritation of the eye from ultraviolet light, dust, sand or wind.

HISTORY

- Usually painless
- Blurred vision if pterygium extends over cornea
- Usually occurs in people who spend a lot of time outdoors

PHYSICAL FINDINGS

- Visual acuity normal
- Bilateral or unilateral lesions may be present
- A mounded, injected triangular mass of conjunctival tissue arising from either canthus and possibly extending across cornea
- Blood vessels may present within the tissue

DIFFERENTIAL DIAGNOSIS

- Pinguecula (inflamed)

COMPLICATIONS

- Recurrent conjunctivitis

DIAGNOSTIC TESTS

- Measure central and peripheral visual acuity

MANAGEMENT

Goals of Treatment

- Identify asymptomatic lesions
- Prevent further growth

Appropriate Consultation

Arrange a non-urgent consultation with the physician.

Nonpharmacologic Interventions

Client Education

- Stress importance of preventing chronic irritation
- Educate those at high risk
- Recommend use of protective eyewear in both summer and winter
- Explain course of disease and expected outcome
- Ask client to return to the clinic for reassessment when signs of conjunctivitis are noticed or if lesion interferes with vision

Monitoring and Follow-Up

- Follow annually; note any changes in size
- Test central and peripheral vision

Referral

Referral for definitive treatment (surgical removal) by an ophthalmologist may be necessary if lesion interferes with vision.

CATARACTS

DEFINITION

A decrease in the transparency of the crystalline lens to the degree that vision is impaired.

CAUSES

Protein coagulates in opaque areas in the lens for unknown reasons. Ninety-five percent of people over age 65 have some degree of lens opacity. Most cases (90%) occur as a natural process of aging. Other cases are metabolic, congenital or drug-induced, or are the result of ocular trauma or an ocular condition such as chronic anterior uveitis.

Factors that influence the risk of cataract development include exposure to ultraviolet B radiation; diabetes mellitus; use of alcohol; use of medications such as major tranquilizers, diuretics and systemic corticosteroids; and lack of antioxidant vitamins.

HISTORY

- Diminished vision
- Increased perception of glare from lamps or sun or when driving at night
- Altered perception of color (loss of contrast sensitivity)
- Presence of risk factors (*see "Causes," above*)

PHYSICAL FINDINGS

– Visual acuity may be decreased in affected eye
– Funduscopic exam reveals opacities of the lens (with ophthalmoscope set at +10, these appear as dark areas against the background of the red–orange pupillary light reflex)

DIFFERENTIAL DIAGNOSIS

– Macular degeneration
– Diabetic retinopathy

COMPLICATIONS

– Risks associated with loss of vision (e.g., falls, trauma)

DIAGNOSTIC TESTS

None.

MANAGEMENT

Goals of Treatment

– Maintain optimal vision
– Prevent accidents (e.g., falls)

Appropriate Consultation

Consult a physician on a non-urgent basis, unless vision is significantly diminished and there is risk of visual impairment, or cataract is related to ocular trauma or other eye disease process.

Nonpharmacologic Interventions

Non-surgical management includes changing lens prescription and using strong bifocal eyeglasses, magnification and appropriate illumination.

Client Education

– Counsel client that progression of cataract formation may be slowed by decreasing sun exposure, quitting smoking or increasing ingestion of antioxidant vitamins (if diet is deemed deficient in this area)
– Teach client how to prevent falls and accidents in the home
– Recommend use of magnification and appropriate illumination

Monitoring and Follow-Up

Follow-up (by physician) should be done at least annually.

Referral

Referral to an ophthalmologist for evaluation is necessary if client experiences increasing functional impairment. Decision concerning surgery is based on the degree of functional impairment.

FOLLOW-UP AFTER CATARACT SURGERY

Goals of Care

– Control inflammation
– Prevent infection
– Maintain eye comfort
– Promote early visual rehabilitation

History

– Post-operative pain is usually minimal, with mild foreign-body sensation
– Increased pain may be due to inadvertent trauma, infection or increased intracranial pressure
– Itchy red eye
– Changes in vision: darkening or loss of detail (any significant post-operative change could indicate hemorrhage, retinal detachment, acute glaucoma or infection)
– Visual phenomena such as flashing lights or dark shadows require investigation

Eye Examination

– Redness or swelling of the conjunctiva or lids suggests infection or allergic response to medications
– Red reflex (confirm with ophthalmoscopy)
– Corneal opacity
– Hyphema (blood in the anterior chamber)

Post-Operative Medication Review

– Antibiotics (polymyxin/TMP, sodium sulamyd or tobramycin) are used to prevent infection
– Dilators such as tropicamide or phenylephrine drops are used to keep the iris away from the implant during the early healing period
– Anti-inflammatory agents such as ketorolac or diclofenac drops are used to reduce post-operative inflammation

Analgesic agents are used for discomfort:

acetaminophen (Tylenol) (**A class drug**), 500 mg, 1 or 2 tabs q4h prn

No changes to eye medications should be made without consulting the treating ophthalmologist.

Client Education

– Counsel client about appropriate use of medication and side effects
– Patient may engage in activity as tolerated, except no lifting, bending or other activities that strain the intra-abdominal muscles

Monitoring and Follow-Up

Client should be seen by ophthalmologist in 6 weeks.

CHRONIC OPEN-ANGLE GLAUCOMA

Acute angle-closure glaucoma usually presents with acute symptoms and is a medical emergency (*see "Emergency Problems of the Eye," below, this chapter*).

DEFINITION

Glaucoma is a disease usually related to increased intraocular pressure, which may result in damage to the optic nerve that can lead to loss of vision.

A complete understanding of the pathogenesis of glaucoma remains unknown; some people with high intraocular pressure do not have glaucoma, whereas others have glaucoma without elevated intraocular pressure.

CAUSES

- In chronic open-angle glaucoma, the secretion of aqueous humor and its flow between the lens and the iris through the pupil into the anterior chamber is normal; however, the trabecular meshwork does not allow rapid enough drainage of aqueous humor, with a resultant elevation in pressure
- Prevalence is about 1% of people over age 40, increasing to 3% among people older than 70 years; affects men and women equally

Risk Factors

Primary

- Elevated intraocular pressure
- Advanced age
- Family history of condition
- Myopia
- Diabetes mellitus
- Systemic hypertension
- African heritage

Secondary (Acquired)

- Blunt or penetrating trauma
- Previous intraocular surgery
- Previous intraocular inflammation
- Corticosteroid use
- Drugs that cause or worsen glaucoma: corticosteroids (commonly); antihistamines, decongestants, antispasmodics, antidepressants (rarely)

Congenital

- Family history of condition

HISTORY

Symptoms do not arise until disease is very advanced.

- Loss of vision (gradual and painless)
- Peripheral vision affected first
- Halos around lights
- Presence of risk factors

PHYSICAL FINDINGS

- Peripheral field of vision decreased
- Central visual acuity decreased
- Cupping of the optic disk

DIFFERENTIAL DIAGNOSIS

Vascular occlusive disease of the eye.

COMPLICATIONS

Blindness.

DIAGNOSTIC TESTS

- Measure visual acuity
- Determine extent of peripheral fields
- Measure intraocular pressure with Schiøtz tonometry; if pressure > 21 mm Hg, investigations should be initiated, especially if patient is symptomatic

Eighty-five percent of patients with intraocular pressure > 21 mm Hg do not have glaucoma and will not develop this condition in the next 5 years. Unless tonometry is performed frequently and accurately with precise instruments, the results may be inaccurate; therefore the screening value of tonometry has been challenged. The detection of glaucoma may be more appropriately based on the periodic screening of high-risk individuals with a thorough ophthalmological assessment.

MANAGEMENT

Goals of Treatment

- Prevent, slow or stop progressive vision loss
- Preserve a healthy optic nerve
- Early detection of those at risk

Appropriate Consultation

Consult a physician if new-onset glaucoma is suspected or symptoms of previously diagnosed glaucoma have worsened.

Nonpharmacologic Interventions

For early detection of glaucoma in the general population, the Canadian Task Force on the Periodic Health Examination (1994) (now the Canadian Task Force on Preventive Health Care) gave funduscopic exam and tonometry a C recommendation (i.e., poor or insufficient research evidence to include or exclude from the periodic health examination). The Task Force prudently recommended that anyone with risk factors for glaucoma undergo periodic assessment by an ophthalmologist:

- People > 40 years of age should be assessed every 3–5 years
- People > 65 years of age should be assessed annually

No lifestyle modifications have proven helpful either before or after the use of drug therapy. Surgical and laser procedures are options if drug therapy fails.

Pharmacologic Interventions

Drug treatment for glaucoma is prescribed by an ophthalmologist. A stepped-up approach is used if the symptoms progress (Figure 1). The main aim of all drug therapy is to reduce intraocular pressure. Any visual loss is usually irreversible.

Monitoring and Follow-Up

Ensure regular follow-up by a physician at least annually when stable.

Referral

Refer back to the ophthalmologist annually or sooner if symptoms progress.

Fig. 1: Common Drug Therapy for Chronic Open-Angle Glaucoma

Step 1
Topical β-blocker (e.g., timolol [**B class drug**])

Step 2
Topical carbonic anhydrase inhibitor (e.g., dorzolamide hydrochloride) [**B class drug**])
or
Topical prostaglandin analog (e.g., latanoprost [**B class drug**])
or
Topical adrenergic agonist (e.g., dipivefrin hydrochloride [**B class drug**])
±
β-blocker

Step 3
Topical cholinergic agonist (e.g., pilocarpine hydrochloride [**B class drug**])
±
Any of the preceding topical medications

Step 4
Glaucoma laser procedures
±
Any combination of the preceding topical medications

Step 5
Oral carbonic anhydrase inhibitors (e.g., acetazolamide [**B class drug**])
±
Topical medications
±
Further laser procedures

Step 6
Glaucoma surgery
±
Topical and oral medications
±
Further laser procedures

Source: *Therapeutic Choices* (Gray 1998)

EMERGENCY PROBLEMS OF THE EYE

CORNEAL ABRASION

DEFINITION

Superficial corneal defect due to scraping or rubbing of the corneal epithelium.

CAUSES

Usually trauma or a foreign body in the eye.

HISTORY

- Foreign-body sensation
- Sudden unilateral eye pain (sharp or worse with blinking)
- Moderate to profuse tearing
- Mild photophobia
- Mild blurred vision (due to tearing) may be present

PHYSICAL FINDINGS

- Vital signs normal
- Visual acuity may be slightly blurred in affected eye
- Diffuse conjunctival injection
- Pupils react briskly to light
- Fluorescein staining will reveal area of abrasion
- Presence of a foreign body under the upper or lower eyelid must be ruled out

DIFFERENTIAL DIAGNOSIS

Rule out other causes of red eye (*see Table 1, in "Red Eye," above, this chapter*).

COMPLICATIONS

- Corneal ulceration
- Secondary bacterial infection
- Corneal scarring if abrasion recurs
- Uveitis (iritis)

DIAGNOSTIC TESTS

- Measure visual acuity
- Apply fluorescein stain: corneal cells that have been damaged or lost will stain green; cobalt blue light allows easier visualization of the abrasion

MANAGEMENT

Goals of Treatment

- Prevent secondary bacterial infection
- Prevent development of corneal ulceration

Appropriate Consultation

Consult a physician if there is a large or central corneal abrasion or if a penetrating corneal ulcer is found on initial examination, if pain is severe, if the abrasion does not respond to therapy after 48 hours or if a residual rust ring is evident.

Nonpharmacologic Intervention

Firm, comfortable double-patching of the eye may relieve pain associated with larger abrasions. One day is usually sufficient.

Patching is contraindicated if abrasion is associated with wearing contact lenses.

Client Education

- Advise client that daily follow-up is important to ensure proper healing
- Counsel client about appropriate use of medications (type, dose, frequency, side effects)
- Instruct client to return to clinic immediately if pain increases or vision decreases before 24-hour follow-up
- Suggest that client wear protective glasses while working to help prevent similar incidents in future

Pharmacologic Interventions

Instill topical anesthetic eye drop:

tetracaine 0.5% eye solution (Pontocaine) (**D class drug**), 2 drops

Complaints of irritation and foreign-body sensation should resolve in 1 or 2 minutes. Instill a generous amount of antibiotic eye ointment in the lower conjunctival sac:

sulfacetamide 10% eye ointment (Cetamide) (**A class drug**)

Monitoring and Follow-Up

- Follow-up at 24 hours to assess healing is imperative
- If no symptoms or signs, patient can be sent home with advice on preventing corneal abrasions
- If client is still symptomatic but improving, the eye should be re-treated as above with antibiotic ointment or drops and re-examined daily with fluorescein. The uptake of dye should be less than on the previous day. Re-examine daily until the abrasion has healed completely.

(cont'd)

Referral

Referral to an ophthalmologist is required within 24 hours for large or central defects and in 48–72 hours if there is no response to therapy.

CORNEAL ULCER

DEFINITION

An infection of the cornea results in breakdown of the protective epithelial barrier. The ulcer may be central or marginal.

CAUSES

- Bacterial, viral or fungal invasion
- Common bacteria include *Pseudomonas*, *Staphylococcus*, *Streptococcus*
- Common virus is herpes simplex
- Risk factors include any abrasive corneal injury, wearing of soft contact lenses, dry eyes, thyroid disease, diabetes mellitus, imunosuppressive conditions, long-term topical use of eye steroid medication

HISTORY

- Eye pain
- Blurred vision
- Foreign-body sensation
- Photophobia
- Red eye

PHYSICAL FINDINGS

- Conjunctiva inflamed
- Eyelid may be inflamed
- Mucopurulent discharge
- Ulcer visible on cornea, but usually only after fluorescein staining

DIFFERENTIAL DIAGNOSIS

- Corneal abrasion
- Conjunctivitis
- Blepharitis
- Keratitis

COMPLICATIONS

- Scarring of cornea
- Permanent loss of vision
- Extension of infection to other ocular structures

DIAGNOSTIC TESTS

- Measure visual acuity
- Apply fluorescein stain

MANAGEMENT

Goals of Treatment

- Alleviate infection
- Prevent permanent loss of vision

Appropriate Consultation

Consult a physician immediately if an ulcer is detected.

Nonpharmacologic Interventions

- Double-patch the eye with sterile patch
- Explain diagnosis and disease process
- Provide reassurance and support

Pharmacologic Interventions

Apply a generous amount of an antibiotic ointment in the lower conjunctival sac:

sulfacetamide 10% (Cetamide) (**A class drug**)

Referral

Urgent; refer to an ophthalmologist within 24 hours.

CONJUNCTIVAL, CORNEAL OR INTRAOCULAR FOREIGN BODIES

DEFINITION

- Presence of a foreign object on the conjunctiva or cornea or intraocularly (within the globe)
- May be organic or inorganic

CAUSE

Improper protection of eyes.

HISTORY

Get an accurate description of the material and the circumstances under which it entered the eye (slow speed or high velocity); a rapidly moving projectile object may penetrate the globe of the eye. This typically occurs when metal is hammered upon metal.

With a penetrating eye injury, the eye may appear deceptively normal.

- Sudden onset of unilateral eye pain
- Irritation (foreign-body sensation)
- Tearing
- Photophobia
- Visual disturbance may be present

PHYSICAL FINDINGS

- Visual acuity usually normal
- PERRLA
- Tearing
- Foreign body will be found in lower conjunctival sac or under the upper lid; may need to evert upper lid to find object
- Fluorescein stain may reveal associated corneal abrasion
- If foreign body is metallic, look for a rust ring around material

DIFFERENTIAL DIAGNOSIS

- Other causes of red eye (*see Table 1, in "Red Eye," above, this chapter*)
- Intraocular foreign body

COMPLICATIONS

- Corneal ulcer
- Secondary infection

DIAGNOSTIC TESTS

- Measure visual acuity of both eyes
- Apply sterile fluorescein stain to identify any associated corneal defect

MANAGEMENT

Goals of Treatment

- Remove foreign body
- Identify associated corneal abrasion
- Identify residual corneal rust ring
- Identify embedded corneal foreign body

Appropriate Consultation

Consult a physician immediately if the foreign body cannot be dislodged with your treatment, if there is suspicion of an intraocular foreign body or if there is continued foreign-body sensation (lasting 24 hours or longer) when no foreign body has been detected.

Nonpharmacologic Interventions

Remove a superficial, non-embedded conjunctival foreign body by gently irrigating with normal saline or by gently wiping with a sterile cotton-tipped applicator moistened with a topical anesthetic or sterile saline.

Do not try to remove an obviously embedded foreign body, because it may have penetrated more deeply than expected.

After removing the superficial foreign body, use fluorescein stain to detect any remaining fragments, a rust ring or corneal abrasion.

Client Education

- Suggest that client wear protective glasses while working to help prevent similar incidents in future
- Stress that close follow-up is very important to ensure proper healing

Pharmacologic Interventions

Instill a topical anesthetic eye drop:

tetracaine 0.5% (Pontocaine) (**D class drug**), 2 drops

Monitoring and Follow-Up

Follow up in 24 hours to ensure resolution of symptoms.

Referral

Refer immediately any client with a foreign body that cannot be dislodged with your treatment, if there is a large or central corneal abrasion or if there is any concern that the globe has been penetrated by a high-speed object.

Refer within 24 hours any client who continues to experience a foreign-body sensation even though no foreign body is detected.

ACUTE ANGLE-CLOSURE GLAUCOMA

DEFINITION

A sudden increase in intraocular pressure.

The pathogenesis of glaucoma remains unknown; some people with high intraocular pressure do not have glaucoma, whereas others have glaucoma without elevated intraocular pressure.

CAUSES

- Pre-existing narrow angle of anterior chamber
- Spontaneous dilatation of pupil by drugs or darkened environment
- Complication of penetrating intraocular foreign body
- Trauma such as a chemical burn

HISTORY

- Sudden onset of severe unilateral eye pain
- Vision blurred, reduced or absent
- Nausea and vomiting may be present
- Tearing

PHYSICAL FINDINGS

- Heart rate may be elevated
- Blood pressure may be elevated
- Client may be in acute distress (from pain or fear)
- Visual acuity reduced in affected eye
- Conjunctiva diffusely injected red
- Perilimbal flush may be present
- Cornea appears steamy
- Pupil mid-dilated and non-reactive to light
- Funduscopic exam of affected eye may reveal increased cupping of the disk
- Peripheral field of vision decreased in affected eye
- Intraocular pressure elevated on tonometry (normal range is 10–20 mm Hg)

DIFFERENTIAL DIAGNOSIS

- Rule out other causes of red eye (*see Table 1, in "Red Eye," above, this chapter*).
- Uveitis (iritis)
- Macular degeneration

COMPLICATIONS

- Loss of vision
- Loss of eye
- Development of glaucoma in other eye

DIAGNOSTIC TESTS

- Measure central and peripheral visual acuity
- Measure intraocular pressure with Schiøtz tonometry (normal range is 10–20 mm Hg); if pressure > 21 mm Hg, investigations should be initiated, especially if patient is symptomatic

Eighty-five percent of patients with intraocular pressure > 21 mm Hg do not have glaucoma and will not develop this condition in the next 5 years. Unless tonometry is performed frequently and accurately with precise instruments, the results may be inaccurate; therefore the screening value of tonometry has been challenged.

MANAGEMENT

Goals of Treatment

- Identify condition quickly
- Relieve pain
- Preserve vision by reducing intraocular pressure

If the intraocular pressure is not reduced, glaucoma may develop in the unaffected eye because of a sympathetic response.

Appropriate Consultation

Consult a physician immediately.

Nonpharmacologic Interventions

- Keep client at rest
- Support and reassure client to minimize anxiety
- Explain disease process and management

Pharmacologic Interventions

For nausea and vomiting:

dimenhydrinate (Gravol) (**A class drug**), 25–50 mg IM stat

For pain:

meperidine (Demerol) (**D class drug**), 50–100 mg IM stat

To constrict the pupil:

pilocarpine 2% (Isopto Carpine) (**B class drug**), 2 drops q15min for 1 h, then 2 drops q30–60min for 4 h, then 1 drop q4h

When pilocarpine is applied topically at frequent intervals over a short period, there is a possibility of systemic toxic side effects (sweating, retching, salivation and muscle tremors).

acetazolamide (Diamox) (**B class drug**), 250 mg PO or IV, may be used as an adjuvant drug to reduce production of aqueous humor if transfer to hospital is delayed

Referral

Medevac as soon as possible to ophthalmologist; this problem needs surgical intervention.

KERATITIS

DEFINITION

Inflammation of the cornea.

CAUSES

- Bacterial infection
- Prolonged, unprotected exposure to ultraviolet light (e.g., welders not using protective eyewear, people suffering from snow blindness)
- Overuse of contact lenses
- Immunosuppressed condition
- Trauma

HISTORY

- Symptoms range from moderate to severe
- Vision blurred
- Periocular pain
- Foreign-body sensation
- Severe photophobia
- Lid spasm may be present

PHYSICAL FINDINGS

- Moderate to acute distress
- Various degrees of lid edema, spasm
- Tearing may be present
- Purulent or mucoid discharge may be present
- Conjunctiva injected red, may have ciliary flush
- Pupils equal and reactive to light
- Visual acuity should be normal, although it may be blurred
- Corneal opacification may be present
- Fragmented corneal-light reflex
- Punctate roughening of cornea seen with fluorescein staining

DIFFERENTIAL DIAGNOSIS

- Conjunctivitis
- Uveitis (iritis)
- Corneal abrasion
- Corneal foreign-body irritation

COMPLICATIONS

- Corneal scarring or loss of vision

DIAGNOSTIC TESTS

- Measure visual acuity of both eyes
- Stain tear film with sterile fluorescein strips or drops
- Determine the amount of uptake of the dye on the cornea (an indicator of the degree of corneal involvement); usually the cornea will have a punctate pattern of dye uptake across the lower half

MANAGEMENT

Goals of Treatment

- Relieve discomfort
- Prevent recurrence

Appropriate Consultation

Consult a physician if this disorder is suspected.

Nonpharmacologic Interventions

Double-patch the eyes firmly but comfortably (remember, the client cannot see anything with both eyes patched; provide reassurance and assistance with all movements).

Client Education

Advise client that condition can be prevented by wearing protective eyewear while outside, especially on sunny winter days, or when using welding equipment.

Pharmacologic Interventions

Instill a topical anesthetic eye drop to relieve discomfort:

tetracaine 0.5% (Pontocaine) (**D class drug**), 2 drops

Instill a generous amount of a topical antibiotic eye ointment into the lower conjunctival sac:

sulfacetamide 10% (Cetamide) (**A class drug**)

Manage pain with simple analgesics:

acetaminophen (Tylenol) (**A class drug**), 500 mg 1–2 tabs PO q4h prn

Referral

Medevac immediately to ophthalmologist because diagnosis is complex, and expedient, specific treatment is imperative to prevent loss of vision.

HERPETIC KERATITIS

DEFINITION

Viral infection of the cornea with ulcer formation.

CAUSE

Herpes simplex or herpes zoster.

HISTORY

- May be first episode or latest of series of episodes
- Often preceded by upper respiratory tract infection with fever
- Acute onset with severe unilateral pain
- With recurrence, pain becomes less severe
- Mild photophobia
- Blurred vision
- Tearing

PHYSICAL FINDINGS

- Heart rate may be mildly elevated
- Mild to moderate distress
- Visual acuity normal
- Diffuse redness of eye
- Perilimbal flush may be present
- Pupils react briskly to light
- Dendritic ulcer visible with fluorescein staining

DIFFERENTIAL DIAGNOSIS

- Rule out other causes of red eye (*see Table 1, in "Red Eye," above, this chapter*).

COMPLICATIONS

- Chronic scarring of the cornea with reduced vision
- Recurrent exacerbations
- Uveitis (iritis)
- Perforation of cornea

DIAGNOSTIC TESTS

- Measure visual acuity
- Apply fluorescein stain to confirm dendritic ulcer on cornea (the key physical clue to the diagnosis)

MANAGEMENT

Goals of Treatment

- Identify or prevent associated iritis or uveitis
- Relieve symptoms
- Preserve corneal function

Nonpharmacologic Interventions

Double-patch the eyes firmly but comfortably (remember, the client cannot see anything with both eyes patched; provide reassurance and assistance with all movements).

Pharmacologic Interventions

Instill a topical anesthetic eye drop to relieve discomfort:

tetracaine 0.5% (Pontocaine) (**D class drug**), 2 drops

Manage pain with simple analgesics:

acetaminophen (Tylenol) (**A class drug**), 500 mg, 1–2 tabs PO q4h prn

Referral

Refer immediately to ophthalmologist because diagnosis is complex, and expedient, specific treatment is imperative to prevent loss of vision.

CHEMICAL BURNS

DEFINITION

Ocular injury from acidic or alkaline liquids or powders.

Alkali burns can be more serious because tiny particles may be left behind even after the agent has been removed; these residues can cause progressive damage to the eye.

CAUSE

Improper protection of the eyes while working with these materials.

HISTORY

Institute first-aid treatment immediately upon learning that a chemical has come in contact with the eye. The detailed history can be obtained later.

- Name of the material (alkaline burns are more serious than acidic burns)
- Time when accident occurred (as accurate as possible)
- Was irrigation attempted? For how long?
- Was exposure bilateral or unilateral?
- Did material enter the eye or was it only splashed on the lids?
- Severe pain and burning of the eye (there may be no pain if burn is severe)
- Lid spasm
- Photophobia
- Reduced vision
- If the client inhaled or swallowed any of the substance, assess other body systems (e.g., gastrointestinal, respiratory)

PHYSICAL FINDINGS

- Heart rate may be elevated (because of pain or fear)
- Blood pressure may be elevated (because of pain or fear)
- Client may be in acute distress

Mild Injury

- Haziness of cornea
- Injection of conjunctiva
- Intraocular pressure normal

Moderate Injury

- Corneal opacity
- Blurring of iris detail
- Minimal ischemic necrosis of conjunctiva and sclera (partial blanching)
- Intraocular pressure may become elevated

Severe Injury

- Marked corneal edema and haze
- Blurring of pupillary outline
- Blanching of conjunctiva and sclera (marked whitening of the external eye)
- Intraocular pressure elevated

With alkaline burns, there is often an immediate, rapid rise in intraocular pressure.

COMPLICATIONS

- Various degrees of permanent loss of vision
- Loss of eye
- Acute angle-closure glaucoma

DIAGNOSTIC TESTS

– Measure visual acuity of both eyes
– Apply fluorescein stain

MANAGEMENT

Goals of Treatment

– Dilute the toxic chemical *immediately*
– Minimize corneal damage

Appropriate Consultation

Consult physician about further care once emergency first-aid irrigation has diluted the chemical.

Nonpharmacologic Interventions

– Irrigate the eye immediately with large amounts of normal saline IV solution; continue irrigation for 20 minutes. Direct a forceful stream across the cornea and into the conjunctival cul-de-sac
– Have client shift gaze so that the entire cul-de-sac can be flushed
– After the eye has been well irrigated, inspect it for any residual chemical particles (e.g., small pieces of lime in the conjunctival sacs); try to remove these with further irrigation or with a moistened cotton-tipped applicator
– If a corneal defect is noted on examination, double-patch the eye with sterile eye pad and protect with an eye shield

Pharmacologic Interventions

It may be necessary to instill a topical eye anesthetic if lid spasm is severe. *Do not* force lid open or instill any drops if there is concern of a ruptured globe:

tetracaine 0.5% (Pontocaine) (**D class drug**), 2 drops

To control pain:

acetaminophen (Tylenol) (**A class drug**), 325 or 500 mg, 1–2 tabs PO q4h prn

or

acetaminophen with codeine (Tylenol #2) (**C class drug**), 1–2 tabs PO q4h prn if pain moderate or severe

Monitoring and Follow-Up

Monitor for the development of post-burn glaucoma.

Referral

Refer to an ophthalmologist immediately after emergency treatment if you find one or more of the following:

– Acid or alkali burn
– Subnormal visual acuity
– Severe conjunctival swelling
– Corneal clouding

BLUNT OR LACERATING OCULAR TRAUMA

DEFINITION

Traumatic injury to the eye or surrounding structures.

CAUSES

Blunt or lacerating trauma may cause a variety of injuries to the eye and its surrounding structures. Blunt trauma associated with fights, sports injuries or motor vehicle crashes can also result in serious damage. Most often, blunt trauma causes a contusion, but a strong impact may cause tissues to be torn.

There are 6 types of injuries:

– Contusion of globe and/or orbital tissues
– Orbital fracture (contusions limited to the orbital tissues and fractures of the orbits are much less threatening to vision but may be associated with significant coincident facial and intracranial injuries)
– Laceration of the ocular adnexa or globe, one of the more serious injuries (a ruptured globe is the most dangerous outcome of either blunt or lacerating trauma)
– Intraocular hemorrhage
– Retinal detachment
– Complicated eyelid lacerations (less dangerous but potentially serious)

Lacerations of the globe may be hard to find. Presume rupture of the globe if it has occurred before or if there is evidence of severe forceful trauma.

HISTORY

– Note mechanism of injury: What hit the eye? Where did it hit (eye, forehead or cheek)?
– How hard was the blow? When did it occur?
– Determine whether a penetrating injury is possible or whether the injury is limited to the structures around eye
– Swelling and pain around eye
– Pain deep in the eye may be present
– Reduced vision due to lid edema, retinal damage, corneal damage, dislocated lens, ruptured globe

PHYSICAL FINDINGS

Inspect only. *Do not palpate the globe*. It may be difficult or impossible to examine the globe because of associated swelling. Do not force the lid open. Avoid putting direct pressure on globe and bony structures.

- Moderate to severe distress
- Pulse may be elevated
- Blood pressure may be elevated
- Swelling and bruising around the eye
- Deformity of the bone may be present
- Visual acuity may be diminished (do not test if doing so requires forcing the lid open or instilling drops)
- Conjunctival ecchymosis and swelling
- Pupil reaction to light should be normal; suspect globe damage if it is abnormal
- Red reflex should be present; suspect retinal detachment or lens damage if it is abnormal
- Note presence of hyphema (blood in the anterior chamber)
- Extraocular movement should be normal; *suspect a fracture of the floor of the bony orbit* if there is some limitation of the upward gaze of the affected eye
- Tenderness of bony structures

COMPLICATIONS

- Loss of vision
- Retinal detachment
- Dislocation of lens
- Acute angle-closure glaucoma
- Rupture of globe
- Hyphema
- Fracture of orbital bone
- Laceration of eyelid

DIAGNOSTIC TESTS

Measure visual acuity in both eyes (but do not perform this test if doing so requires forcing open the lid or use of anesthetic drops).

MANAGEMENT

Goals of Treatment

- Identify serious injuries to the eye or orbital bone
- Protect the eye from further damage

Appropriate Consultation

Consult a physician immediately if serious injuries are identified or suspected.

Nonpharmacologic Interventions

- Cover the eye *loosely* with a sterile gauze and apply an eye shield to prevent further injury; do not instill any medications into the eye
- Keep the client at rest in a half-sitting position

Referral

Medevac to the care of an ophthalmologist if any of the following are suspected or confirmed after inspection:

- Severe pain
- Subnormal visual acuity
- Severe conjunctival ecchymosis
- Hyphema (blood in the anterior chamber)
- Irregular pupil
- Corneal or scleral laceration
- Deformation or laceration of globe
- Laceration of lid

MINOR SOFT-TISSUE CONTUSION

If serious injuries to the eyeball, eyelids or orbit have been ruled out, swelling or bruising of the soft tissues around the eye is not considered serious.

MANAGEMENT

Goals of Treatment

- Symptomatic care
- Prevent further injury

Nonpharmacologic Interventions

- Cold compresses several times daily to reduce the swelling
- Eye shield for 1–2 days to protect eye from further injury
- Use of protective eyewear when engaged in high-risk activities or occupations such as contact sports, carpentry or sheet-metal work

Pharmacologic Interventions

Analgesia to control discomfort:

acetaminophen (Tylenol) (**A class drug**), 325 or 500 mg, 1–2 tabs PO q4h prn

or

ibuprofen (Motrin) (**A class drug**), 200 mg, 1–2 tabs PO q4h prn

Monitoring and Follow-Up

See client in 2 or 3 days, once swelling goes down, to re-examine the eye thoroughly for injury.

UVEITIS (IRITIS)

DEFINITION

Inflammation of the uveal tract (iris, ciliary body or choroid). This may involve one or all three portions of the uveal tract. The most frequent form is acute anterior uveitis (iritis).

CAUSES

Usually idiopathic, but may be associated with systemic disease (Reiter's syndrome, ankylosing spondylitis, sarcoidosis, juvenile arthritis, herpes simplex, herpes zoster) or may be a complication of ocular trauma such as corneal abrasion.

HISTORY

- Acute onset with moderate to severe unilateral periocular pain
- Photophobia
- Tearing
- Vision blurred and may be decreased
- Possible history of similar previous episodes
- History of other associated systemic disease

PHYSICAL FINDINGS

- Patient may appear to be in acute distress
- Heart rate may be elevated
- Visual acuity reduced in affected eye
- Conjunctiva reddened
- Perilimbal (ciliary) flush present
- Cornea clear with white precipitates
- Border of iris may be blurred
- Pupil small, possibly irregular in shape and poorly reactive to light
- Hypopyon (pus in the anterior chamber) may be present

DIFFERENTIAL DIAGNOSIS

- Rule out other causes of red eye (*see Table 1, in "Red Eye," above, this chapter*).

COMPLICATIONS

- Acute angle-closure glaucoma
- Posterior adhesions (synechiae)
- Reduced vision

DIAGNOSTIC TESTS

Measure visual acuity, if possible.

MANAGEMENT

Goals of Treatment

Early identification.

Appropriate Consultation

Consult a physician *immediately* for a management plan.

Nonpharmacologic Interventions

- Explain disease process and management plan
- Support and reassure client to reduce anxiety
- Use a metal or opaque plastic eye shield to cover and protect the eye
- Do not put any pressure on the eyeball
- Client should wear sunglasses if a shield is unavailable

Pharmacologic Interventions

Initial management usually consists of a fast-acting topical eye drop to dilate the pupil. This relieves pain (caused by spasm of ciliary and iris muscles) and prevents formation of a scar between the pupillary border and the anterior lens capsule (posterior synechia):

cyclopentolate 1% (Cyclogyl) (**B class drug**), 1 drop q6h

or

tropicamide 1% (Mydriacyl) (**B class drug**), 1 drop q6h

The dilating and antispasmodic effects are maximal in 30–60 minutes, and usually last from 3 to 6 hours.

These medications may increase the intraocular pressure and lead to acute glaucoma. This risk is greatest in older patients.

Referral

Medevac to the care of an ophthalmologist.

CHAPTER 2 – EARS, NOSE AND THROAT (ENT)

Table of Contents

ASSESSMENT OF THE EARS, NOSE AND THROAT

HISTORY OF PRESENT ILLNESS AND REVIEW OF SYSTEM

GENERAL

The following characteristics of each symptom should be elicited and explored:

- Onset (sudden or gradual)
- Chronology
- Current situation (improving or deteriorating)
- Location
- Radiation
- Quality
- Timing (frequency, duration)
- Severity
- Precipitating and aggravating factors
- Relieving factors
- Associated symptoms
- Effects on daily activities
- Previous diagnosis of similar episodes
- Previous treatments
- Efficacy of previous treatments

CARDINAL SYMPTOMS

In addition to the general characteristics outlined above, additional characteristics of specific symptoms should be elicited, as follows.

Ears

- Recent changes in hearing
- Compliance with and effectiveness of hearing aid
- Itching
- Earache
- Discharge
- Tinnitus
- Vertigo
- Ear trauma

Nose

- Nasal discharge or postnasal drip
- Epistaxis
- Obstruction of airflow
- Sinus pain
- Itching
- Nasal trauma

Mouth and Throat

- Dental status
- Oral lesions
- Bleeding gums
- Sore throat
- Dysphagia (difficulty swallowing)
- Hoarseness or recent voice change

Neck

- Pain
- Swelling
- Enlarged glands

Other Associated Symptoms

- Fever
- Malaise
- Nausea or vomiting

MEDICAL HISTORY (SPECIFIC TO ENT)

- Frequent ear or throat infections
- Sinusitis
- Trauma to head or ENT area
- ENT surgery
- Audiometric screening results indicating hearing loss
- Allergies
- Prescription or over-the-counter medications used regularly

FAMILY HISTORY (SPECIFIC TO ENT)

- Others at home with similar symptoms
- Seasonal allergies
- Asthma
- Hearing loss
- Menière's disease
- ENT cancer

PERSONAL AND SOCIAL HISTORY (SPECIFIC TO ENT)

- Frequent exposure to water (swimmer's ear)
- Use of foreign object to clean ear
- Crowded living conditions
- Dental hygiene habits
- Exposure to smoke or other respiratory toxins
- Recent air travel
- Occupational exposure to toxins or loud noises

EXAMINATION OF THE EARS, NOSE AND THROAT

GENERAL APPEARANCE

- Apparent state of health
- Degree of comfort or distress
- Color (flushed or pale)
- Nutritional status (obese or emaciated)
- Match between appearance and stated age
- Difficulty with gait or balance

EARS

Inspection

- Pinna: lesions, abnormal appearance or position
- Canal: discharge, swelling, redness, wax, foreign bodies
- Ear drum: color, light reflex, landmarks, bulging or retraction, perforation, scarring, air bubbles, fluid level

Estimate hearing with a watch or whisper test; perform screening audiometry or tympanography (if equipment available).

Palpation

- Tenderness over tragus or mastoid process
- Tenderness on manipulation of the pinna
- Pre- or post-auricular nodes

NOSE

Inspection

- External: inflammation, deformity, discharge, bleeding
- Internal: color of mucosa, edema, deviated septum, polyps, bleeding points
- Transilluminate sinuses for dulling of light reflex

Palpation

Sinus and nasal tenderness.

Percussion

Sinus and nasal tenderness.

MOUTH AND THROAT

Inspection

- Lips: color, lesions, symmetry
- Oral cavity: breath odor, color, lesions of buccal mucosa
- Teeth and gums: redness, swelling, caries
- Tongue: color, texture, lesions, tenderness of floor of mouth
- Throat: color, tonsillar enlargement, exudate

NECK

Inspection

- Symmetry
- Swelling
- Masses
- Redness
- Thyroid enlargement

Palpation

- Tenderness, enlargement, mobility, contour and consistency of nodes and masses
- Thyroid: size, consistency, contour, position, tenderness

COMMON PROBLEMS OF THE EARS AND NOSE

OTITIS EXTERNA

DEFINITION

Infection or inflammation of the ear canal.

Mild otitis externa

Inflammation confined to the canal. No significant narrowing of the canal. May or may not be purulent.

Moderate otitis externa

Significant narrowing of the canal and significant swelling of soft tissue.

Severe otitis externa

Significant obstruction of the canal. Invasion of soft tissues, especially along the floor of the canal and extending medially, as is often seen in malignant otitis externa.

CAUSES

- Gram-negative rods: *Proteus, Pseudomonas*
- Gram-positive cocci (less common): *Staphlylococcus, Streptococcus*
- Fungal infection (e.g., candidiasis)
- Predisposing factors: hearing aids, narrow ear canal, use of cotton-tipped applicators, use of ear plugs, swimming in contaminated water
- Risk factors: immunocompromise (e.g., in patients with diabetes or cancer and those who have undergone transplantation), use of systemic steroid medication

HISTORY

- Ear pain (otalgia)
- Pruritis or irritation
- Purulent discharge from canal (cheesy white, greenish blue or gray)
- Recent exposure to water or mechanical trauma
- Reduced hearing or feelings of fullness in ear may be present

PHYSICAL FINDINGS

- Temperature may be elevated
- Redness and edema of ear canal and pinna
- Purulent exudate or debris in canal
- Tympanic membrane usually normal (may be slightly reddened)
- If edema and debris are severe, it may be impossible to visualize the tympanic membrane
- Manipulation of pinna or pressure on tragus causes pain
- Peri-auricular and anterior cervical nodes may be enlarged and tender

DIFFERENTIAL DIAGNOSIS

- Acute otitis media with perforation
- Skin condition involving the ear
- Mastoiditis
- Furuncle in canal
- Foreign-body irritation

COMPLICATIONS

- Severe otitis externa with closure of canal
- Cellulitis of the external ear and face

DIAGNOSTIC TESTS

Swab for culture and sensitivity if there is any exudate (so that antimicrobial therapy can be tailored to the organism, should initial treatment fail).

MANAGEMENT

Goals of Treatment

- Relieve pain
- Prevent recurrence
- Prevent extension of infection

Appropriate Consultation

Consultation usually not needed, unless cellulitis of the external ear or face is present, the problem is recurrent or the client is immunocompromised.

Nonpharmacologic Interventions

- Debriding the canal is critical, and the importance of this step cannot be overemphasized
- Clean the outer ear and the canal with normal saline and gently debride the area of debris and exudate with a gauze wick
- If there is significant drainage or if there is threat of further narrowing, an ear wick (1 inch [2.5 cm] of cotton or gauze), threaded gently into the canal and left there, will help keep the canal open and ensure that medicated drops reach the distal part of the canal
- Change wick daily

Client Education

- Counsel client about appropriate use of medications (if possible, have another family member instill drops and clean the ear)
- Counsel client about proper ear hygiene before instilling medications
- Advise client about preventing recurrent irritation (e.g., client should not use cotton-tipped applicators in the ears)
- Recommend proper drying of ears after swimming or use of ear plugs while swimming
- Counsel client about proper hygiene of hearing aids and ear plugs

For recurrent episodes, start the client on prophylactic measures:

Burrow's solution (Buro-Sol otic solution) (**A class drug**), 2 or 3 drops after swimming or showers

or

vinegar, full or half strength, 2 or 3 drops after swimming or showers

Pharmacologic Interventions

Manage pain with simple analgesics:

acetaminophen (Tylenol) (**A class drug**), 325 or 500 mg, 1–2 tabs PO q4–6h prn

Mild Otitis Externa

If condition very mild (i.e., no exudate and only mild inflammation), consider topical antiseptic:

Burrow's solution (Buro-Sol otic solution) (**A class drug**), 2 or 3 drops tid or qid

Some studies show no difference in clinical outcome between topical antiseptic and topical gentamicin antibiotic drops.

Moderate Otitis Externa

If inflammation and purulence are more significant, or if therapy described above has failed, start ear drops consisting of a combination of an antibiotic and an anti-inflammatory agent (steroid):

dexamethasone/framycetin (Sofracort otic drops) (**A class drug**), 2 drops tid or qid for 7–10 days

or

hydrocortisone/neomycin/polymyxin B (Cortisporin otic solution) (**A class drug**), 2 drops tid or qid for 7–10 days

or

betamethasone (Garasone otic drops) (**C class drug**), 2 drops tid or qid for 7 days

If perforation of the tympanic membrane is suspected, Garasone should probably be avoided, because of the risk of ototoxicity if aminoglycosides (such as the garamycin in Garasone) are used for more than 7 days in the presence of such perforation.

Severe Otitis Externa

See "Referral," below.

Fungal Otitis Externa

Fungal organisms can cause otitis externa, especially in immunocompromised patients. In mild to moderate cases of otitis externa due to fungi treat with antifungal agents:

clotrimazole 1% cream (Canesten) (**A class drug**), apply bid

Monitoring and Follow-Up

- Follow up in 1–3 days (instruct client to return sooner if pain increases, or if fever develops despite therapy)
- Follow up 10 days after course of therapy is complete

Referral

- Immediately refer cases of severe otitis extema, which may require admission to hospital for IV antibiotic therapy
- Consult a physician for clients with recurrent episodes of otitis externa, especially if fungal organisms are the cause, to investigate for immunocompromising conditions

ACUTE OTITIS MEDIA

DEFINITION

Infection of the middle ear.

CAUSES

- Viral in 25% of cases
- Bacterial forms due to *Hemophilus influenzae*, *Moraxella catarrhalis*, *Staphylococcus aureus*, *Streptococcus pneumoniae*, *Streptococcus pyogenes*

Active or passive smoking is a major predisposing factor.

HISTORY

- General malaise and fever
- Ear pain (throbbing)
- Sensation of fullness
- Hearing decreased
- Tinnitus or roaring in ear, vertigo
- Purulent discharge if drum perforated
- Infection of the upper respiratory may be present concurrently or may precede the otitis media

PHYSICAL FINDINGS

- Temperature may be elevated
- Client may be mildly or moderately ill
- Tympanic membrane red, dull, bulging
- Bony landmarks obscured or absent
- Possible perforation and purulent discharge in canal
- Decreased mobility of tympanic membrane
- Bullae seen on tympanic membrane (but only in cases of mycoplasm infection)
- Peri-auricular and anterior cervical nodes enlarged and tender

DIFFERENTIAL DIAGNOSIS

- Acute otitis externa
- Transient middle-ear effusion (non-infection)
- Mastoiditis
- Trauma or foreign-body irritation
- Referred ear pain from dental abscess or temporomandibular joint dysfunction

COMPLICATIONS

- Reduced hearing
- Serous otitis media
- Mastoiditis
- Chronic otitis media
- Meningitis
- Epidural abscess
- Cholesteatoma

DIAGNOSTIC TESTS

- Swab any drainage for culture and sensitivity

MANAGEMENT

Goals of Treatment

- Relieve pain
- Prevent complications

Appropriate Consultation

Usually not necessary if condition is uncomplicated.

Nonpharmacologic Interventions

Client Education

- Recommend increased rest in the acute febrile phase
- Counsel client about appropriate use of medications (dosage, compliance, follow-up)
- Explain disease course and expected outcome (serous otitis media may persist for several weeks)
- Recommend avoidance of flying until symptoms have resolved

Pharmacologic Interventions

To relieve pain and fever:

acetaminophen (Tylenol) (**A class drug**), 325 or 500 mg, 1–2 tabs PO q4–6h prn

Antibiotic therapy:

amoxicillin (Amoxil) (**A class drug**), 250 mg PO tid for 10 days

or

sulfamethoxazole/trimethoprim (Septra DS) (**A class drug**), 1 tab PO bid for 10 days

or

erythromycin (E-Mycin) (**A class drug**), 250 mg PO qid for 10 days

Monitoring and Follow-Up

- Instruct client to return in 3 days if symptoms do not improve, or if symptoms progress despite therapy
- Follow up in 10–14 days: look for development of serous otitis media
- Assess hearing 1 month after treatment

Referral

Not necessary if condition is uncomplicated.

CHRONIC OTITIS MEDIA (PURULENT DRAINING EAR)

DEFINITION

Non-resolving or recurrent low-grade infection of the middle ear.

CAUSES

- *Proteus, Pseudomonas* or *Staphylococcus*
- Water contamination of the middle ear

HISTORY

- Hearing decreased
- Continuous foul-smelling discharge from the ear
- Tinnitus
- Usually no pain
- No fever

PHYSICAL FINDINGS

- Client appears generally well
- Foul-smelling purulent drainage from ear canal
- Perforation of tympanic membrane

DIFFERENTIAL DIAGNOSIS

- Chronic otitis externa
- Subacute otitis media

COMPLICATIONS

- Permanent, severe hearing loss
- Mastoiditis
- Cholesteatoma

DIAGNOSTIC TESTS

- Swab any drainage for culture and sensitivity

MANAGEMENT

Goals of Treatment

- Prevent complications
- Avoid unnecessary use of antibiotics

Appropriate Consultation

Consult a physician if symptoms do not respond to therapy.

Nonpharmacologic Interventions

Client Education

- Explain disease process and expected course
- Counsel client about appropriate use of medications (including compliance)
- Counsel client about ear hygiene: ear canal should be cleaned with 3% hydrogen peroxide before instilling medication to remove any exudate or debris (demonstrate the procedure to a family member and have this person perform the routine as instructed)
- Recommend proper drying of ears after swimming or use of ear plugs while swimming
- Counsel client about proper hygiene of hearing aids and ear plugs
- To prevent recurrence, recommend that ear canal be cleaned with Burrow's solution (Buro-Sol otic solution; **A class drug**) or a solution of half vinegar and half sterile water, 4–6 drops in the ear after exposure to water

Pharmacologic Interventions

Mild chronic otitis media

Topical antibiotic ear drop alone is sufficient:

dexamethasone/framycetin (Sofracort otic solution) (**A class drug**), 2 or 3 drops tid or qid for 10–14 days

or

hydrocortisone/neomycin/polymyxin B (Cortisporin otic solution) (**A class drug**), 4 drops tid or qid for 10–14 days

Moderate chronic otitis media

If there is significant soft-tissue involvement, systemic antibiotics are indicated:

sulfamethoxazole/trimethoprim (Septra DS) (**A class drug**), 1 tab PO bid for 14 days

or

cephalexin (Keflex) (**C class drug**), 250 mg PO qid for 14 days

or

amoxicillin/clavulanate (Clavulin) (**B class drug**), 250 mg PO tid for 14 days

Oral antibiotics should be used in combination with consistent cleansing of the canal and topical administration of antibiotic otic drops as described for mild chronic otitis media, above.

Monitoring and Follow-Up

Follow up in 7–14 days.

Referral

Referral to ENT specialist may be necessary if treatment fails or complications develop. Surgical intervention is sometimes required.

SEROUS OTITIS MEDIA (OTITIS MEDIA WITH EFFUSION)

DEFINITION

Presence of non-infective fluid in the middle ear for longer than 3 months without symptoms or signs of acute infection.

CAUSES

- Dysfunction of eustachian tube
- Predisposing factors: viral infection of the upper respiratory tract, allergies, barotrauma, enlargement of adenoids, recent acute otitis media

HISTORY

- Exposure to one of the predisposing factors
- Reduced hearing in affected ear
- Sensation of fullness in ear
- Nose and ears may be itchy
- Pain mild or absent
- Fever absent

PHYSICAL FINDINGS

- Tympanic membrane intact, dull, retracted or hypomobile
- Presence of clear fluid, air bubbles or air–fluid level behind the tympanic membrane
- Bony landmarks usually accentuated because of retraction of the tympanic membrane
- Audiometric screening may show a decrease in hearing
- Abnormal hearing test results (conductive loss)

DIFFERENTIAL DIAGNOSIS

- Dysfunction of eustachian tube
- Nasopharyngeal tumor (if problem longstanding)

COMPLICATIONS

- Secondary infection (purulent acute otitis media)
- Chronic serous otitis media
- Hearing loss
- Impacted cerumen

DIAGNOSTIC TESTS

None.

MANAGEMENT

Goals of Treatment

- Identify underlying cause
- Relieve symptoms
- Prevent hearing loss

Appropriate Consultation

Consult a physician if effusion with significant hearing loss (more than 20 dB) persists for more than 2–3 months.

Nonpharmacologic Interventions

Client Education

- Explain disease process and expected outcomes
- Offer support and reassurance, as symptoms can last a long time (2–3 months)
- Counsel client about appropriate use of medications (dosage and compliance)
- Recommend avoidance of flying until signs and symptoms have resolved
- Discuss signs and symptoms of purulent otitis media; advise client to return to clinic if they occur
- Instruct client to gently try to equalize pressure between middle ear and throat, using a simple maneuver such as yawning or chewing gum

Pharmacological Interventions

Most studies indicate that antihistamines and decongestants are ineffective, but some clients may derive symptomatic relief. Try a short course.

Oral antihistamine or decongestant (or both):

pseudoephedrine (Sudafed) (**A class drug**), 30–60 mg PO tid or qid for 4–7 days

or

triprolidine (Actifed) (**A class drug**), 1 tab PO tid for 2–4 weeks

Start with the smaller dose and lower frequency. Instruct client to increase dose slowly to minimize any side effects (such as restlessness, insomnia, irritability, tremor).

Do not prescribe decongestants for elderly clients, for people with hypertension, heart disease, peripheral vascular disease, hyperthyroidism, previous acute angle-closure glaucoma or previous urinary retention, or for anyone taking monoamine oxidase inhibitors or antidepressants.

Monitoring and Follow-Up

Monitor the response to therapy in 2–4 weeks. In particular, note any improvement in hearing or decrease in tinnitus.

Reassess hearing, preferably with screening audiometry (if available).

Referral

Refer to an ENT physician if effusion persists after 3 months.

CERUMINOSIS (IMPACTED CERUMEN)

DEFINITION

Obstruction of the ear canal by cerumen (ear wax).

CAUSES

Cerumen is produced naturally by the ear canal and is normally cleared by the body's own mechanisms. Occasionally, cerumen is produced in excessive amounts and partially or totally occludes the ear canal.

HISTORY

- Ear pain
- Sensation of fullness
- Itching
- Conductive hearing loss

PHYSICAL FINDINGS

- Hardened wax blocks canal
- Canal may be reddened and swollen

DIFFERENTIAL DIAGNOSIS

- Foreign-body irritation
- Otitis media
- Otitis externa

COMPLICATIONS

- Hearing loss
- Otitis externa

DIAGNOSTIC TESTS

None.

MANAGEMENT

Goals of Treatment

- Remove wax
- Treat any underlying irritation of the canal

Appropriate Consultation

Consulting a physician is usually not necessary.

Nonpharmacologic Interventions

- Inject lukewarm water with an ear syringe until wax is cleared
- Sometimes it is helpful to soften the wax with a few drops of slightly warmed mineral oil or baby oil before attempting to irrigate the ear
- To prevent cerumenosis, anyone who produces large amounts of cerumen can periodically (once or twice weekly) instill 3 drops of a 1:1 solution of hydrogen peroxide and water into each ear to decrease the likelihood of impaction. One or two drops of baby oil once or twice weekly will help to keep wax soft.

Monitoring and Follow-Up

Advise client to return as necessary if symptoms recur.

LABYRINTHITIS

DEFINITION

Disorder of the vestibular labyrinth in the inner ear.

CAUSES

- Viral infection
- Mismatch of vestibular, visual and somatosensory systems, triggered by an external stimulus, such as a stop after whirling turns or motion sickness
- Tumors within the vestibular pathways
- Ototoxic drugs, especially aminoglycosides
- Head injury
- Neuronitis
- Vasculitis

HISTORY

- Vertigo (most prominent symptom)
- Dizziness
- Nausea and vomiting
- Fluctuating hearing loss
- Tinnitus
- Malaise
- Perspiration

PHYSICAL FINDINGS

- Diaphoresis
- Increased salivation
- Nystagmus

DIFFERENTIAL DIAGNOSIS

- Benign positional vertigo
- Menière's disease
- Chronic bacterial mastoiditis
- Drug-induced damage to the vestibular labyrinth
- Acoustic neuroma
- Multiple sclerosis
- Temporal-lobe epilepsy

COMPLICATIONS

- Permanent hearing loss
- Falls potentially leading to injury

DIAGNOSTIC TESTS

None.

MANAGEMENT

Goals of Treatment

- Identify and treat underlying disorder if anything other than viral labyrinthitis is suspected
- Supportive treatment of symptoms only

Appropriate Consultation

Consult a physician if the client's symptoms persist for more than 1 week with therapy or if anything other than a simple viral illness is suspected.

Nonpharmacologic Interventions

Advise client to rest in a darkened room with eyes closed during acute attacks (otherwise activity as tolerated).

Pharmacologic Interventions

Treat nausea and vomiting:

dimenhydrinate (Gravol) (**A class drug**), 50–75 mg q6h prn

Monitoring and Follow-Up

Follow up in 1 or 2 days to monitor symptom control. Ensure that the client remains hydrated if nausea or vomiting is significant.

Referral

Referr to a physician if anything other than viral labyrinthitis is suspected, especially if attacks are severe or recurrent. A neurology consult may be necessary to identify and treat underlying disorder.

MENIÈRE'S DISEASE

DEFINITION

An inner-ear disorder in which there is an increase in volume and pressure of the innermost fluid in the middle ear, which results in recurrent attacks of a cluster of symptoms.

CAUSES

- Unknown, but the best theory suggests that it is an inner-ear response to an injury (e.g., reduced inner ear pressure, allergy, endocrine disease, lipid disorder, vascular disorder, viral infection)
- A more recent theory suggests that it results from intracranial compression of a balancing nerve by a blood vessel

Risk Factors

- Caucasian heritage
- Stress
- Allergy
- High salt intake
- Exposure to noise

HISTORY

- Occurs as attacks with intervening periods of remission
- Fluctuating loss of low-frequency hearing
- Vertigo (spontaneous attacks lasting from 20 minutes to several hours)
- Sensation of fullness in the ear
- Nausea, vomiting
- Falling
- Prostration (inability to stand up because motion increases symptoms)

PHYSICAL FINDINGS

- Pallor
- Sweating
- Distress, prostration
- May be some measure of dehydration if vomiting is severe
- Audiometry testing with pure tones may show low-frequency sensorineural nerve loss and impaired speech distinction
- Tuning fork tests (Weber and Rinne) confirm validity of the audiometry results

DIFFERENTIAL DIAGNOSIS

- Viral labyrinthitis
- Benign positional vertigo
- Acoustic tumor
- Syphilis
- Multiple sclerosis
- Vertebrobasilar disease

COMPLICATIONS

- Hearing loss
- Injury from falls during attacks
- Inability to work
- Failure to diagnose acoustic neuroma

DIAGNOSTIC TESTS

None.

MANAGEMENT

Goals of Treatment

- Control symptoms
- Ascertain underlying cause

Appropriate Consultation

Consult physician for help with diagnosis (not urgent so long as client is stable and symptoms are controlled with treatment).

Nonpharmacologic Interventions

Client Education

Counsel client about prevention of attacks: stress-reduction strategies, avoidance of excessive salt intake, smoking cessation, avoidance of prolonged exposure to noise (client should use ear protectors), avoidance of ototoxic medications such as acetylsalicylic acid (ASA).

Pharmacologic Interventions

For acute attack, control nausea and vomiting:

dimenhydrinate (Gravol) (**A class drug**), 50 mg IM or PO q4h prn

Monitoring and Follow-Up

Assess hearing at least annually in clients with stable symptoms.

Referral

Refer to a physician if symptoms are not controlled or if hearing loss is evident. A neurology consult may be necessary to identify and treat underlying disorder.

RHINITIS

There are 3 types of rhinitis to consider in the differential diagnosis of nasal congestion and rhinorrhea (runny nose).

DEFINITION

Allergic rhinitis: Reactive inflammation of the nasal mucosa.

Vasomotor rhinitis: Perennial inflammation of the nasal mucosa, which represents a hyperreactive state of the nasal mucosa (nonallergic).

Viral rhinitis (infection of upper respiratory tract): Viral infection confined to the upper respiratory tract. Usually mild and self-limiting.

CAUSES

Allergic Rhinitis

Sensitivity to inhaled allergens (pollens, grasses, ragweed, dust, molds, animal dander, smoke).

Vasomotor Rhinitis

- Unknown; symptoms do not correlate with exposure to specific allergens
- Attacks may be triggered by abrupt changes in temperature or barometric pressure, odors or emotional stress.

Viral Rhinitis (Infection of Upper Respiratory Tract)

Numerous viral agents.

HISTORY

Allergic Rhinitis

- Seasonal or perennial symptoms
- History of familial allergies
- Asthma or eczema may be present
- Paroxysmal sneezing
- Itchy nose
- Nasal congestion
- Excessive, continuous, clear, watery nasal discharge
- Eyes may be itchy or watery
- Ears may be itchy
- General malaise and headache may be present
- Symptoms worst in the morning and least during the day, worsening again during the night
- Postnasal drip
- Breathing through the mouth
- Snoring and dry cough at night may be present

Vasomotor Rhinitis

- Sudden onset of nasal congestion
- Perennial symptoms
- Persistent postnasal drip
- Intermittent throat irritation
- No response to environmental controls and medications
- Sensation of constantly needing to clear throat
- Changes in acuity of hearing or smell
- Snoring at night
- Fatigue

Viral Rhinitis (Infection of Upper Respiratory Tract)

- Non-productive cough or cough that produces clear sputum
- Low-grade fever
- Nasal congestion with clear nasal discharge
- Sneezing
- Postnasal drip
- Scratchy throat
- Mild headache and general malaise
- Pressure in ears

PHYSICAL FINDINGS

Allergic Rhinitis

- Injected conjunctiva may be present
- Eyes may tear
- Edema of the eyelids and periorbital area may be present
- Pale, edematous nasal mucosa is pink, with clear thin secretions
- Nasal polyps may be present
- Skin around nose may be irritated
- "Allergic salute" may be present
- Sinuses may feel tender if symptoms are severe

Vasomotor Rhinitis

- Vital signs usually normal
- Nasal mucosa red and swollen
- Nasal turbinates enlarged
- Throat may be slightly reddened because of irritation from postnasal drip
- Tonsils and adenoids may be enlarged
- Sinuses may feel tender if symptoms are severe

Viral Rhinitis (Infection of Upper Respiratory Tract)

- Temperature may be slightly elevated
- Client appears mildly ill
- Clear nasal discharge
- Skin around nares slightly irritated
- Ears normal
- Throat normal, mild erythema
- Sinuses may feel tender if symptoms are severe

DIFFERENTIAL DIAGNOSIS (ALL TYPES)

- Acute or chronic sinusitis
- Abuse of nose drops
- Abuse of drugs or solvents (e.g., cocaine, gas, glue)
- Foreign body in nares
- Nasal polyps
- Deviated septum
- Hypothyroidism as a cause of the nasal congestion
- Nasal congestion induced by pregnancy or use of oral contraceptives

COMPLICATIONS (ALL TYPES)

- Otitis media
- Nasal polyps
- Epistaxis
- Enlargement of tonsils and adenoids
- Sinusitis

DIAGNOSTIC TESTS (ALL TYPES)

- Consider skin testing for allergies

MANAGEMENT (ALL TYPES)

Goals of Treatment

- Relieve and suppress symptoms
- Identify the underlying allergen(s)
- Prevent complications

Nonpharmacologic Interventions

Environmental control is important. Eliminate or reduce known allergen(s) in the environment wherever possible, or avoid them altogether.

Client Education

- Recommend increasing fluid intake to improve hydration
- Counsel client about appropriate use of medications (dose, frequency, side effects, avoidance of overuse)
- Recommend avoidance of caffeine
- Recommend avoidance of known allergens (client should keep living area clear of dust, avoid going outside when pollen count is high and use synthetic fibers in bedding and clothing) and removal of pets (to eliminate animal dander)
- Counsel client about preventing spread of viral rhinitis to other household members
- Recommend frequent hand-washing, appropriate disposal of used facial tissues, and covering of mouth and nose when coughing or sneezing

Pharmacologic Interventions

Allergic and Vasomotor Rhinitis

Normal saline nasal drops, prn, to wash out mucus and any inhaled allergen.

Oral antihistamines to treat acute symptoms of runny nose, sneezing, itch, and conjunctival symptoms (but these will not help nasal congestion):

chlorpheniramine (Chlor-Tripolon) (**A class drug**), 4 mg PO qid

or

cetirizine (Reactine) (**A class drug**), 10 mg od

or

loratadine (Claritin) (**A class drug**), 10 mg od

Oral antihistamine and decongestant combination drugs can provide the antihistamine effects and relieve nasal obstruction (use for 4–7 days to avoid rebound effect):

pseudoephedrine (Sudafed) (**A class drug**), 1 tab PO tid prn

Antihistamines can cause drowsiness, dry mouth and urinary retention, and have additive effects with sedative drugs. Use with caution in elderly patients.

Topical nasal steroids are the mainstay of therapy for chronic allergic rhinitis and chronic vasomotor rhinitis and for maintenance and prophylactic treatment of these conditions. They can be used alone or in combination with the antihistamine and decongestant regimen.

Consult a physician about the use of inhaled nasal steroids if antihistamines and decongestants are not effective. Examples of common choices:

beclomethasone (Beconase aqueous) (**B class drug**), 50 µg/spray, 1 or 2 sprays each nostril bid

or

fluticasone (Flonase) (**B class drug**), 50 µg/spray, 2 sprays/nostril daily

or

triamcinolone (Nasocort) (**B class drug**), 2 sprays/nostril daily

Viral Rhinitis

The first step in relieving symptoms is to use a nasal decongestant for a short course (3 or 4 days):

xylometazoline (Otrivin) (**A class drug**), 0.1% spray, 1 spray/nostril od or bid

Oral antihistamines and decongestants can be tried if nasal medication fails (for 4–7 days, to avoid rebound effect):

pseudoephedrine (Sudafed) (**A class drug**), 1 tab PO tid prn

Antihistamines have little proven benefit in the treatment of the common cold.

Do not prescribe decongestants for elderly clients, for people with hypertension, heart disease, peripheral vascular disease, hyperthyroidism, previous acute angle-closure glaucoma or previous urinary retention, or for anyone taking monoamine oxidase inhibitors or antidepressants.

Manage fever:

acetaminophen (Tylenol) (**A class drug**), 325 or 500 mg, 1–2 tabs PO q4–6h prn

Monitoring and Follow-Up

Instruct client to return for further assessment if fever develops, or if symptoms have not resolved within 14 days.

Referral

Refer to a physician if symptoms of rhinitis are not controlled with initial treatment. Allergy testing, sinus radiography or other medications may be required.

ANTERIOR EPISTAXIS

DEFINITION

Localized bleeding from the anterior portion of the nasal septum.

CAUSES

- Trauma and irritation
- Foreign-body irritation
- Neoplasm (rare)
- Predisposing factors: allergic rhinitis, deviated nasal septum, infection of the upper respiratory tract, local vascular lesions

HISTORY

- Exposure to one or more of the predisposing factors
- Usually unilateral
- Profuse bleeding or blood-streaked nasal discharge
- Determine duration, amount and frequency of bleeding
- Use of anticoagulants, ASA products or other medications
- History of easy bruising or bleeding elsewhere (e.g., melena, heavy menstrual periods)
- Family history of bleeding disorders (von Willebrand's disease)

PHYSICAL FINDINGS

Examine client sitting up and leaning forward so that the blood will flow forward.

- Blood pressure normal unless bleeding is severe enough to cause loss of volume
- Heart rate may be elevated because of fear or if bleeding is severe enough to cause loss of volume
- Obvious deformity or displacement may be present
- Bleeding from anterior portion of septum may be present
- Inspect throat for posterior bleeding
- Sinuses may feel tender
- Septum may be deviated

DIFFERENTIAL DIAGNOSIS

- Mild infection of nasal mucosa
- Dryness and irritation of nasal mucosa
- Nasal fracture
- Foreign body
- Malignant lesion
- Tuberculosis
- Blood dyscrasias

DIAGNOSTIC TESTS

None.

MANAGEMENT

Goals of Treatment

- Stop loss of blood
- Prevent further episodes

Appropriate Consultation

Usually not necessary unless complications arise or serious underlying pathology is a concern.

Nonpharmacologic Interventions

Most bleeding will be stopped by application of pressure to both sides of the nose, with firm pressure against the nasal septum for 5–15 minutes.

Client Education

- Recommend increasing room humidity (client should keep a pot of water on the stove at all times, especially in winter)
- Counsel client about appropriate use of medications (dosage and side effects; avoidance of overuse)
- Recommend avoidance of known irritants and local trauma (nose-picking, forceful nose-blowing)
- Instruct client about first-aid control of recurrent epistaxis (sitting up and leaning forward; applying firm, direct pressure to nasal septum)
- Recommend use of ice packs to control acute bleeding
- Recommend liberal use of lubricants such as vasoline in the nares to promote hydration of the nasal mucosa
- Advise client to trim fingernails to avoid trauma from nose-picking

Pharmacologic Interventions

If direct pressure alone is insufficient to stop the bleeding:

epinephrine (**D class drug**), 1:1000 solution

Soak a cotton ball with epinephrine. Place the medicated cotton ball in the anterior portion of the nose. Press firmly against the bleeding nasal septum for 5–10 minutes.

If both of the above measures fail, the involved mucous membrane must be anesthetized and cauterized:

lidocaine topical (Xylocaine) (**A class drug**), 4%

Soak a cotton ball with lidocaine. Place the medicated cotton ball in the anterior portion of the nose. Firmly press against the bleeding nasal septum for 5 minutes. Next, apply a silver nitrate stick very gently to the site of bleeding. Cauterize as small an area as possible. Cautery should be used as a last resort, because it forms scar tissue.

Promote healing and prevent further bleeding by applying a nasal lubricant (petroleum jelly) in both nostrils tid or qid.

Monitoring and Follow-Up

Follow up as necessary if problem is recurrent or there is concern about a serious underlying problem.

Referral

Refer to a physician to rule out other pathologies if the problem is recurrent or if the client is older.

If there has been trauma (e.g., a fist fight), it is important to rule out septal hematoma. Management of hematoma of the nasal septum is surgical, and medevac is necessary.

ACUTE SINUSITIS

DEFINITION

Infection of mucous membranes lining the sinuses.

CAUSES

- Common: *Hemophilus influenzae, Moraxella catarrhalis*, *Streptococcus pneumoniae*
- Less common: *Chlamydia pneumoniae*, *Streptococcus pyogenes*, viruses, fungi
- Predisposing factors: common cold, allergies, deviated nasal septum, smoking, adenoidal hypertrophy, dental abscess, nasal polyps, trauma, foreign body, diving or swimming, neoplasms, cystic fibrosis

HISTORY

- Exposure to one or more of the predisposing factors
- Headache
- Facial pain
- Pressure over involved sinuses increases when bending forward
- Purulent nasal discharge, which may be tinged with blood
- Dental pain, especially of upper incisor and canine teeth
- General malaise may be present
- Fever may be present

PHYSICAL FINDINGS

- Temperature may be mildly elevated
- Client appears mildly to moderately ill
- Irritation of skin around nares
- Swollen nasal mucosa may be pale or dull red
- Nasal polyp may be present
- Dental abscess may be present
- Tenderness over involved sinuses
- Tenderness over a tooth
- Anterior cervical nodes may be enlarged and tender

DIFFERENTIAL DIAGNOSIS

- Dental abscess
- Nasal polyp(s)
- Tumor
- Presence of foreign bodies
- Periorbital cellulitis
- Infection of upper respiratory tract
- Allergic rhinitis
- Vasomotor rhinitis
- Cluster headache
- Migraine headache

COMPLICATIONS

- Contiguous spread of infection to intraorbital or intracranial structures
- Chronic sinusitis
- Periorbital cellulitis

DIAGNOSTIC TESTS

None.

MANAGEMENT

Goals of Treatment

- Identify predisposing factors
- Identify underlying dental abscess
- Relieve symptoms

Nonpharmacologic Interventions

Apply moist heat (such as with steam inhalation or warm compresses) to sinuses to help relieve pressure by loosening and liquefying thickened secretions. Normal saline nose drops also help to do this.

Client Education

- Recommend increased rest during acute phase
- Recommend increasing hydration (8–10 glasses of fluid per day)
- Counsel client about appropriate use of medications (dose, frequency, side effects)
- Recommend protection of sinuses from changes in temperature
- Recommend avoidance of irritants (e.g., smoke)
- Recommend avoidance of swimming, diving or flying during acute phase

Pharmacologic Interventions

Nasal decongestant sprays or drops may be used for the first 24–48 hours if congestion is marked. Topical decongestants are more effective than oral ones. Client should not use antihistamines (unless there is an allergic component to the symptoms), because these dry and thicken the secretions:

xylometazoline (Otrivin) (**A class drug**), 0.1% nasal spray, 1 or 2 sprays q8–12h prn

or

xylometazoline (Otrivin) (**A class drug**), 0.1% nasal drops, 2 or 3 drops q8–12h prn

or

phenylephrine (Neo-Synephrine) (**A class drug**), 0.25% nasal spray, 3 sprays q4–6h prn

or

phenylephrine (Neo-Synephrine) (**A class drug**), 0.25% nasal drops, 3 drops q4–6h prn

It is very important to limit the use of a nasal decongestant spray to a period of 4–7 days to avoid development of "rebound" nasal congestion when the nasal spray is withdrawn (a complication called rhinitis medicamentosa).

Manage pain and fever with simple analgesics:

acetaminophen (Tylenol) (**A class drug**), 325 or 500 mg, 1–2 tabs PO q4h prn

or

ibuprofen (Motrin) (**A class drug**), 200 mg, 1–2 tabs PO q4h prn

Oral antibiotics:

amoxicillin (Amoxil) (**A class drug**), 250–500 mg PO tid for 10–14 days

or

sulfamethoxazole/trimethoprim (Septra DS) (**A class drug**), 1 tab PO bid for 10–14 days

Monitoring and Follow-Up

Follow up in 10–14 days. Instruct client to return sooner if symptoms progress despite therapy or if symptoms fail to respond to therapy.

CHRONIC SINUSITIS

DEFINITION

Non-resolving inflammation of the mucous membranes lining the sinuses.

CAUSES

- Infection (bacterial anaerobes, *Staphylococcus aureus*, viruses)
- Structural abnormalities

HISTORY

- Prolonged nasal congestion (more than 30 days)
- Nasal discharge, intermittently purulent
- Postnasal drip may be present
- Early-morning hoarseness may be present
- Sinus pain across the middle of the face
- Headache may be present
- Popping of ears
- Eye pain
- Halitosis
- Chronic cough
- Fatigue
- No fever
- History of allergies may be present

PHYSICAL FINDINGS

- Client appears well
- Nasal mucous membranes may appear pale and "boggy"
- Poor transillumination of sinuses
- Tenderness may be present over sinuses

DIFFERENTIAL DIAGNOSIS

- Allergic rhinitis
- Vasomotor rhinitis
- Nasal polyp
- Infection of upper respiratory tract
- Tumor
- Migraine headache
- Cluster headache
- Dental abscess

COMPLICATIONS

- Recurrent acute sinusitis
- Spread of infection to the intraorbital or intracranial structures

DIAGNOSTIC TESTS

- None initially
- Consider diagnostic tests such as sinus x-ray or CT scan of sinuses if initial therapy fails; discuss these diagnostic tests with a physician

MANAGEMENT

Goals of Treatment

- Relieve symptoms
- Identify predisposing or underlying factors
- Prevent spread of infection to other structures

Appropriate Consultation

Consult with a physician if initial trial of antibiotics fails to relieve symptoms.

Nonpharmacologic Interventions

Client Education

- Recommend increasing hydration (8–10 glasses of fluid per day)
- Recommend inhalation of steam or warm compresses to relieve pressure on sinuses
- Counsel client about appropriate use of medications (dosage and side effects)
- Recommend avoidance of irritants (e.g., smoke) and allergens
- Recommend avoidance of diving, swimming or flying if symptoms are acute

Pharmacologic Interventions

Manage current symptoms with oral antibiotics; a longer course of therapy than for acute sinusitis is usually needed (i.e., 3–4 weeks):

amoxicillin (Amoxil) (**A class drug**), 250–500 mg PO tid for 21 days

or

sulfamethoxazole/trimethoprim (Septra DS) (**A class drug**), 1 tab PO bid for 21 days

Monitoring and Follow-Up

Follow up in 2 weeks.

Referral

Refer to a physician if symptoms do not improve after 4 weeks of continuous antibiotic therapy, to rule out underlying pathology (e.g., nasal polyps, deviated nasal septum, chronic allergies). Refer to a dentist if underlying dental disease is suspected.

COMMON PROBLEMS OF THE MOUTH AND THROAT

DENTAL ABSCESS

DEFINITION

Infection of the soft tissue surrounding a dead tooth.

CAUSES

- Progressive dental decay causing pulpitis from gram-positive anaerobes and *Bacteroides*
- Predisposing factors: deep caries, poor dental hygiene, dental trauma

HISTORY

- Localized tooth pain
- Constant, deep, throbbing pain
- Pain worsens with mastication or exposure to extreme temperatures
- Tooth may be mobile
- Gingival or facial swelling (or both) may be present

PHYSICAL FINDINGS

- Fever (rare but possible)
- Facial swelling may be present
- Carious tooth
- Gingival edema and erythema
- Tooth may be loose
- Localized tenderness over affected area of jaw
- Anterior cervical nodes enlarged and tender
- Localized tooth pain

DIFFERENTIAL DIAGNOSIS

- Disease of the salivary gland (e.g., mumps)
- Sinusitis
- Cellulitis

COMPLICATIONS

- Cellulitis
- Recurrent abscess formation

DIAGNOSTIC TESTS

None.

MANAGEMENT

Goals of Treatment

- Relieve symptoms
- Prevent spread of infection

Appropriate Consultation

Consult a physician if a large fluctuant abscess is present, if client is acutely ill or if the infection has spread to the soft tissues of the neck.

Nonpharmacologic Interventions

Warm saline oral rinses qid.

Client Education

- Counsel client about appropriate use of medications (dosage and side effects)
- Recommend dietary modifications (liquids or soft diet)
- Recommend improvements to dental hygiene

Pharmacologic Interventions

Oral antibiotics:

penicillin V potassium (Pen Vee K) (**A class drug**), 300–600 mg PO qid for 7–10 days

For clients with penicillin allergy:

erythromycin (E-Mycin) (**A class drug**), 250 mg PO qid for 10 days

Simple analgesics for mild to moderate dental pain:

ibuprofen (Motrin) (**A class drug**), 200 mg, 1–2 tabs PO q4h prn

or

acetaminophen (Tylenol) (**A class drug**), 325 or 500 mg, 1–2 tabs PO q4–6h prn

For moderately severe dental pain, add codeine:

codeine phosphate, 15 mg in combination with acetaminophen (Tylenol #2) (**C class drug**), 1–2 tabs PO q4–6h prn (maximum 15 tabs)

Monitoring and Follow-Up

Follow up in 48–72 hours.

Referral

Refer to a dentist for definitive therapy.

LARYNGITIS

DEFINITION

Inflammation of the mucosa of the larynx and vocal cords.

CAUSES

- Viral infection (common cold)
- Bacterial infection (*Streptococcus*)
- Chronic mouth breathing
- Overuse of voice
- Chronic sinusitis
- Excessive smoking (or exposure to secondhand smoke)
- Aspiration of caustic chemical
- Gastroesophageal reflux
- Changes due to aging (e.g., muscle atrophy, bowing of cords)
- Alcohol abuse
- Long-term exposure to dust or other irritants

HISTORY

- Presence of risk factors (*see "Causes," above*)
- Concurrent infection of the upper respiratory tract may be present
- Hoarseness or loss of voice, abnormal-sounding voice
- Throat pain, tickle or rawness
- Aphonia
- Dysphagia (trouble swallowing)
- Cough
- Fever
- Malaise

PHYSICAL FINDINGS

- Temperature may be elevated
- Client appears mildly ill
- Throat may be mildly to moderately injected
- No exudate
- Lymph nodes may be enlarged

DIFFERENTIAL DIAGNOSIS

- Cancer of the throat or larynx (if condition prolonged or recurrent)
- Polyps of vocal cords

DIAGNOSTIC TESTS

None.

MANAGEMENT

Goals of Treatment

- Relieve symptoms
- Identify and remove contributing factors (e.g., smoking)

Appropriate Consultation

Consult a physician immediately if client has stridor and shortness of breath.

Nonpharmacologic Interventions

- Voice rest is the mainstay of treatment
- Removal of contributing factors (e.g., smoking and alcohol) is also important
- Increase humidity of room air
- Increase fluid intake if febrile
- Increase rest until any fever settles

Client Education

- Explain disease course and expected outcomes
- Counsel client about appropriate use of medications (dosage and side effects)
- Stress importance of follow-up if not resolved in 3 weeks

Pharmacologic Interventions

Usually none.

Monitoring and Follow-Up

Follow up in 3 weeks if not resolved.

Referral

Refer to a physician if symptoms persist for longer than 3 weeks.

PHARYNGITIS (SORE THROAT)

DEFINITION

Inflammation or infection of mucous membranes of pharynx (may also affect the palatine tonsils).

CAUSES

Infectious

- Viruses (e.g., rhinovirus, adenovirus, parainfluenza, coxsackievirus, Epstein–Barr virus, herpes virus)
- Bacteria (e.g., group A ß-hemolytic *Streptococcus* [most common]), *Chlamydia*, *Corynebacterium diphtheriae*, *Hemophilus influenzae*, *Neisseria gonorrhoeae*
- Fungi (e.g., *Candida*); rare except in immunocompromised people (e.g., those with HIV or AIDS)

Non-infectious

- Allergic rhinitis
- Sinusitis with postnasal drip
- Mouth breathing
- Trauma
- Gastroesophageal reflux disease
- Risk factors: contact with a person with group A streptococcal infection, crowded living quarters, immunosuppression (e.g., HIV/AIDS), fatigue, smoking, excess consumption of alcohol, oral sex, diabetes mellitus or use of steroids (oral or inhaled)

HISTORY

Bacterial

- Abrupt onset of sore throat
- Pain on swallowing
- Absence of cough
- Fever or chills
- Malaise
- Skin rash may be present
- Headache
- Anorexia

Viral

- Slow, progressive onset of sore throat
- Mild malaise
- Cough
- Nasal congestion

Non-infectious

- Slow, progressive onset of sore throat
- Mild malaise
- Cough
- Persistent, recurrent
- Pain on swallowing

PHYSICAL FINDINGS

Bacterial

- Temperature elevated
- Pulse elevated
- Client appears acutely ill
- Posterior pharynx red and swollen
- Tonsils enlarged
- Purulent exudate may be present
- Tonsillar and anterior cervical nodes enlarged and tender
- Rash (scarlatina form in group A streptococcal infection)

Viral

- Temperature may be elevated
- Posterior pharynx red and swollen
- Purulent exudate may be present
- Tonsillar and cervical nodes may be enlarged and tender
- Petechiae on palate (in mononucleosis)
- Vesicles (in herpes)

Non-infectious

- Posterior pharynx red and swollen
- Tonsillar and anterior cervical nodes may be enlarged and tender
- Exudate may be present

It is often impossible to distinguish clinically between bacterial and viral pharyngitis. See Appendix 1 (*this chapter*) for the clinical tool "The Sore Throat Score" to help decide whether a patient has a group A streptococcal throat infection and needs antibiotics.

DIFFERENTIAL DIAGNOSIS

- Distinguish bacterial from viral infection
- Infectious mononucleosis
- Sexually transmitted infection (for chronic pharyngitis, investigate sexual practices)
- Vincent's angina (necrotic tonsillar ulcers)
- Distinguish reactive inflammation from an underlying disorder (*see "Causes," above*)

COMPLICATIONS

- Rheumatic fever (group A *Streptococcus* only)
- Glomerulonephritis (group A *Streptococcus* only)
- Peritonsillar abscess

DIAGNOSTIC TESTS

Swab the throat for culture and sensitivity (*see Appendix 1, this chapter,* for indications to swab)

MANAGEMENT

Goals of Treatment

- Relieve symptoms
- Prevent complications
- Prevent spread of group A *Streptococcus* to contacts

Appropriate Consultation

Consult a physician if the client has significant dysphagia or dyspnea (signalling obstruction of the upper airways) or if there is concern about an underlying pathology such as HIV.

Nonpharmacologic Interventions

- Bed rest during febrile phase
- Adequate oral intake of fluids (8–10 glasses of fluid per day)
- Avoidance of irritants (e.g., smoke)
- Gargling with warm saline qid

Pharmacologic Interventions

For pain and fever:

acetaminophen (Tylenol) (**A class drug**), 325 or 500 mg, 1–2 tabs PO q4h prn

or

ibuprofen (Motrin) (**A class drug**), 200 mg, 1–2 tabs q4h prn

Treat with antibiotics if streptococcal disease is suspected:

penicillin V potassium (Pen Vee K) (**A class drug**), 300 mg PO qid for 10 days

For clients with penicillin allergy:

erythromycin (E-Mycin) (**A class drug**), 250 mg PO qid for 10 days

Do not use ampicillin or amoxicillin, because these drugs may cause a generalized red "drug rash" if infectious mononucleosis is present.

Monitoring and Follow-Up

Instruct client to return to clinic for reassessment if symptoms do not improve in 48–72 hours.

Referral

Referral may be necessary if condition is recurrent or persistent or an undiagnosed underlying pathology is suspected.

EMERGENCY PROBLEMS OF THE EARS, NOSE AND THROAT

MASTOIDITIS

DEFINITION

Acute suppurative inflammation of mastoid antrum and air cells.

CAUSES

- Complication of inadequately treated acute otitis media, cholesteatoma or b lockage of outflow tract of mastoid air cells
- Most common organisms: *Hemophilus influenzae*, group A *Streptococcus, Streptococcus pneumoniae*

Risk Factors

- Recurrent otitis
- Cholesteatoma
- Immunocompromise

HISTORY

- Ear pain
- Non-resolving otitis media
- Spiking fever
- Post-auricular redness, swelling and pain
- Tinnitus
- Otorrhea if ear drum is perforated

PHYSICAL FINDINGS

- Temperature moderately to severely elevated
- Client appears moderately ill
- Post-auricular swelling and erythema
- Pinna may be displaced anteriorly if edema severe
- Manipulation of pinna and otoscopic exam of the ear causes acute pain
- Purulent drainage if tympanic membrane ruptured
- Post-auricular warmth
- Tenderness over mastoid process
- Anterior cervical and peri -auricular nodes enlarged and tender

DIFFERENTIAL DIAGNOSIS

- Severe otitis externa
- Post-auricular cellulitis
- Benign or malignant neoplasm
- Infection of deep neck space (Ludwig's angina)

COMPLICATIONS

- Residual hearing loss
- Meningitis
- Intracranial abscess
- Subperiosteal abscess

DIAGNOSTIC TESTS

Swab for culture and sensitivity if ear is draining.

MANAGEMENT

Goals of Treatment

- Relieve pain and swelling
- Prevent spread of infection

Appropriate Consultation

Consult a physician concerning IV antibiotic therapy.

Adjuvant Therapy

Start IV therapy with normal saline. Adjust rate according to state of hydration.

Pharmacologic Interventions

IV antibiotics:

ampicillin (Ampicin) (**D class drug**), 1.0–2.0 g IV q6h

For clients with penicillin allergy:

erythromycin (Erythrocin) (**A class drug**), 500 mg IV q6h

or

cefuroxime (Zinacef) (**B class drug**), 750 mg IV q8h

Analgesics for pain and fever:

acetaminophen (Tylenol) (**A class drug**), 325 or 500 mg, 1–2 tabs PO q4–6h

Referral

Medevac to hospital as soon as possible; client may need several days of IV drug therapy and surgery.

POSTERIOR EPISTAXIS

DEFINITION

Bleeding from the posterior portion of the nose.

CAUSES

- Idiopathic (cause unknown)
- Hypertension
- Vascular abnormalities (hereditary hemorrhagic telangiectasia)
- Trauma: deviation or perforation of the septum
- Infection (e.g., chronic sinusitis)
- Neoplasm (rare)

HISTORY

- Sudden onset of brisk, bright bleeding from nose
- May be unilateral or bilateral
- Blood running down back of throat
- May be a history of hematemesis if client has swallowed a large quantity of blood
- History of easy bruising, bleeding elsewhere (e.g., melena, heavy menses), family history of bleeding tendencies, use of anticoagulants, use of ASA products

PHYSICAL FINDINGS

- Heart rate elevated
- Blood pressure may be reduced if loss of blood is significant
- Client appears anxious
- Client may be pale, sweaty if loss of blood is significant
- Bright red bleeding from nares (unilateral or bilateral)
- Bleeding site not visible
- Blood observed in pharynx
- Sinuses may feel tender

DIFFERENTIAL DIAGNOSIS

- Hypertension
- Trauma
- Vascular abnormalities (e.g., hereditary hemorrhagic telangiectasia)
- Deviation of the septum
- Perforation of the septum
- Infection (e.g., chronic sinusitis)
- Neoplasm (rare)

COMPLICATIONS

- Hypotension or shock (hypovolemic)
- Anemia

DIAGNOSTIC TESTS

None.

MANAGEMENT

Goals of Treatment

- Stop bleeding
- Maintain circulating blood volume

Appropriate Consultation

Consult a physician if initial management fails to control bleeding or there is significant potential of underlying pathology.

Adjuvant Therapy

- Start IV therapy with normal saline or Ringer's lactate solution; adjust IV rate according to pulse and blood pressure response and rate of bleeding

Nonpharmacologic Interventions

- Keep client at rest with head at a 90° angle
- Apply pressure to the nose
- Insert a posterior nasal pack; use a posterior nasal pack balloon system if available
- An effective alternative is to use a 10–14 Fr. Foley catheter system, as follows:

Procedure

1. Insert tip of Foley catheter through the nostril to the nasopharynx.
2. Visualize catheter through the mouth; avoid placement in the lower pharynx.
3. Inflate balloon. Pull forward on catheter until balloon wedges in the posterior passage.
4. Maintain traction and place catheter along midsection of lateral wall of nasal cavity.
5. Insert an anterior nasal pack next (½ × 72 inch [1.25 × 180 cm] ribbon gauze impregnated with petroleum jelly).
6. Maintain catheter traction and stretch slightly.
7. Place an umbilical cord clamp across the nostril against the anterior pack so that the elasticity of the catheter compresses the balloon against the anterior pack.
8. Protect facial skin from clamp by padding with 2 × 2 inch (5 × 5 cm) gauze.
9. Drape rest of catheter over ear on same side and tape in place.

Bilateral packing is sometimes required to achieve adequate compression. The bleeding should stop after the nasal packs are in place.

Monitoring and Follow-Up

– Monitor vital signs and loss of blood closely
– Remove packs and balloons in 24–36 hours

Referral

Medevac to hospital if bleeding does not stop, if hypovolemia is evident or if significant underlying pathology is suspected.

PERITONSILLAR ABSCESS

DEFINITION

Abscess that forms behind the tonsil in the posterolateral pharyngeal wall as a complication of streptococcal pharyngitis.

CAUSES

Bacterial infection, usually related to group A *Streptococcus pyogenes*.

HISTORY

– Recent episode of pharyngitis
– Gradually increasing unilateral ear and throat pain
– Fever
– Malaise
– Dysphagia (difficulty swallowing)
– Dysphonia
– Drooling
– Trismus (difficulty opening mouth)

PHYSICAL FINDINGS

– Fever
– Heart rate increased
– Client may appear acutely ill or distressed
– Diaphoretic; flushed if feverish
– Affected tonsil grossly swollen medially and reddened
– Tonsil may displace uvula and soft palate to the opposite side of pharynx
– Swelling and redness of the soft palate
– Trismus (difficulty opening mouth)
– Tonsillar lymph nodes enlarged and very tender
– Fluctuance may be felt on affected side of palate

DIFFERENTIAL DIAGNOSIS

– Epiglottitis
– Gonococcal pharyngitis

COMPLICATIONS

– Obstruction of the airways
– Sepsis

DIAGNOSTIC TESTS

Swab for culture and sensitivity of any exudate if the client is being treated as an outpatient (mild to moderate symptoms).

MANAGEMENT OF MILD-TO-MODERATE CONDITION

Treat on an outpatient basis.

Goals of treatment

– Relieve symptoms
– Prevent complications

Nonpharmacologic Interventions

Client Education

– Advise client to return immediately if pain becomes worse, or if drooling, difficulty swallowing, difficulty breathing or inability to open mouth develops
– Recommend increased fluid intake
– Recommend increased rest until fever settles
– Recommend frequent gargling with warm saline for 48 hours

Pharmacologic Interventions

Antibiotics:

penicillin V potassium (Pen Vee K) (**A class drug**), 300 mg PO qid for 10 days

or

penicillin G (Bicillin) (**A class drug**), 1.2 million units IM

For clients with penicillin allergy:

erythromycin (E-mycin) (**A class drug**), 500 mg PO qid for 10 days

Analgesics for pain and fever:

acetaminophen (Tylenol) (**A class drug**), 325 or 500 mg, 1–2 tabs PO q4h prn

or

ibuprofen (Motrin) (**A class drug**), 200 mg, 1–2 tabs PO q4h prn

Monitoring and Follow-Up

Follow up if no improvement in 48–72 hours.

(cont'd)

MANAGEMENT OF MODERATE-TO-SEVERE CONDITION

Client appears acutely ill and has difficulty swallowing.

Goals of Treatment

– Relieve symptoms
– Prevent complications

Appropriate Consultation

Consult a physician if the abscess is significant in size and the client appears acutely ill; immediate referral to hospital and examination by an ENT specialist are in order. Consult with a physician concerning choices for IV antibiotic treatment.

Adjuvant Therapy

– Start IV therapy with normal saline; adjust rate according to age and state of hydration

Nonpharmacologic Interventions

– Bed rest
– Give sips of cold liquids only
– Give nothing by mouth if drooling

Pharmacologic Interventions

Antibiotics:

penicillin G sodium (**A class drug**), 500 000 to 1 million units IV q6h

For clients with penicillin allergy:

erythromycin (Erythrocin) (**A class drug**), 500 mg IV q6h

Monitoring and Follow-Up

Monitor client to ensure adequate airway is maintained.

Referral

Medevac to hospital; client may require surgical incision to drain abscess.

APPENDIX 1

AN ALTERNATIVE APPROACH TO SORE THROAT MANAGEMENT: THE SORE THROAT SCORE

In 1994, a group of community-based family physicians and general practitioners from Stratford, Ontario, began a joint project with researchers from the Institute for Clinical Evaluative Sciences in Toronto, Ontario, to improve the accuracy of identifying people with Group A streptococcal pharyngitis and thus reduce the number of antibiotic prescriptions. They identified a "sore throat score" that had been tested in trials and seemed practical for an office-based setting.

The score was originally developed by a group of US emergency physicians. Using a mathematical model, the physicians identified 4 clinical characteristics that could be used to assess the likelihood of group A streptococcal pharyngitis:

- exudate
- swollen tonsillar anterior cervical nodes
- a history of a fever of more than 38ºC
- lack of cough

Using the Sore Throat Score in Clinical Practice

No. of Characteristics Present	% of Patients with Group A Streptococcus	% of Sore Throats Seen in a Practice Setting
None	2.5	15
One	6–7	30
Two	14–17	25
Three	30–34	20
Four	56	10

Among people who have *no or only one* clinical finding, fewer than 10% will have a group A streptococcal infection. Because a routine throat culture will miss 10% of cases of group A streptococcal infection, this is a reasonable cut-off for stating that these people *do not need a throat culture and should not receive an antibiotic.*

Among patients with *two or three* clinical findings, it is suggested that *a throat sample be taken for culture but that antibiotics not be prescribed until the culture result is available.*

There are three reasons for this recommendation:

1. The risk of rheumatic fever is not increased if antibiotics are delayed 48–72 hours.
2. The results of culture will be negative for most patients in this group, so symptom relief may be adequate with ASA or acetaminophen.
3. Early antibiotic treatment may predispose a person to further group A streptococcal pharyngitic infections.

Using this approach should substantially reduce the use of antibiotics for disease not caused by group A *Streptococcus*.

Patients with *all four* clinical findings are likely to be sicker and have the highest chance of having group A streptococcal pharyngitis, although those with this type of infection constitute only about 10% of cases of sore throat. For these patients, it is suggested that a throat swab be taken for culture and that a decision to institute antibiotics be made on clinical grounds, as the relief of symptoms may be greatest for this group. However, anyone who has been ill for 3 days before seeking care is likely past the point at which antibiotics will provide symptom relief.

Until further validation is done for pediatric populations, this rule should be applied to adult populations only (defined as those 15 years of age or older).

The score is *invalid* in any community in which an outbreak or epidemic of group A streptococcal pharyngitis is occurring and should *not* be applied in this type of situation.

Sources

A "sore throat score" for use in the office. Institute for Clinical Evaluative Sciences, Toronto, ON, 1998.

McIsaac, W.; White, D.; Tannenbaum, D.; et al. A clinical score to reduce unnecessary antibiotic use in patients with sore throat. *Canadian Medical Association Journal* 1998;158(1):75-83.

CHAPTER 3 – RESPIRATORY SYSTEM

Table of Contents

ASSESSMENT OF THE RESPIRATORY SYSTEM

HISTORY OF PRESENT ILLNESS AND REVIEW OF SYSTEM

GENERAL

The following characteristics of each symptom should be elicited and explored:

- Onset (sudden or gradual)
- Chronology
- Current situation (improving or deteriorating)
- Location
- Radiation
- Quality
- Timing (frequency, duration)
- Severity
- Precipitating and aggravating factors
- Relieving factors
- Associated symptoms
- Effects on daily activities
- Previous diagnosis of similar episodes
- Previous treatments
- Efficacy of previous treatments

CARDINAL SYMPTOMS

In addition to the general characteristics outlined above, additional characteristics of specific symptoms should be elicited, as follows.

Cough

- Quality (e.g., dry, hacking, loose, productive)
- Severity
- Timing (e.g., at night, with exercise)

Sputum

- Color
- Amount (in teaspoons, tablespoons, cups)
- Consistency

Hemoptysis

- Amount of blood
- Association with leg pain, chest pain, shortness of breath

Shortness of Breath

- Exercise tolerance (number of stairs client can climb or distance client can walk)
- Orthopnea (number of pillows used for sleeping)
- Association with paroxysmal nocturnal dyspnea (waking up out of sleep acutely short of breath; attack resolves within 20 to 30 minutes of sitting or standing up)

Chest Pain

- Onset (sudden or gradual)
- Location
- Radiation
- Quality
- Timing
- Severity
- Aggravating and relieving factors
- Associated symptoms

Wheeze

- Timing (e.g., at rest, at night, with exercise)

Other Associated Symptoms

- Fever
- Malaise
- Fatigue
- Night sweats
- Weight loss

MEDICAL HISTORY (SPECIFIC TO RESPIRATORY SYSTEM)

- Smoking history (number of packages/day, number of years)
- Frequency of colds or asthma and treatment used
- Other respiratory illnesses (e.g., nasal polyps, chronic sinusitis)
- Bronchitis, pneumonia, chronic obstructive pulmonary disease (COPD), tuberculosis (TB) (disease or exposure), cancer, cystic fibrosis
- Seasonal allergies or allergies to drugs such as acetylsalicylic acid (ASA)
- Medications such as angiotensin-converting enzyme (ACE) inhibitors, ß-blockers, ASA, steroids, nasal sprays, antihistamines
- Admissions to hospital for respiratory illness
- Date and result of last Mantoux test and chest x-ray
- Vaccination history (e.g., pneumococcal, annual influenza)

FAMILY HISTORY (SPECIFIC TO RESPIRATORY SYSTEM)

- Others at home with similar symptoms
- Allergies, atopy
- Asthma, lung cancer, TB, cystic fibrosis
- Heart disease

PERSONAL AND SOCIAL HISTORY (SPECIFIC TO RESPIRATORY SYSTEM)

- Exposure to secondhand smoke
- Occupational or environmental exposure to respiratory irritants
- Exposure to pets
- Crowded living conditions
- Poor personal or environmental cleanliness
- Institutional living
- Injection drug use
- Alcohol abuse
- HIV risks

EXAMINATION OF THE RESPIRATORY SYSTEM

Examination of the ear, nose, throat and cardiovascular system should also be carried out because of the interrelatedness between these systems and structures and the functioning of the lower respiratory tract (*see chapter 2, "Ears, Nose and Throat," and chapter 4, "Cardiovascular System,"* for details of these examinations).

GENERAL APPEARANCE

- Acutely or chronically ill
- Degree of comfort or distress
- Degree of sweatiness
- Ability to speak a normal-length sentence without stopping to take a breath
- Color (e.g., flushed, pale, cyanotic)
- Nutritional status (obese or emaciated)
- Hydration status

VITAL SIGNS

- Temperature
- Pulse
- Pulse oximetry
- Respiratory rate
- Blood pressure

INSPECTION

- Color (e.g., central cyanosis)
- Shape of chest (e.g., barrel-shaped, spinal deformities)
- Movement of chest (symmetry)
- Rate, rhythm and depth of respiration
- Use of accessory muscles (sternocleidomastoid muscles)
- Intercostal indrawing
- Evidence of trauma
- Chest wall scars
- Clubbing of the fingers

PALPATION

- Tracheal position (midline)
- Chest wall tenderness
- Chest expansion
- Tactile fremitus
- Spinal abnormality
- Nodes (axillary, supraclavicular, cervical)
- Masses
- Subcutaneous emphysema

PERCUSSION

- Resonance (dull or hyperresonance)
- Location and excursion of the diaphragm

AUSCULTATION

- Assist client to breathe effectively
- Listen for sounds of normal air entry before trying to identify abnormal sounds

BREATH SOUNDS

- Degree of air entry throughout the chest (should be equal)
- Quality of breath sounds (e.g., bronchial, bronchovesicular, vesicular)
- Length of inspiration and expiration

ADDITIONAL SOUNDS

- *Wheezes:* continuous sounds, ranging from a low-pitched snoring quality to a high-pitched musical quality, may clear with coughing
- *Crackles:* discrete, crackling sounds heard on inspiration
- *Pleural rub:* a creaking sound from pleural irritation, heard on inspiration or expiration

DIFFERENTIAL DIAGNOSIS OF RESPIRATORY SYMPTOMS

ACUTE COUGH

- Infection: viral or bacterial, upper or lower respiratory tract
- Asthma
- Exacerbations of chronic bronchitis
- Bronchogenic carcinoma
- Foreign-body inhalation
- Esophageal reflux with aspiration
- Left-sided heart failure

CHRONIC COUGH

Common Causes

- Smoking
- Exposure to environmental irritants (secondhand smoke)
- Postnasal drip
- Asthma
- COPD or chronic bronchitis
- Gastroesophageal reflux with aspiration
- Lung tumors

Less Common Causes

- Carcinoma of the upper or lower respiratory tract
- Interstitial lung disease
- Medications (e.g., ACE inhibitors)
- Chronic lung infections (e.g., bronchiectasis, cystic fibrosis, TB, lung abscess)
- Occult left heart failure
- Thyroid disorders
- Disorders of the pleura, pericardium, diaphragm, stomach
- Idiopathic (psychogenic)
- Pressure from an external mass (e.g., thyromegaly, aortic aneurysm)

COUGH AND SPUTUM PRODUCTION

- Acute bronchitis
- Pneumonia
- Asthma
- TB
- COPD
- Bronchiectasis
- Lung abscess
- Lung cancer

DYSPNEA

- Asthma
- COPD
- Pneumothorax
- Pneumonia
- Interstitial lung disease (e.g., sarcoidosis)
- Lung cancer
- Pulmonary emboli or infarction
- Cardiac failure, congestive heart failure
- Anxiety with hyperventilation

HEMOPTYSIS

- Bronchitis
- Bronchiectasis
- Cystic fibrosis
- TB
- Bronchogenic cancer
- Lung abscess
- Pneumonia, necrotizing form (caused by *Klebsiella*)
- Pulmonary contusion
- Pulmonary embolism
- Systemic lupus erythematosus
- Primary pulmonary hypertension
- Mitral stenosis
- Cardiac failure, congestive heart failure
- Vascular anomalies (e.g., aneurysm)
- Chest trauma
- Inhalation of toxic material
- Bleeding disorders

WHEEZE

- Acute bronchitis
- COPD
- Asthma
- Bronchopneumonia (due to aspiration)
- Lung neoplasm obstructing a bronchus
- Pulmonary emboli
- Foreign-body aspiration

CHEST PAIN (PLEURITIC)

Diseases of the Lungs or Pleura

- Pneumonia
- Pleurisy
- Pleuritis associated with connective tissue diseases
- Pneumothorax
- Hemothorax
- Empyema
- Pulmonary infarction
- Neoplasm of lungs
- TB

Diseases of the Pericardium

- Pericarditis
- Trauma
- Postmyocardial infarction (Dressler's syndrome)

Diseases of the Chest Wall Muscle, Bone, Nerves, Skin

- Chest wall contusion
- Fractures of ribs, sternum
- Inflammation of chest wall muscles (costochondritis)
- Herpes zoster neuropathies
- Bone tumor

Gastrointestinal Diseases

- Liver abscess
- Pancreatitis
- Subdiaphragmatic abscess

Other Diseases

- Psychoneurosis

CHEST PAIN (NONPLEURITIC)

Diseases of the Pulmonary Vessels

- Pulmonary embolism
- Primary pulmonary hypertension
- Disease of the aorta
- Dissecting aortic aneurysm

Diseases of the Myocardium

- Myocardial infarction
- Angina
- Cardiomyopathies (myocarditis)
- Mitral valve prolapse

Referred Pain from Gastrointestinal Structures

- Reflux esophagitis, ulceration
- Esophageal motility disorders (e.g., alhalasia)
- Esophageal perforation or rupture
- Esophageal spasm
- Esophageal neoplasm
- Esophageal diverticula
- Gastric or duodenal ulcer
- Cholelithiasis, cholecystitis
- Pancreatitis, pancreatic neoplasm

COMMON PROBLEMS OF THE RESPIRATORY SYSTEM

CHRONIC ASTHMA

DEFINITION

A disorder of the airways characterized by paroxysmal or persistent symptoms (including dyspnea, chest tightness, wheeze and cough) with variable airflow limitation and airway hyperresponsiveness to a variety of stimuli.

Airway inflammation and its consequences are the important features in the pathogenesis of asthma (Ernst et al. 1996).

CAUSES

- Unknown in many cases
- Allergic airway hyperreactivity to airborne pollens, molds, house dust mites, animal dander, feather pillows
- Nonallergic asthma triggered by drugs (such as ASA, nonsteroidal anti-inflammatory drugs [NSAIDs], tartrates, ß-blockers and ACE inhibitors), smoke and other occupational, industrial and environmental substances
- Common trigger factors: intercurrent respiratory tract infections, cold air, exercise, emotional stress, sinusitis, gastroesophageal reflux disease (GERD)

Risk Factors

- Positive family history
- Frequent, severe viral infections of the lower respiratory tract in infancy

DETERMINING SEVERITY

The severity of asthma is determined by the frequency and chronicity of symptoms, the presence of persistent airflow limitations and the medication needed to maintain control of the condition.

Severity is best evaluated after an aggressive trial of therapy with inhaled corticosteroids (Table 1).

Table 1: Characteristics of Various Forms of Chronic Asthma

Mild Asthma	Moderate Asthma	Severe Asthma
Respiratory symptoms (wheeze, cough, dyspnea) up to 2 times weekly and/or respiratory symptoms lasting less than 30 minutes with activity	Respiratory symptoms > 2 times weekly, with exacerbations affecting sleep and activity and often lasting several days	Respiratory symptoms so frequent that they interfere with activities of daily living
Minimal or no shortness of breath at rest; exercise increases cough or wheeze and usually causes shortness of breath; nighttime cough, worse in early predawn hours	Shortness of breath at rest or with mild exertion; tightness in the chest; wheezing at rest; increased cough at night or with exercise	Daily symptoms and frequent nighttime symptoms
Able to do usual tasks without difficulty	Some difficulty speaking and sleeping	Occurrence of a prior near-fatal episode (intubation needed)
PEFR and FEV_1 > 80% of predicted	PEFR 60% to 80% of predicted	PEFR < 60% of predicted
Asymptomatic between exacerbations	Occasional visits to emergency department	Frequent admissions to hospital or visits to emergency department
	Intermittent use of $ß_2$-agonist inhaler	Need for inhaled $ß_2$-agonists several times per day or at night

PEFR = peak expiratory flow rate; FEV_1 = forced expiratory volume in the first second.
Note: Cough at night or during times of emotional stress or physical activity may be the only sign of asthma.

DIFFERENTIAL DIAGNOSIS

- Mechanical airway obstruction (foreign body)
- Severe allergic reaction
- COPD with chest infection
- Congestive heart failure
- Pulmonary edema
- Inhalation of toxic material
- Laryngeal dysfunction
- Cough secondary to drugs such as ACE inhibitors, ß-blockers

COMPLICATIONS

- Severe acute attack: hypoxia, respiratory failure, atelectasis, pneumothorax, death
- Chronic: interference with activities of daily living, COPD

DIAGNOSTIC TESTS

Objective measurements are needed to confirm a diagnosis of asthma and to assess severity in all but the most minimally symptomatic clients. The following tests should be carried out.

- Arrange baseline pulmonary function tests
- Determine peak expiratory flow rate (PEFR)
- Arrange histamine or methacholine challenge test
- Arrange allergy testing (Canadian Asthma Consensus Conference guidelines [Ernst et al. 1996])

MANAGEMENT

Goals of Treatment

- Maintain normal activity
- Prevent symptoms
- Maintain normal pulmonary function
- Prevent exacerbations
- Avoid side effects of therapy (given that side effects may lead to poor adherence to treatment plan)

Appropriate Consultation

Consult a physician to discuss appropriate medication therapy *at first diagnosis and as necessary thereafter until symptoms have stabilized*.

Adjuvant Therapy

- Administer annual influenza vaccine
- Administer pneumococcal vaccine

Nonpharmacologic Interventions

- Recommend that client avoid known precipitating factors such as environmental allergens and occupational irritants
- Offer counseling for smoking cessation (if applicable)
- Recommend that client avoid NSAIDs and ASA products

Client Education

- Discuss diagnosis and expected course of illness
- Counsel client about appropriate use of medications (dose, frequency, side effects)
- Advise client on proper use of aerosol delivery device, aerochamber and spacer
- Teach client how to monitor for symptoms and how to use peak flow meter (if deemed beneficial to managing symptoms)
- Advise client on an action plan to increase medication from maintenance level at first sign of exacerbation
- Counsel client on how to minimize local side effects (oral candidiasis) by careful rinsing of the mouth and gargling

Pharmacologic Interventions (Fig. 1)

Fig. 1: Recommended Drug Treatment for Chronic Asthma

Inhaled corticosteroids

beclomethasone (**B class drug**)

or

fluticasone (Flovent) (**B class drug**)

+

Short-acting β_2-agonists

salbutamol (Ventolin) (**D class drug**), prn for breakthrough symptoms

+

Long-acting β_2-agonists

salmeterol (Serevent) (**B class drug**), if symptoms are not controlled, especially at night

or

discontinue long-acting β_2-agonists and add oral theophylline (e.g., Theodur) (**B class drug**)

±

Inhaled anticholinergics

ipratropium bromide (Atrovent) (**B class drug**)

+

Oral steroids

prednisone (Prednisolone) (**B class drug**)

(used to treat acute exacerbations when an attack is severe [i.e., PEFR < 60% of predicted] or when response to an increase in inhaled steroid is inadequate)

Source: Canadian Asthma Consensus Conference guidelines (Ernst et al. 1996)

Inhaled corticosteroids

Inhaled corticosteroids are the best agents for bringing and keeping asthma under control, and their use may improve the overall prognosis for clients with this condition.

Initial recommended doses of inhaled corticosteroid for mild to moderate asthma:

beclomethasone (**B class drug**), 400–1000 µg bid

or

fluticasone (Flovent) (**B class drug**), 100–500 µg bid

or

budesonide (Pulmicort) (**B class drug**), 40 µg bid

Once best results are achieved (i.e., symptoms are controlled), the dose of inhaled steroid is reduced to identify the minimum dose required to maintain control.

Inhaled steroids are safe for use during pregnancy and lactation, but the lowest dose possible to maintain control of asthma is recommended. Unless contraindicated, an estrogen supplement should be given to postmenopausal women receiving oral systemic corticosteroids.

Short-Acting ß$_2$-Agonists

Short-acting ß$_2$-agonists are the drugs of choice to relieve asthma symptoms that break through maintenance therapy. They are most effective for preventing and treating exercise-induced brochospasm. Their use should be limited to rescue medication and they should be used less than 3 times a week.

salbutamol (Ventolin) (**D class drug**), 100 µg, 1 or 2 puffs q4h prn

Long-Acting ß$_2$-Agonists

The long-acting ß$_2$-agonists (e.g., salmeterol, formoterol) can be used as an additional treatment for people whose asthma is not adequately controlled with optimum inhaled steroids, particularly when there are nocturnal symptoms. These drugs should never be used to rescue patients with significant symptoms of an acute asthma attack.

Oral Theophylline and Derivatives

Theophylline is an effective anti-asthma drug. It is not a first-line therapy but can be useful in people whose symptoms persist despite high doses of inhaled corticosteroids.

Anticholinergics

The anticholinergic drugs (e.g., ipratropium bromide) act more gradually than ß$_2$-agonists to offer modest bronchodilation in stable asthma patients. They are of greatest value in treating older patients and patients with a combination of asthma and COPD. During acute exacerbations they are used as an adjunct to optimal doses of short-acting ß$_2$-agonists.

Monitoring and Follow-Up

- Follow up every 3–6 months once stabilized
- Assess adherence to the medication regimen
- Review inhaler technique periodically
- Watch for complicating conditions such as GERD, sinusitis, nasal polyps
- Carefully monitor clients taking more than 2000 µg daily of inhaled steroids to watch for long-term effects on bone metabolism (osteoporosis)
- Review strategies to reduce environmental allergens if applicable (e.g., reduce dust mites, stop smoking, minimize humidity, remove furred pets)

Referral

Referral to a specialist is recommended for adults when more than 1000 µg daily of inhaled beclomethasone or its equivalent is required on an ongoing basis. Ideally, a physician should review the client at least annually if stable and more often if symptoms are not well controlled.

Consider referral to a respirology rehabilitation program (if available) for clients whose activities of daily living are significantly compromised by poorly controlled symptoms despite adequate therapy and adequate compliance with the treatment plan.

ACUTE ASTHMA EXACERBATION

Exacerbations should be treated promptly to reverse the symptoms and prevent them from becoming severe.

The findings depend on the acuteness and severity of the attack, which can range from mild to very severe.

MILD ASTHMA EXACERBATION

HISTORY

- Exertional dyspnea, no acute distress
- Cough

PHYSICAL FINDINGS

- Respiratory rate normal or minimally elevated
- Heart rate < 100 bpm
- Low-pitched wheezes (inspiratory or expiratory, or both)
- FEV_1 and PEFR > 60% predicted or best
- PEFR > 300 L/min
- Good response (usually) to short-acting ß$_2$-agonists

MANAGEMENT

Appropriate Consultation

Consult a physician if the client is not already taking inhaled steroids.

Pharmacologic Interventions

- If client has been using medication regularly as prescribed, increase inhaled steroids to 2–4 times usual dose
- If client has not been taking medications recently, restart usual dose
- Bronchodilation as necessary to reduce bronchospasm:

  salbutamol (Ventolin) (**D class drug**), by metered dose inhaler (MDI) with AeroChamber, 1 or 2 puffs q4h prn, to a maximum of 2–4 puffs q4h

The nebulized form offers no advantage over an MDI with AeroChamber or dry powder inhalers (Turbohaler, Rotohaler).

Monitoring and Follow-Up

Advise follow-up in 24 hours if symptoms are not controlled.

For exercise or cold-induced asthma:

salbutamol (Ventolin) (**D class drug**), 1 or 2 puffs 15 minutes before exercising or going out in the cold air

MODERATE ASTHMA EXACERBATION

HISTORY

- Dyspnea at rest
- Congested cough
- Tightness of the chest
- Nocturnal symptoms
- $ß_2$-Agonists needed > q4h

PHYSICAL FINDINGS

- Appears short of breath
- Respiratory rate elevated
- Heart rate > 100 bpm
- Some use of accessory muscles of respiration
- Audible wheeze
- High-pitched wheezes in all lung fields (inspiratory or expiratory, or both)
- FEV_1 and PEFR 40% to 60% predicted or best
- PEFR 200–300 L/min
- $ß_2$-Agonists provide only partial relief

MANAGEMENT

Appropriate Consultation

Consult physician.

Adjuvant Therapy

Oxygen 6–10 L/min by mask; keep oxygen saturation at 97% to 98%.

Pharmacologic Interventions

salbutamol (Ventolin) (**D class drug**) by MDI and AeroChamber, 100 µg/puff, 4–8 puffs q15–20min, 3 times; then increase to 1 puff q30–60s (for 4–20 puffs) prn

or

salbutamol solution (Ventolin) (**C class drug**) by nebulizer, 5.0 mg (1 mL in 3 mL normal saline) q15–20min, 3 times, continuous if necessary

±

ipratropium bromide (Atrovent) (**B class drug**) by MDI and AeroChamber, 20 µg /puff, 4–8 puffs q15–20min, 3 times; then increase to 1 puff q30–60s (for 4–20 puffs) prn

or

ipratropium bromide (Atrovent) (**B class drug**) by nebulizer, 0.25–0.50 µg (1–2 mL in 3 mL normal saline) q15–20min, 3 times, continuous if necessary (may be mixed with salbutamol; decrease in recovery phase)

±

prednisone (**B class drug**), 1 mg/kg (40–60 mg) PO od or bid for 5–7 days

People with steroid-dependent asthma and those who are already receiving inhaled steroids should also receive oral steroid therapy.

Monitoring and Follow-Up

PEFR and FEV_1 should be checked frequently to evaluate response to bronchodilator therapy.

Client may be discharged after the initial emergency treatment if there is good response and there has been no attack within the previous 24 hours.

Referral

Medevac if after treatment the FEV_1 reading is < 60% predicted value or there has been another attack within the previous 24 hours.

SEVERE ASTHMA EXACERBATION

HISTORY

- Acute respiratory distress
- Agitated, diaphoretic
- Difficulty speaking

PHYSICAL FINDINGS

- Heart rate > 110 bpm
- Marked use of accessory muscles of respiration
- Blood pressure elevated
- Breath sounds decreased in intensity
- Diffuse, high-pitched wheezes (inspiratory or expiratory, or both)
- FEV_1 and PEFR: unable to perform test or < 40% predicted or best
- PEFR < 200 L/min
- Oxygen saturation < 90%
- No pre-clinic relief afforded by $ß_2$-agonists

Caution: Beware of the "silent chest" (poor air entry, no wheezing) in a patient with a history of asthma who presents in acute respiratory distress. Such a person is status asthmaticus, which is the most severe and dangerous form of asthma.

MANAGEMENT

Appropriate Consultation

Consult a physician as soon as possible.

Adjuvant Therapy

- Start oxygen 6–10 L/min by mask
- Keep oxygen saturation at 97% to 98%
- Start IV therapy with normal saline; run at 250 mL/h for the first hour
- Aggressive fluid administration can help liquefy bronchial secretions unless otherwise contraindicated

Pharmacologic Interventions

salbutamol (Ventolin) (**D class drug**) by MDI and AeroChamber, 100 µg /puff, 4–8 puffs q15–20min, 3 times; increase to 1 puff q30–60s (for 4–20 puffs) prn

or

salbutamol solution (Ventolin) (**C class drug**) by nebulizer, 2.5–5.0 mg (0.5–1.0 mL in 3 mL normal saline) q15–20min, 3 times, continuous if necessary; titrate to client response

+

ipratropium bromide (Atrovent) (**B class drug**) by MDI and AeroChamber, 20 µg /puff, 4–8 puffs q15–20min, 3 times ; increase to 1 puff q30–60s (for 4–20 puffs) prn

or

ipratropium bromide (Atrovent) (**B class drug**) by nebulizer, 0.25–0.50 µg (1–2 mL in 3 mL normal saline) q15–20min, 3 times, continuous if necessary (may be mixed with salbutamol; decrease salbutamol du ring recovery phase)

+

hydrocortisone (Solu-Cortef) (**D class drug**), 500 mg IV q8h

Monitoring and Follow-Up

Assess response to medication by continuously monitoring oxygen saturation and by measuring PEFR and vital signs frequently.

Referral

Medevac as soon as possible.

Patients at Risk of Relapse

- Previous near-death episode (Beveridge et al. 1996)
- Recent emergency room visit for acute exacerbation
- Frequent admissions to hospital
- Dependent on steroids and recent use of oral steroids
- History of sudden attacks
- Allergic or anaphylactic triggers
- Recent attack of prolonged duration
- Poor understanding of illness and poor adherence to therapy
- No removal of environmental triggers

CHRONIC OBSTRUCTIVE PULMONARY DISEASE (COPD)

DEFINITION

A functional disorder of the lung characterized by progressive and incompletely reversible airflow obstruction and actual destruction of lung tissue. The clinical presentation depends on which of the following pathophysiologic processes are prominent:

- Inflammatory narrowing of the bronchioles
- Proteolytic digestion of the connective tissue framework of the lung, resulting in decreased parenchymal tethering of the airways
- Loss of alveolar surface area and capillary bed
- Lung hyperinflation caused by loss of elastic recoil
- Increased pulmonary vascular resistance caused by vasoconstriction and loss of capillary bed

Source: Guidelines for the Assessment and Management of Chronic Obstructive Pulmonary Disease (Canadian Thoracic Society Workshop Group 1992)

CAUSES

- Usually a combination of factors

Risk Factors

- Smoking
- Secondhand smoke
- Severe viral pneumonia early in life
- Aging
- Genetic predisposition
- Air pollution
- Occupational exposure to respiratory irritants

FORMER CLASSIFICATION

Most clients with COPD have a combination of chronic bronchitis and emphysema. However, one pattern is predominant: people with COPD either tend to have more cough and sputum production and less shortness of breath (chronic bronchitis) or tend to have more shortness of breath and less cough and sputum production (emphysema).

Chronic Bronchitis

Chronic productive cough that is present for at least 3 months each year, for 2 years in a row. Initially, cough and sputum are present only in the morning (especially in the winter). Eventually the symptoms are present throughout the day and throughout the year. There are frequent episodes of acute chest infections superimposed on the chronic condition.

Emphysema

Chronic shortness of breath, initially with exercise. Cough is only a minor problem and sputum production is limited. The shortness of breath gradually becomes worse until the person is short of breath even at rest.

HISTORY

- Client almost always a smoker
- 40 years of age or older
- Frequent chest infections
- Weight loss and fatigue (in the advanced stages)
- Shortness of breath
- Cough with sputum (clear, white, yellow–green)
- Wheeze

PHYSICAL FINDINGS

Physical findings vary, depending on extent of disease and whether exacerbation is acute.

The upper respiratory tract (e.g., ears, nose and throat) (*see chapter 2*) and the cardiovascularsystem (*see chapter 4*) should be examined, and neuromental status should be determined (to check for hypoxia) (*see chapter 8*).

- Temperature may be elevated with acute infection
- Heart rate may be elevated
- Respiratory rate elevated, depth of respiration may be decreased
- Expiratory phase may be prolonged
- Oxygen saturation may be reduced
- Client may appear thin or wasted
- Degree of respiratory distress varies
- May be using accessory muscles of respiration
- Cyanosis may occur
- Clubbing of fingers may be present
- Chest diameter may increase (“barrel chest”)
- Breathing may be pursed-lipped
- If hypoxia is significant, confusion, irritability and diminished level of consciousness may result
- Tactile fremitus decreased
- Chest excursion decreased
- Hyperresonance
- Decreased diaphragmatic excursion (chronically hyperinflated lungs)
- Air entry reduced
- Breath sounds distant (if barrel chest is present)
- Scattered wheezes and crackles may be present
- Decreased FEV_1 on peak flow testing

DIFFERENTIAL DIAGNOSIS

- Bronchitis (acute)
- Bronchiectasis
- Asthma
- Bronchogenic carcinoma

COMPLICATIONS

- Acute bronchitis
- Pneumonia
- Pulmonary hypertension
- Cor pulmonale (right heart failure)
- Respiratory failure
- Polycythemia (abnormally high hemoglobin)

DIAGNOSTIC TESTS

Arrange for baseline pulmonary function testing at some point and baseline chest x-ray.

MANAGEMENT

Goals of Treatment

- Reduce or eliminate dyspnea
- Reduce sputum production
- Maintain exercise tolerance
- Prevent progression of disease
- Reduce frequency of exacerbations
- Keep oxygen saturation > 90%

Appropriate Consultation

Consult a physician for previously undiagnosed clients, those whose symptoms are not controlled with their current therapy and those with an acute exacerbation.

Nonpharmacologic Interventions

Client Education

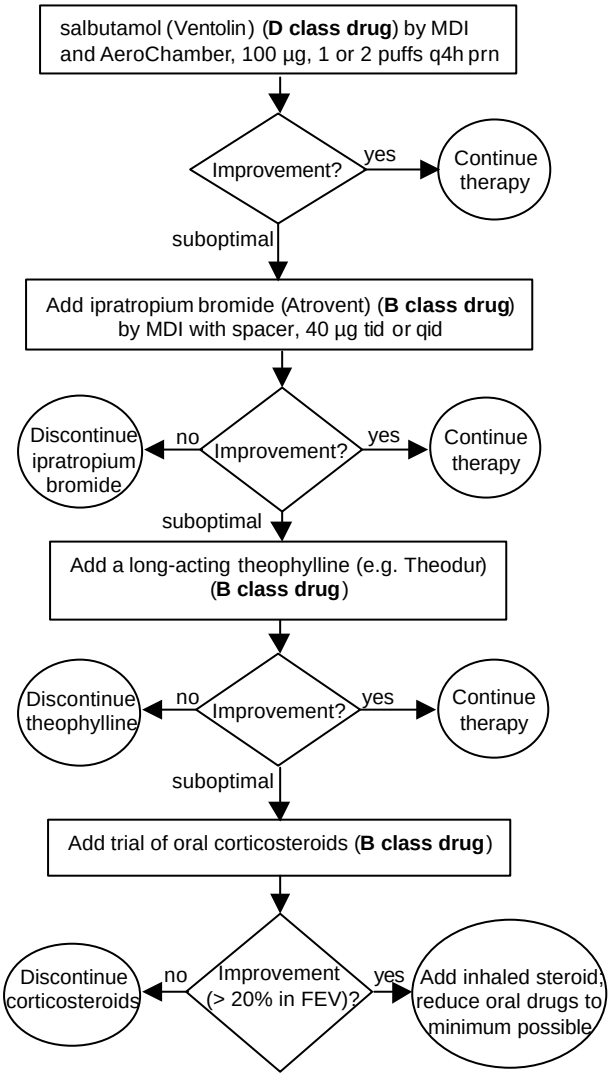
- Early public education about the hazards of smoking can prevent COPD
- Counsel client about smoking cessation (if applicable)
- Recommend adequate hydration (8–10 glasses of fluid per day; there is no evidence that drinking more than this quantity is of any benefit)
- Recommend increasing room humidity (client should keep a pot of water on the stove, especially in the winter)
- Recommend adequate nutrition: small, frequent meals high in protein and calories
- Recommend an exercise program (e.g., walking) to improve general fitness and sense of well-being
- Recommend a weight-loss program (if applicable)
- Discuss natural history, expected course and prognosis of disease
- Counsel client about appropriate use of medications (purpose, dose, frequency, side effects)
- Counsel client about proper use of inhaler
- Perform chest physiotherapy (deep breathing and coughing, pursed-lip breathing, abdominal breathing and postural drainage)
- Teach client symptoms and signs of exacerbation and acute infection to encourage self-monitoring and early presentation when condition deteriorates
- Counsel client to avoid travel at high altitudes; when air travel cannot be avoided, the client should have access to oxygen (especially when traveling in an unpressurized aircraft)

Adjuvant Therapy

- Consider home oxygen therapy for clients with advanced disease (it can increase lifespan by 6 to 7 years [Canadian Thoracic Society Workshop Group 1992]).
- Give yearly influenza vaccine to all clients with COPD
- Give pneumococcal vaccine to all clients with COPD

Pharmacologic Interventions (Fig. 2)

Fig. 2: Recommended Drug Treatment for Chronic COPD



Source: *Therapeutic Choices* (Gray 1998)

Monitoring and Follow-Up

- For clients using oral theophylline medications, measure serum levels of drug every 3–6 months and teach client the symptoms and signs of toxic effects
- Follow-up every 6 months if stable
- Follow-up monthly if symptoms poorly controlled

Referral

The physician should assess the client at least annually if condition is stable, and as soon as feasible if symptoms are not controlled.

ACUTE COPD EXACERBATION

DEFINITION

Recent deterioration of the patient's clinical and functional state due to a worsening of his or her COPD.

HISTORY

- Worsening dyspnea, sometimes at rest
- Increased cough
- Increased sputum production, often with change in character from mucoid to purulent
- Development of or increase in wheezing
- Loss of energy
- Fever
- Increase in respiratory rate
- Tachycardia
- Increase in cyanosis
- Use of accessory muscles
- Peripheral edema
- Loss of alertness
- Worsening of airflow obstruction, as indicated by FEV_1 or PEFR
- Worsening of oxygen saturation, as indicated by pulse oximetry

EVIDENCE OF SEVERE EXACERBATION

Loss of alertness or a combination of two of the other typical symptoms and signs of COPD exacerbation (see above) suggests severe exacerbation and a need for referral to the emergency department. These criteria are not intended to replace a healthcare provider's judgment about the need for referral.

MANAGEMENT

The decision as to whether to manage a client at home or to refer him or her for evaluation depends on many factors: the severity of the exacerbation; the severity of the underlying COPD; comorbid conditions; the medical sophistication, judgment and reliability of the client and caregivers; and the distance the client lives from the health center or clinic.

Exacerbations should be treated with appropriate supplemental oxygen, aggressive bronchodilator therapy, corticosteroids and antibiotics.

Appropriate Consultation

Consult a physician as soon as possible.

Adjuvant Therapy

– Oxygen 4–6 L/min or more prn; keep oxygen saturation at 90% to 92%
– Start IV therapy with normal saline; adjust IV rate according to state of hydration

Pharmacologic Interventions

The choice of medications and dosages (Fig. 3) depends on the current drug regimen and the client's compliance with it, as well as the severity of the exacerbation (particularly the degree of respiratory distress).

The maximal effective doses of short-acting ß$_2$-agonists (e.g., salbutamol) and long-acting ß$_2$-agonists (e.g., ipratropium bromide) in COPD exacerbation are unknown.

For severe exacerbation, the American Thoracic Society (1995) recommends 6–8 puffs every 2 hours. The Canadian Asthma Consensus Conference (Ernst et al. 1996) makes no recommendations.

Monitoring and Follow-Up

Monitor vital signs, oxygen saturation and PEFR frequently to assess response to bronchodilator therapy.

Referral

Medevac any client who shows signs of respiratory distress.

Fig. 3: Recommended Drug Treatment for Acute Exacerbation of COPD

Bronchodilators

e.g., salbutamol (Ventolin) (**D class drug**), 3 or 4 puffs q4h prn; may increase to 6–8 puffs q2h in severe exacerbation

+

Anticholinergics

e.g., ipratroprium bromide (Atrovent) (**B class drug**), 3 or 4 puffs q4h prn; may increase to 6–8 puffs q2h in severe exacerbation

+

Oral steroids

e.g., prednisone (Prednisolone) (**B class drug**), 40–60 mg od for 2 weeks

or

hydrocortisone (Solu-Cortef) (**D class drug**), 500 mg IV

+

Oral antibiotics

e.g., amoxicillin (Amoxil) (**A class drug**), 500 mg PO tid for 10 days

or

sulfamethoxazole/trimethoprim (Septra DS) (**A class drug**), 1 tab, PO bid for 10 days

or

tetracycline (**A class drug**), 500 mg PO qid for 10 days

or

IV antibiotics

e.g., ampicillin (Ampicin) (**D class drug**), 500–1000 mg IV q6h

(For clients with penicillin allergy, use erythromycin [Erythrocin] [**A class drug**], 250–500 mg IV q12h)

Erythromycin interacts with theophylline and can cause toxic effects. Do not use erythromycin if the person is already taking a theophylline preparation.

Sources: Guidelines for the Assessment and Management of Chronic Obstructive Pulmonary Disease (Canadian Thoracic Society Workshop Group 1992), *Breathing to Live* (Chapman and Tames 1991, 1994)

ACUTE BRONCHITIS

DEFINITION

Inflammation of trachea and bronchi (larger airways).

CAUSES

- Viral infection: influenza A or B, adenovirus, rhinovirus, parainfluenza
- Bacterial infection: *Hemophilus influenzae*, *Moraxella catarrhalis*, *Mycoplasma* , *Streptococcus pneumoniae*

Risk Factors

- Chronic sinusitis
- COPD
- Bronchiectasis
- Immunosuppression
- Smoking
- Secondhand smoke
- Air pollutants
- Alcoholism
- GERD

HISTORY

- Previous infection of upper respiratory tract
- General malaise
- Fever
- Cough; initially dry, later productive of white, yellow or green sputum
- Muscular aching in the chest wall or discomfort with coughing
- Wheezing may be present

PHYSICAL FINDINGS

The presentation of acute bronchitis and pneumonia are often similar. In general, clients with pneumonia are sicker and usually have more chest abnormalities. The organisms that cause bronchitis can also cause pneumonia. The difference is in where the infection lies anatomically. Bronchitis involves the larger airways, whereas pneumonia involves the smaller airways and air sacs.

- Temperature may be mildly to moderately elevated
- Heart rate may be mildly elevated if febrile
- Respiratory rate may be slightly elevated
- Spasmodic cough
- Rhinitis may be present
- Expiratory phase may be slightly prolonged
- Wheezes (scattered, low pitched) may be present

DIFFERENTIAL DIAGNOSIS

- Influenza
- Acute sinusitis
- Pneumonia
- Acute exacerbation of chronic bronchitis
- Asthma
- Allergies
- Inhaled or aspirated chemical irritants
- TB or lung cancer (if recurrent)
- Pertussis
- Cystic fibrosis

COMPLICATIONS

- Pneumonia
- Postbronchitis cough

DIAGNOSTIC TESTS

None.

MANAGEMENT

Goals of Treatment

- Relieve symptoms
- Prevent pneumonia

Appropriate Consultation

Consultation is usually not necessary if the person is otherwise healthy.

Nonpharmacologic Interventions

- Increased rest (especially if febrile)
- Adequate hydration (8–10 glasses of fluid per day)
- Increased humidity in the environment
- Avoidance of pulmonary irritants (e.g., stop or decrease smoking)

Client Education

Recommend handwashing to prevent spread of infection throughout a household.

Pharmacologic Interventions

For fever or pain:

acetaminophen (Tylenol) (**A class drug**), 325 or 500 mg, 1 tab q4h prn

Clients who have been unwell for more than 5–7 days and have purulent sputum, or those with underlying health concerns (e.g., asthma) may require a course of antibiotics. Use the following:

erythromycin (E-Mycin) (**A class drug**), 250 mg PO qid for 7 days

or

tetracycline (**A class drug**), 250 mg PO qid for 7 days

or

sulfamethoxazole/trimethoprim (Septra DS) (**A class drug**), 1 tab PO bid for 7 days

If bronchospasm is significant, short-acting ß$_2$-agonist bronchodilators can be used until acute symptoms resolve:

salbutamol (Ventolin) (**D class drug**), 1 or 2 puffs q4h prn

Monitoring and Follow-Up

Arrange for follow-up in 5–7 days if not resolving.

Referral

Usually not necessary.

PNEUMONIA

DEFINITION

Infection of the distal airways, air sacs or both.

CAUSES

In the past, cases of pneumonia were divided into two categories, bacterial or atypical. In community-based practices, the following classification of community-acquired pneumonia is now commonly used.

– If the patient was previously well or is under 65 years of age (or both): *Streptococcus pneumoniae* (pneumococcal) and *Mycoplasma* are the most common causes in younger healthy adults; also, less frequently, *Chlamydia pneumoniae* and *Hemophilus influenzae*
– If the patient has comorbid illness or is 65 years of age or older (or both): *Hemophilus influenzae, Klebsiella pneumoniae*, *Legionella pneumophila*, *Moraxella catarhalis*, *Mycobacterium tuberculosis*, *Staphylococcus aureus* and, less commonly, *Streptococcus pneumoniae*
– Viral pneumonia uncommon except in outbreaks of influenza A and respiratory syncytial virus or as a comp lication of atypical measles
– Cytomegalovirus and herpes simplex viruses are treatable causes of pneumonia in immunocompromised patients
– *Pneumocystis carinii* pneumonia may occur in immunocompromised patients, especially those with HIV or AIDS
– Aspiration of oral pharyngeal secretions, gastric contents or chemicals may predispose a patient to bacterial pneumonia. Those at risk for this problem include alcoholic people, elderly people, those who have difficulty swallowing, those with motility or neuromuscular disorders, and stroke victims
– No cause is identified in approximately one-third to one-half of all cases

HISTORY

There is considerable overlap in the symptoms of the various types of pneumonias.

– Fever, chills
– Cough
– Sputum may be yellow, green, blood-tinged
– Chest pain: sharp, localized pleuritic chest pain is seen in acute lobar type only
– Shortness of breath may be present

In elderly or chronically ill clients, the symptoms may not be as acute or as obvious. These clients may present with only confusion or a deterioration of pre-existing medical problems.

As a general rule, pneumonia caused by *Mycoplasma*, *Chlamydia*, viruses and *P. carinii* have a slower, more insidious onset. The client may not appear as acutely ill and may have a lower fever, dry cough and scanty sputum production.

PHYSICAL FINDINGS

- Temperature elevated
- Heart rate elevated
- Respiratory rate increased
- Oxygen saturation decreased
- May or may not appear acutely ill
- Flushed, diaphoretic if fever is high
- May "splint" the affected side if there is pleuritic pain
- Variable level of respiratory distress
- Dullness on percussion if there is consolidation
- Air entry may be decreased
- Inspiratory crackles
- Wheezes may be present
- Bronchial breathing
- Pleural rub may be present (rarely)

In elderly clients, the clinical presentation of the various types of pneumonias is often atypical or obscured. Overt respiratory signs may be absent. They may present with changes in level of consciousness, confusion, functional impairment such as loss of energy, a decease in appetite or vomiting. These clients are at increased risk of death from bacterial pneumococcal disease.

DIFFERENTIAL DIAGNOSIS

- COPD
- Acute bronchitis
- Underlying TB
- Underlying lung cancer
- Aspiration pneumonia
- Lung abscess
- Atelectasis

COMPLICATIONS

- Decompensation of other medical problems
- Respiratory failure from hypoxia
- Sepsis (bacteremia)
- Metastatic infection such as meningitis, endocarditis, pericarditis, peritonitis, empyema
- Renal failure
- Cardiac failure

DIAGNOSTIC TESTS

- Chest x-ray (posterioanterior and lateral) only if diagnosis is clinically obscure or diagnosis is uncertain

MANAGEMENT

Goals of Treatment

- Relieve symptoms
- Improve or prevent respiratory distress
- Prevent complications

Appropriate Consultation

Consult a physician for any client with severe symptoms (e.g., appears acutely ill or has hemoptysis, significant respiratory distress or a significant comorbid condition such as diabetes mellitus, heart disease, renal disease or cancer) or for any client who has not responded to initial oral treatment and whose condition is worsening.

Nonpharmacologic Interventions

- Increased bed rest
- Adequate fluid intake (8–10 glasses of fluid per day)
- Increased humidity in the air (kettle, humidifier or pot of water on the stove)

Client Education

- Explain diagnosis and expected course of illness
- Counsel client about appropriate use of medications (dose, frequency, side effects)

Pharmacologic Interventions

Client < 65 years of age with no comorbid conditions and mild-to-moderate pneumonia

For fever, pain and muscle ache:

acetaminophen (Tylenol) (**A class drug**), 325 or 500 mg, 1–2 tabs PO q4–6h prn

Antibiotics:

erythromycin (E-Mycin) (**A class drug**), 500 mg PO bid or 250 mg qid for 10 days

or

tetracycline (**A class drug**), 250–500 mg qid for 10 days

Client ≥ 65 years of age with comorbid illness and mild-to-moderate pneumonia

sulfamethoxazole/trimethoprim (Septra DS) (**A class drug**), 1 tab PO bid for 10 days

or

cefaclor (Ceclor) or amoxicillin/clavulanate (Clavulin) if there is contraindication to sulpha (**B class medications requiring physician orders**)

Monitoring and Follow-Up

Arrange follow-up within 48 hours for reassessment if shortness of breath develops and again after the course of antibiotics is completed.

Referral

Usually not necessary for patients with mild to moderate symptoms unless their condition is worsening, complications occur or they have significant comorbid conditions.

MANAGEMENT OF SEVERE PNEUMONIA

Appropriate Consultation

Consult a physician for any client with severe symptoms (e.g., appears acutely ill or has hemoptysis, significant respiratory distress or a significant comorbid condition such as diabetes mellitus, heart disease, renal disease or cancer) or for any client who has not responded to initial oral treatment and whose condition is worsening.

Adjuvant Therapy

- Oxygen 6–10 L/min; keep oxygen saturation > 97% to 98%
- Start IV therapy with normal saline; adjust the rate to maintain hydration

Pharmacologic Interventions

IV antibiotics of choice:

ceftriaxone (Rocephin) (**B class drug**), 0.5–1.0 g q12h

or

cefuroxime (Zinacef) (**B class drug**), 750 mg q8h

Monitoring and Follow-Up

Monitor oxygen saturation (with pulse oximeter if available) and vital signs closely.

Referral

Medevac to hospital.

EMERGENCIES OF THE RESPIRATORY SYSTEM

PNEUMOTHORAX

DEFINITION

Pneumothorax is partial or complete collapse of a lung because of the presence of air in the pleural space. There are 2 categories: spontaneous and traumatic. There are 3 mechanisms: closed, open and tension.

Closed pneumothorax: Air from the lung itself leaks into the pleural space through a tear in the lung tissue (e.g., when a fractured rib end tears the lung), causing the lung to collapse.

Open pneumothorax (a sucking chest wound): Air from the outside enters the pleural space through a hole in the chest wall (such as a knife wound), causing the lung to collapse.

Tension pneumothorax: This is a special form of closed pneumothorax, and it is life threatening. Air is trapped under pressure in the pleural space. It collapses the lung, then pushes on the heart and the opposite lung. If the pressure is not quickly released, the client will become hypotensive and die.

CAUSES

- Perforation of the visceral pleura and entry of air from the lung
- Penetration of the chest wall, diaphragm, mediastinum or esophagus

Risk Factors

- Idiopathic (cause unknown, a spontaneous occurrence)
- COPD (rupture of an emphysematous bulla or bleb)
- TB
- Cystic fibrosis
- Asthma
- Lung neoplasm
- Flying
- Diving
- Spontaneous vigorous exercise
- Smoking
- Penetrating chest trauma (e.g., knife or gunshot wound)
- Blunt chest trauma (e.g., rib fracture)

HISTORY

- Recent trauma
- Known COPD
- Young, tall, healthy male, 20–40 years of age (idiopathic)
- Smoking
- Sudden onset of one-sided chest or shoulder pain
- Shortness of breath
- Symptoms may develop more slowly if the collapse is gradual and the person is able to partially compensate.

PHYSICAL FINDINGS

Physical findings vary, depending on the extent of the lung tissue that has collapsed and the mechanism of the pneumothorax.

- Heart rate elevated
- Respiratory rate elevated
- Blood pressure variable: normal to hypotensive
- Mild to severe respiratory distress, oxygen saturation decreased
- Cyanosis (late feature of hypoxia)
- Movement of air may be felt over an open chest wound
- Hyperresonance (hollow) over the pneumothorax
- Breath sound decreased or absent over the pneumothorax

The trachea deviates *toward* the side of an open or a closed pneumothorax, but *away from* the side of a tension pneumothorax; the mediastinum (apex of the heart) shifts in the same direction as the trachea.

DIFFERENTIAL DIAGNOSIS

- Pleurisy
- Pericarditis
- Pulmonary embolism
- Myocardial infarction
- Dissecting aneurysm
- Diaphragmatic hernia

DIAGNOSTIC TESTS

- Chest x-ray (if available)

MANAGEMENT

Goals of Treatment

- Relieve pressure in the pleural space (tension pneumothorax)
- Improve oxygenation
- Re-expand the collapsed lung

Appropriate Consultation

Consult a physician as soon as possible.

Adjuvant Therapy

- Oxygen 6–10 L/min; keep oxygen saturation > 97% to 98%
- Ventilatory assistance as needed with Ambu bag or mask
- Start IV therapy with normal saline to keep the vein open; if there has been trauma, start 2 IVs. Replace any lost blood. *(See "Shock" in chapter 14, "General Emergencies and Major Trauma.")*

Nonpharmacologic Interventions

Tension Pneumothorax

This condition is life threatening. The pressure build-up must be released immediately by needle decompression.

- Locate the puncture site. The fourth or fifth intercostal space in the midaxillary line on the same side as the pneumothorax is recommended as the site of approach. An alternate site is the second intercostal space.
- Prepare the area with an antiseptic such as povidone–iodine (Betadine)
- Make a one-way valve by inserting a 13- or 14-gauge angiocatheter through a condom
- Insert the catheter into the skin over the fifth or sixth rib and direct it over the top of the rib into the interspace (if using the alternate site go over the top of the second rib)

Open Pneumothorax

- Cover the hole in the chest with loose sterile gauze taped on three sides
- If a foreign body (e.g., a knife) is protruding from the chest wall, *do not remove it*; stabilize it and leave it in place

Monitoring and Follow-Up

- Place client on bed rest
- Monitor ABC (airway, breathing, circulation) and lung sounds frequently

Referral

Medevac as soon as possible.

ACUTE FOREIGN-BODY OBSTRUCTION OF AN AIRWAY

DEFINITION

Complete or partial blockage of the airway with a foreign body.

CAUSES

Aspiration (due to eating too quickly, eating and talking at the same time, neurological disorders, motility disorders of the esophagus).

HISTORY AND PHYSICAL FINDINGS

Partial Airway Obstruction

- Clear history of sudden aspiration
- Symptoms of respiratory distress
- Air entry variable, ranging from adequate to poor
- With poor air entry, client has limited ability to breathe, talk and cough; cough is weak and ineffective; severe respiratory distress is present
- With adequate air entry the client can cough forcefully, talk and breathe; frequently there is wheezing between coughs; severe respiratory distress is not present.

Complete Airway Obstruction

- Client unable to speak or breathe
- Severe respiratory distress
- The hands are usually put around the throat in a classic choking signal
- Loss of consciousness will occur if the obstruction is not quickly relieved
- The victim may be unconscious
- Cyanosis

DIFFERENTIAL DIAGNOSIS

- Anaphylaxis with laryngeal edema (acute allergy)
- Airway trauma
- Acute asthmatic attack
- Any condition that can cause sudden respiratory failure (e.g., stroke, epilepsy, myocardial infarction, drug overdose)

COMPLICATIONS

- Retention of fragment of foreign material
- Fracture of ribs or internal injury as a result of abdominal thrusts
- Decompensation of pre-existing medical conditions
- Death

MANAGEMENT

Goals of Treatment

- Dislodge and remove the foreign body
- Improve oxygenation

Nonpharmacologic Interventions

- Perform abdominal thrusts to dislodge foreign body
- Do not use abdominal thrusts when the person is able to cough forcefully, breathe and speak (which indicates partial obstruction with adequate air entry); allow the person to clear his or her own airway with spontaneous coughing and breathing

Adjuvant Therapy

- Assist ventilation as necessary with Ambu bag or mask once the obstruction has been removed
- Administer oxygen as necessary once the obstruction has been removed
- Start IV therapy with normal saline to keep vein open if client shows evidence of continuing respiratory distress

Monitoring and Follow-Up

Monitor the client for development of respiratory distress (which may indicate retention of fragment of the foreign body).

Appropriate Consultation

Consult a physician if the client shows evidence of continuing respiratory distress (which may indicate retention of fragment of the foreign body).

Referral

Medevac as required for further investigation and management of continuing respiratory distress.

PULMONARY EMBOLISM

DEFINITION

Sudden obstruction of pulmonary circulation.

CAUSES

- Blood clot embolizing from deep pelvic or leg veins
- Fat embolus (related to fractured femur or pelvis), air embolus

Risk Factors

- Prolonged bed rest
- Advanced age
- Obesity
- Lower limb trauma
- Oral contraceptives
- Recent surgery
- Stroke
- Pregnancy
- Congestive heart failure
- Malignant disease

HISTORY

Symptoms vary greatly in severity. Pulmonary embolus may present as three different syndromes.

Acute cor pulmonale (right-sided heart failure) is due to massive embolus obstructing 60% to 75% of the pulmonary circulation.

Pulmonary infarction occurs in patients with massive embolism and complete obstruction of a distal branch of the pulmonary circulation.

Acute unexplained shortness of breath occurs in patients who do not have cor pulmonale or infarction.

- Sudden onset of shortness of breath (may be the only symptom)
- Pleuritic chest pain with infarction
- Cough (rare)
- Hemoptysis may be present in infarction
- Syncope (faintness) may be present in cor pulmonale
- Leg pain (infrequent)
- Anxiety

Older clients may present with increasing shortness of breath, confusion and restlessness (which indicate hypoxia).

PHYSICAL FINDINGS

The physical findings, like the history, are variable. The results of the examination can be deceptively normal or obviously abnormal. Consider pulmonary embolism in any person with unexplained dyspnea.

- Heart rate elevated
- Respiratory rate elevated
- Blood pressure normal, elevated or low (cor pulmonale)
- Mild-to-severe respiratory distress, oxygen saturation decreased
- Anxiety
- Sweating, pallor and cyanosis may be present
- Distension of neck veins with cor pulmonale
- Peripheral edema may be present with cor pulmonale
- Swelling, redness of calf infrequently present
- Calf tenderness may be present
- Peripheral pitting edema may be present
- Dullness to percussion may be present (with infarction and if associated with pleural effusion)
- Air entry may be reduced in affected area
- Crackles and wheezes may be present (with infarction)
- S_3 (gallop rhythm) may be present with cor pulmonale
- Loud second heart sound may be present

DIFFERENTIAL DIAGNOSIS

- Acute congestive heart failure
- Myocardial infarction
- Pneumonia
- Viral pleuritis
- Pericarditis

COMPLICATIONS

- Pulmonary infarction
- Cor pulmonale (right heart failure)
- Left heart failure with pulmonary edema
- Recurrent emboli
- Death

DIAGNOSTIC TESTS

- Electrocardiography; results are often normal, except for tachycardia, but can help rule out myocardial ischemia

MANAGEMENT

Goals of Treatment

- Prevent death
- Prevent recurrent embolization

Appropriate Consultation

Consult a physician as soon as possible.

Adjuvant Therapy

- Oxygen 6–10 /min or more prn; keep oxygen saturation > 97% to 98%
- Start IV therapy with normal saline; adjust rate according to state of hydration
- If hypotension is present, resuscitate with appropriate fluid volumes (*see "Shock" in chapter 14, "General Emergencies and Major Trauma"*)

Nonpharmacologic interventions

Bed rest.

Monitoring and Follow-Up

- Monitor ABC and vital signs frequently if abnormal
- Assess lung sounds periodically for signs of cardiac failure

Referral

Medevac as soon as possible.

If the client has evidence of pulmonary edema, refer to *"Pulmonary Edema" in chapter 4, "Cardiovascular System."*

INHALATION OF TOXIC MATERIALS

DEFINITION

Inhalation of gases, fumes or particulate matter.

CAUSES

- Household fires
- Leaky vehicle muffler
- Suicide attempt
- Chemical exposure in the work place
- Agents: carbon monoxide, carbon dioxide, toxic gases, toxic byproducts from the burning of plastics

HISTORY

- Exposure to any of the agents listed above
- Cough and sputum (which may be black)
- Shortness of breath
- Sore throat, hoarseness
- Altered consciousness or confusion before admission

PHYSICAL FINDINGS

- Heart rate elevated
- Respiratory rate increased
- Blood pressure may be elevated
- Oxygen saturation with pulse oximeter is not accurate for carbon monoxide poisoning
- Level of consciousness variable
- Degree of respiratory distress variable
- Facial burns, singed eyebrows and nasal hair
- Soot around or in the nose
- Mucosal irritation or thermal injury of the mouth with erythema and carbon deposits (soot)
- Other cutaneous burns
- Irritation of the mucous membranes (eyes)
- Air entry may be reduced
- Wheezes may be present
- Stridor or wheeze may be heard
- A flushed face and rosy red cheeks are characteristic of carbon monoxide poisoning

DIFFERENTIAL DIAGNOSIS

- Drug overdose
- Alcohol intoxication

COMPLICATIONS

- Bronchospasm
- Pulmonary edema
- Acute laryngeal edema
- Obstruction of the upper airway
- Deterioration of pre-existing heart or lung disease
- Death

DIAGNOSTIC TESTS

- Chest x-ray (if available), but only if you think it will alter your decision to transfer care to hospital

MANAGEMENT

Goals of Treatment

- Improve oxygenation
- Identify associated injuries to underlying lung

Appropriate Consultation

Consult a physician.

Adjuvant Therapy

- Oxygen 10–12 L/min or more by mask
- Higher-flow oxygen is needed for carbon monoxide poisoning — consult physician
- Start IV therapy with normal saline; adjust the rate according to the state of hydration

Pharmacologic Interventions

Bronchospasm is treated with inhaled salbutamol (Ventolin) (*See sections on management of asthma, above, this chapter, for details.*)

Monitoring and Follow-Up

Monitor ABC and lung sounds closely.

Referral

Medevac as soon as possible.

CHAPTER 4 – CARDIOVASCULAR SYSTEM

Table of Contents

ASSESSMENT OF THE CARDIOVASCULAR SYSTEM

HISTORY OF PRESENT ILLNESS AND REVIEW OF SYSTEM

GENERAL

The following characteristics of each symptom should be elicited and explored:

- Onset (sudden or gradual)
- Chronology
- Current situation (improving or deteriorating)
- Location
- Radiation
- Quality
- Timing (frequency, duration)
- Severity
- Precipitating and aggravating factors
- Relieving factors
- Associated symptoms
- Effects on daily activities
- Previous diagnosis of similar episodes
- Previous treatments
- Efficacy of previous treatments

CARDINAL SYMPTOMS

In addition to the general characteristics outlined above, additional characteristics of specific symptoms should be elicited, as follows.

Chest Pain

- Associated symptoms (e.g., faintness, shortness of breath)
- Relation to effort, exercise, meals, bending over

Shortness of Breath

- Relation to exercise (level ground, uphill, stairs)
- Relation to posture
- Orthopnea (number of pillows used for sleeping)
- Paroxysmal nocturnal dyspnea
- Associated swelling of ankles or recent weight gain

Fainting or Syncope

- Weakness, lightheadedness, loss of consciousness
- Associated symptoms (e.g., pain, palpitations, shortness of breath, lightheadedness, nausea, sweating)
- Relation to postural changes, vertigo or neurologic symptoms

Palpitations

- Description: fast or slow, irregular or regular
- Relation to exercise

Sputum

- Color
- Consistency (e.g., frothy white, pink)

Cyanosis

- Observation of blue color of the lips or fingers (under what circumstances, when first noted, recent change in this characteristic)

Extremities

- Site of edema (e.g., in dependent body parts)
- Relation of edema to activity or time of day
- Intermittent claudication (exercise-induced leg pain)
- Distance client can walk before onset of pain related to claudication
- Time needed to rest to relieve claudication
- Temperature of affected tissue (warm, cool or cold)
- Tingling
- Leg cramps or pain at rest
- Presence of varicose veins

Other Associated Symptoms

- Sweating
- Nausea
- Vomiting

MEDICAL HISTORY (SPECIFIC TO CARDIOVASCULAR SYSTEM)

- Increased cholesterol level
- Hypertension
- Coronary artery disease (angina)
- Myocardial infarction
- Cardiac murmurs
- Rheumatic fever
- Valvular heart disease
- Diabetes mellitus
- Thyroid disease
- Chronic renal disease
- Chronic obstructive pulmonary disease (COPD)
- Systemic lupus erythematosus
- Recent viral illness (e.g., viral cardiomyopathy)

FAMILY HISTORY (SPECIFIC TO CARDIOVASCULAR SYSTEM)

- Diabetes mellitus
- Hypertension
- Coronary artery disease (ischemic)
- Heart disease
- Myocardial infarction (especially in family members < 50 years of age)
- Sudden death from cardiac disease
- Hypercholesterolemia
- Hypertrophic cardiomyopathy

PERSONAL AND SOCIAL HISTORY (SPECIFIC TO CARDIOVASCULAR SYSTEM)

- Smoking
- Exposure to secondhand smoke
- Obesity
- High stress levels (personal or occupational)
- Chronic abuse of cocaine, amphetamines, anabolic steroids
- Alcohol abuse

EXAMINATION OF THE CARDIOVASCULAR SYSTEM

An examination of the cardiovascular system involves more than just examining the heart. The examination generally covers two systems: the central cardiovascular system (head, neck and precordium [anterior chest]) and the peripheral vascular system (extremities). Examination of the cardiovascular system must also include a full assessment of the lungs and neuromental status (for signs of confusion, irritability or stupor).

VITAL SIGNS

- Temperature
- Pulse
- Respiratory rate
- Oxygen saturation
- Blood pressure (lying and standing, in both arms)

HEAD AND NECK

- Central cyanosis
- Color of conjunctiva
- Jugular venous pressure
- Carotid bruits

INSPECTION OF PRECORDIUM (ANTERIOR CHEST)

- Look for visible pulsations of the chest wall

PALPATION

- Location of apical beat (point of maximum impulse [PMI])
- Quality and intensity of apical beat (normal, diffuse, weak, forceful)
- Heave (abnormally forceful PMI)
- Thrill (a palpable murmur that feels like a purr)
- Identify and assess pulsations and thrills in aortic, pulmonic, mitral and tricuspid areas, along left and right sternal borders, in epigastrium and along left anterior axillary line

AUSCULTATION

- Listen to normal heart sounds before trying to identify murmurs
- Use diaphragm of stethoscope first, then bell of stethoscope, when listening to the heart
- Listen at apex, in aortic and pulmonic areas, and along left sternal border

HEART SOUNDS

- Determine rate and rhythm
- Determine if there is an underlying rhythm or if rhythm is completely irregular
- Identify and describe intensity of first and second heart sounds
- Identify extra sounds (S_3, S_4, splitting of second sound, rubs)

MURMURS

- Timing (in relation to the cardiac cycle)
- Quality
- Intensity (loudness)
- Location where murmurs sound loudest
- Radiation
- Pitch

BRUITS

- Carotid
- Abdominal
- Iliac
- Femoral

EXTREMITIES

Hands

- Color of skin, nail beds
- Nicotine stains
- Clubbing of fingers
- Temperature
- Equality of pulses (brachial, radial)
- Synchrony of radial and femoral pulses
- Capillary refilling time

Legs

- Color (pigmentation, discoloration), distribution of hair
- Temperature, texture
- Capillary refilling time
- Changes in foot color with changes in leg position (e.g., blanching with elevation, rubor with dependency)
- Ulcers, varicose veins, edema (check sacrum if client is bedridden)
- Presence and equality of pulses (femoral, popliteal, posterior tibial, dorsalis pedis)

OTHER ASSESSMENTS

For a client whose condition is not of an urgent nature, assess the following:

- Evidence of hypertensive or diabetic retinopathies (funduscopic exam)
- Color, temperature, rashes, lesions, xanthoma of skin
- Abdominal bruits, enlargement of liver, tenderness in right upper quadrant of abdomen

DIFFERENTIAL DIAGNOSIS OF CARDINAL CARDIOVASCULAR SYMPTOMS

CHEST PAIN

See Table 1.

Table 1: Differential Diagnosis of Chest Pain

Characteristic of Chest Pain	Myocardial Infarction or Acute Coronary Insufficiency	Angina	Pneumonia	Pulmonary Embolism*	Pericarditis	Musculoskeletal Disorder	Esophageal, Gastric or Duodenal Disorder	Stress or Emotional Disorder
Onset	Sudden, patient at rest	With exertion	Gradual or sudden	Sudden	Gradual or sudden	Gradual or sudden	Gradual or sudden	Gradual or sudden
Location	Retrosternal, anterior chest	Retrosternal, anterior chest	Anterior, lateral and/or posterior lung field(s)	Retrosternal, anterior chest, lateral chest	Retrosternal, anterior chest	Anterior, lateral and/or posterior chest wall	Retrosternal, epigastric, left chest, left or right upper quadrant	Variable; anterior chest, left chest
Radiation	Left arm, left shoulder, neck, jaw, back, upper abdomen	Left arm, left shoulder, neck, jaw, back, upper abdomen	Anterior chest, shoulder, neck	Variable	Variable: shoulder tip, neck	Arm, shoulder, neck, back, abdomen	May be felt in back or arm	Usually none
Duration	> 20 min	Usually < 1–2 min	Hours	Variable	Hours to days	Minutes or hours	Minutes or hours	Minutes or hours
Intensity	Severe	Mild to moderate	Moderate	Absent or mild to moderate	Usually moderate, but may be severe	Mild to moderate	Moderate	Mild to moderate
Quality	Sensation of squeezing, pressure	Sensation of tightness, pressure	Constant ache, with intermittent knife-like pain	Dull ache; knife-like pain may also be present	Sharp	Dull ache; sharp pain may also be present	Burning (usually), tightness	Achy, stabbing
Relief	None	Rapid relief with rest and/or sublingual nitroglycerin	None	None	Sitting up and leaning forward often helps; other changes in position may alter the pain	Rest, mild analgesics	Antacids, milk, sitting up or standing up	Rest, relaxation, distraction
Precipitating or aggravating factors	None may be obvious	Exertion, heavy meal, walking uphill against a cold wind	Increased pain with coughing or deep inspiration; recently ill with a cold	Immobilization; none may be obvious; pain may be worse with deep inspiration or coughing	Previous infection of upper respiratory tract; pain worse with deep inspiration or coughing	History of unaccustomed physical work; pain worse with arm action	Certain foods, a large meal, bending over; pain may awaken person from sleep and may occur when stomach is empty	Stressful situations, fatigue
Associated signs and symptoms	Nausea, sweating, shortness of breath, anxiety, palpitations	Typically none	Fever, cough, sputum, shortness of breath	Shortness of breath, sweating, hemoptysis, leg pain (rare)	Symptoms of infection of upper respiratory tract may be present; malaise; usually occurs in younger adults	Localized chest-wall tenderness, tender costochondral area	Regurgitation of acid in mouth, belching, difficulty swallowing, sticking sensation when food swallowed, cough (rare); test of stool for occult blood may be positive	Tightness in neck and shoulder(s), headaches, reduced appetite, mild weight loss, fatigue, sleep disturbance, palpitations, dizziness, hyperventilation symptoms

*Chest pain may be absent in pulmonary embolism.

DYSPNEA

Cardiac Causes

- Congestive heart failure (right, left or biventricular)
- Coronary artery disease
- Myocardial infarction (recent or past history)
- Cardiomyopathy
- Valvular dysfunction
- Left ventricular hypertrophy
- Asymmetric septal hypertrophy
- Pericarditis
- Arrhythmias

Pulmonary Causes

- COPD
- Asthma
- Restrictive lung disorders
- Hereditary lung disorders
- Pneumothorax

Mixed Cardiac and Pulmonary Causes

- COPD with pulmonary hypertension and cor pulmonale
- Deconditioning
- Chronic pulmonary emboli
- Trauma

Noncardiac or Nonpulmonary Causes

- Metabolic conditions (e.g., acidosis)
- Pain
- Neuromuscular disorders
- Otorhinolaryngeal disorders

Functional Causes

- Anxiety
- Panic disorders
- Hyperventilation

FAINTNESS AND SYNCOPE

Faintness is characterized by transient symptoms of lack of strength associated with an impending sense of loss of consciousness. Syncope is characterized by transient symptoms of generalized weakness associated with loss of consciousness and loss of muscle tone. Symptoms are due to a temporary impairment of cerebral function and are usually precipitated by a reduction in cerebral perfusion.

Vascular Causes

- Vasovagal hypotension (common faint)
- Postural hypotension
- Cerebrovascular disease (transient ischemic attack, stroke, vertebral–basilar insufficiency, carotid insufficiency)

Neurological Causes

- Seizure
- Head trauma

Cardiac Causes

- Abnormally slow heart rate and rhythm
- Abnormally rapid heart rate and rhythm
- Reduced cardiac output
- Acute blood loss (gastrointestinal hemorrhage)
- Valvular heart disease (aortic or pulmonic stenosis)
- Pulmonary hypertension

Other Causes

- Hyperventilation (syncope rare, faintness common)
- Hypoxia

PALPITATIONS

Primary Arrhythmic Causes

- Sinus tachycardia or arrhythmia
- Premature supraventricular or ventricular ectopic contractions
- Bradycardia–tachycardia syndrome (“sick sinus syndrome”)
- Supraventricular tachycardia
- Multifocal atrial tachycardia
- Atrial fibrillation, flutter or tachycardia
- Atrioventricular nodal re-entrant tachycardia
- Atrioventricular reciprocating tachycardia (Wolff–Parkinson–White syndrome)
- Accelerated junctional rhythm
- Ventricular tachycardia
- Bradycardia due to advanced atrioventricular block or sinus node dysfunction

Extracardiac Causes

- Changes in contractility, heart rate or stroke volume
- Fever
- Hypovolemia
- Anemia
- Hypoglycemia
- Pulmonary disease
- Pheochromocytoma
- Thyrotoxicosis
- Vasovagal episodes

Drug-Related Causes

- Vasodilators
- Substance abuse (e.g., cocaine, alcohol, tobacco, caffeine)
- Digoxin
- Phenothiazine
- Theophylline
- $ß_2$-Agonists
- Antiarrhythmics

Psychiatric Causes

- Panic attack
- Hyperventilation

Other Cardiac Causes

- Changes in contractility or stroke volume
- Valvular disease such as aortic insufficiency or stenosis
- Atrial or ventricular septal defect
- Congestive heart failure
- Cardiomyopathy
- Congenital heart disease
- Pericarditis
- Pacemaker-mediated tachycardia
- Pacemaker syndrome

LEG EDEMA

See Table 2.

Table 2: Differential Diagnosis of Leg Edema

Mechanism	Disease or Syndrome	Usual Clinical Features
Increased capillary pressure		
Obstruction of inferior vena cava	Thrombosis, malignancy	Bilateral, severe (may be mild if partial obstruction)
Deep venous obstruction in leg	Thrombosis, extrinsic compression	Unilateral, mild
Reduced venous channels or venous valve incompetence	Coronary bypass grafting, stroke, varicosities	Unilateral or bilateral, mild
Right atrial hypertension	Left ventricular dysfunction	Bilateral
	Pulmonary disease	Bilateral
	Valve disease	Bilateral
	Renal dysfunction	Bilateral, mild
Reduced lymphatic clearance (lymphatic obstruction)	Lymphadenopathy, filariasis	Unilateral or bilateral
Decreased capillary oncotic pressure (hypoalbuminemia)	Severe malnutrition; liver, renal, gastrointestinal disease	Bilateral, mild or severe, generalized, poor prognosis
Increased capillary permeability	Calcium-channel blockers	Bilateral, mild
	Idiopathic cyclic edema	Bilateral, mild, premenstrual female

COMMON PROBLEMS OF THE CARDIOVASCULAR SYSTEM

DYSLIPIDEMIA (HYPERLIPIDEMIA)

DEFINITION

Elevation in serum lipoproteins are a major risk factor for coronary artery disease. The two main lipids in blood are cholesterol and triglyceride. Cholesterol has three clinically significant components: high-density lipoprotein (HDL), low-density lipoprotein (LDL) and very-low-density lipoprotein (VLDL). Triglyceride is found in VLDL particles, but its role in atherosclerosis is not clear. A high level of triglycerides (> 11.0 mmol/L) carries a risk for pancreatitis.

Dyslipidemia is one of the primary causes of atherosclerotic plaque. Up to 75% of patients with coronary artery disease have dyslipidemia. Normalization of lipid values will both lower the rate of symptomatic coronary artery disease and improve overall survival. Dyslipidemia is strongly associated with recurrence of symptomatic coronary artery disease.

CAUSES

Primary Hyperlipidemia

Primary (genetic) single-gene disorders are transmitted by simple dominant or recessive mechanism.

Secondary Hyperlipidemia

Secondary hyperlipidemia occurs as part of a constellation of abnormalities in certain metabolic pathways.

- Hypothyroidism
- Pregnancy
- Excess weight
- Excess alcohol intake
- Obstructive liver disease
- Nephrotic syndrome
- Medications (e.g., thiazide diuretics, some ß-blockers, oral contraceptives, corticosteroids)

HISTORY

- Ask about risk factors and possible causes of secondary hyperlipidemia.
- Previously identified hypercholesterolemia (total cholesterol > 6.2 mmol/L)
- Previously identified low levels of HDL cholesterol (< 0.9 mmol/L)
- Smoking
- Hypertension: blood pressure of 140/90 mm Hg confirmed on repeated determinations or while client is taking antihypertension medication
- Antecedent cardiovascular disease or family history of premature myocardial infarction (in people < 55 years of age)
- Endocrine disease (diabetes mellitus or secondary causes, including hypothyroidism, renal disease or medications)
- Men > 45 years of age are at greater risk
- Postmenopausal women (> 55 years of age) and younger women with artificial menopause and no hormonal replacement are at greater risk

PHYSICAL FINDINGS

- Blood pressure may be elevated if hypertensive
- Arcus corneae (significant in a younger person)
- Retinopathies (seen on funduscopy)
- Xanthomas (lipid deposits)
- Arterial bruits may develop if artherosclerosis is present
- Peripheral pulses may be diminished if atherosclerosis is present
- Obesity

COMPLICATIONS

- Cardiac disease or atherosclerosis (e.g., angina, myocardial infarction)
- Pancreatitis (hypertriglyceridemia)

DIAGNOSTIC TESTS

Guidelines for Lipid Testing

Screening for dyslipidemia by means of a fasting lipid profile (total cholesterol, HDL cholesterol, triglycerides and LDL cholesterol) is suggested for the following groups.

Patients with atherosclerotic vascular disease:

Every 1–3 years, as clinically indicated, up to age 75

Patients with xanthomas or a family history of atherosclerotic vascular disease:

One-time measurement when young. If previous test results are normal, repeat at age 30 and resume testing every 5 years from age 40 for men and age 50 for women

Patients with diabetes mellitus:

Every 1–3 years, as clinically indicated

Men 40–70 years of age, women 50–70 years of age, even those with no other risk factors:

Every 5 years

Lipid test results should be interpreted in light of other risk factors for coronary artery disease.

MANAGEMENT

Goals of Treatment

– Decrease cardiovascular disease by modifying serum cholesterol
– Prevent pancreatitis from severe hypertriglyceridemia

Primary prevention is aimed at identifying dyslipidemia before complications occur

Target: LDL cholesterol < 4.1 mmol/L if client has < 2 cardiovascular risk factors

Target: LDL cholesterol < 3.4 mmol/L if client has ≥ 2 cardiovascular risk factors

Secondary prevention is directed at reducing the impact of dyslipidemia for people with previous cardiovascular disease. These targets are aimed specifically at high-risk patients and are more stringent than those recommended for the general population.

Target: LDL cholesterol < 2.6 mmol/L

Nonpharmacologic Interventions

– Dietary modification aimed at lowering lipid levels should *always be the first approach* to treating dyslipidemias (a 6-month dietary trial is mandatory before medications are prescribed)
– During dietary modification, repeat lipid measurements 2 or 3 times
– Weight reduction
– Smoking cessation
– Increased physical activity

Optimal Control of Other Diseases Related to the Development of Heart Disease

– For hypertension, target blood pressure: systolic < 140 mm Hg, diastolic < 90 mm Hg
– For diabetes mellitus, aim for optimal, realistic blood glucose level
– Diet and lifestyle modification
– Appropriate pharmacologic agents

Pharmacologic Interventions

– Fibrates (e.g., gemfibrozil)
– HMGCoA reductase inhibitors (“statins,” e.g., lovastatin, simvastatin, pravastatin)
– Bile acid sequestrants (e.g., cholestyramine)
– Nicotinic acid (niacin)

Combinations of several drugs can be used, and it is safe to use resins in all combinations. However, combinations of statins with fibrates or niacin should be used with caution because of an increased frequency of more severe muscle and liver complications.

Monitoring and Follow-Up

Follow-up is important; check the response to treatment within 6 weeks (safety blood tests should be carried out early) and, if the results are satisfactory, continue follow-up at regular intervals thereafter (every 3–12 months).

Monitor liver function, cytokinase, complete blood count and creatinine 3, 6 and 12 months after initiation of lipid-lowering drugs and annually thereafter.

Frequency of testing to monitor treatment of dyslipidemia:

Patients on diet therapy only:

Initiation: Every 3–6 months to 1 year

Maintenance: Every 6–12 months

Patients on diet and drug therapy:

Initiation of drug therapy: Every 6–8 weeks to 6 months, depending on severity

Maintenance: Every 3 months in the first year, every 6–12 months thereafter

Referral

Refer all clients diagnosed with hyperlipidemia to a physician for evaluation and to determine whether lipid-lowering medications are needed.

ANGINA PECTORIS

DEFINITION

Heart disease that occurs as a result of inadequate oxygen and blood supply to the myocardium.

TYPES

Stable Angina

Predictable pattern of exertional pressure sensation in the anterior chest relieved by rest or nitroglycerin. No change in frequency, severity or duration of angina episodes during the preceding 6 weeks.

Unstable Angina

Angina that is of new onset, or is changing, so that it is occurring with increasing severity, frequency or duration or is occurring at rest.

Myocardial Infarction

For details of this type of angina, *refer to "Emergencies of the Cardiovascular System," below, this chapter*.

CAUSES

Angina pectoris is the result of myocardial ischemia, which occurs when the cardiac workload and myocardial oxygen demands exceed the ability of the coronary arteries to supply oxygenated blood. It is the main clinical expression of coronary artery disease (subintimal deposition of atheromas in the large and medium-sized arteries serving the heart).

Risk Factors

- Hypertension
- Hyperlipidemia
- Diabetes mellitus
- Cigarette smoking
- Family history of premature coronary artery disease (e.g., father died of coronary artery disease before reaching 60 years of age)
- Use of oral contraceptives
- Sedentary lifestyle
- Obesity (particularly with a truncal distribution)

HISTORY

Stable Angina

Chest pain described as tightness, pressure or aching that is typically located in the substernal area, radiating down one or both arms for 5 minutes or less, precipitated by exercise or emotional stress and relieved by rest or nitroglycerin.

Unstable Angina

More severe anginal pain that lasts more than 30 minutes or that occurs during rest and is not relieved by rest or sublingual nitroglycerin.

Associated Symptoms

- Dyspnea
- Nausea or vomiting
- Sweating
- Weakness
- Palpitations

PHYSICAL FINDINGS

- Diaphoresis
- Apprehension
- Oxygen saturation (may be normal or abnormal in myocardial infarction)
- Blood pressure (may be elevated or reduced in myocardial infarction)
- Tachycardia
- S_4 gallop
- Electrocardiogram (ECG) changes (depression of ST segment, inversion of T wave)

These findings are transient in stable angina and disappear when the pain resolves. People with stable angina are usually seen in a clinic after an attack because of the mild, short, episodic nature of the discomfort. After an episode there are usually no significant physical findings.

DIFFERENTIAL DIAGNOSIS

- Chest-wall pain
- Other musculoskeletal discomfort
- Peptic ulcer disease
- Gastroesophageal reflux
- Esophageal spasm
- Indigestion
- Anxiety attack
- Pulmonary emboli
- Pericarditis
- Aortic dissection
- Pneumothorax (spontaneous)

COMPLICATIONS

- Unstable angina
- Future myocardial infarction

DIAGNOSTIC TESTS

- Compare current ECG tracing with previous one, if available; look for signs of ischemia (depression of ST segment, inversion of T wave, new changes)
- Obtain complete blood count, and determine blood glucose, creatinine and cholesterol levels

MANAGEMENT OF STABLE ANGINA

Goals of Treatment

- Decrease or prevent recurrence of pain
- Identify and manage risk factors
- Improve exercise tolerance
- Prevent complications

Appropriate Consultation

Consult a physician as soon as possible for help with diagnosis and treatment options.

Nonpharmacologic Interventions

Client Education

- Ensure that client understands disease process
- Encourage client to make lifestyle changes (e.g., dietary modifications to reduce fat and cholesterol)
- Encourage client to reduce weight, stop smoking, avoid strenuous exercise but increase moderate exercise (e.g., walking)

Pharmacologic Interventions

For prophylaxis against thrombus formation:

enteric-coated acetylsalicylic acid (ASA) (**A class drug**), 325 mg od, if not contraindicated and client is not already using

For acute episodes of angina:

nitroglycerin (**C class drug**), 0.3- to 0.6-mg SL tabs or lingual spray (0.4 mg) prn

For long-term prophylaxis:

Step 1: If nitroglycerin is effective and client is *not* hypertensive, long-acting nitrates are added (e.g., Isordil or Nitro-Dur Patch) (**B class drug**), 0.2–0.8 mg/h for 12 hours of each 24-hour period

Step 2: If there is inadequate response to the long-acting nitrates or the client is hypertensive, either ß-blocker, e.g., metoprolol (Betaloc) (**B class drug**), *or* calcium-channel blocker, e.g., diltiazem (Cardizem) (**B class drug**), is added

Step 3: If there is inadequate response to the addition of the ß-blocker or calcium-channel blocker, then combination therapy, with a ß-blocker and a calcium-channel blocker, is tried

There is increasing evidence that ß-blockers are the drug of first choice in the management of angina. ß-Blockers are at least as effective as the other two classes in controlling symptoms. ß-Blockers have also been shown to decrease the risk of adverse cardiac events in patients with angina and silent ischemia. Nitrates and calcium-channel blockers do not have this added beneficial effect. For the patient whose condition is not controlled by ß-blockers or who is intolerant to these drugs, long-acting nitrates work well in combination with ß-blockers and are the obvious second choice.

Monitoring and Follow-Up

- Follow up every 6 months once client's symptoms are stable
- Monitor symptoms and identify any changes, especially increases
- Monitor weight and smoking
- Monitor blood pressure and pulse
- Obtain regular blood work as directed
- Monitor adherence and response to long-term lifestyle modifications and medications (e.g., ß-blockers)

Referral

Refer all previously undiagnosed clients and any clients whose symptoms are not controlled on current therapy to a physician for a thorough evaluation. Once the condition has been stabilized, the client should be assessed by a physician at least annually.

MANAGEMENT OF UNSTABLE ANGINA

For anyone who has pain on presentation at the clinic, anyone with a history of angina of recent onset or anginal symptoms at rest, and anyone with known heart disease and an increase or change in anginal pattern and ECG changes.

Appropriate Consultation

Consult a physician as soon possible.

Adjuvant Therapy

- Oxygen 6–10 L/min; keep oxygen saturation > 97% to 98%
- Start IV therapy with normal saline to keep vein open

Nonpharmacologic Interventions

Bed rest for clients experiencing pain on presentation.

Pharmacologic Interventions

nitroglycerin (**C class drug**), 0.3-mg SL tab stat; repeat dose twice, q5min

If the client is hypotensive or has bradycardia on presentation, do not give nitroglycerin without first consulting a physician. If pain is not relieved, treat as myocardial infarction (*see "Myocardial Infarction," this chapter*).

Monitoring and Follow-Up

Continue to closely monitor pain, vital signs (including oxygen saturation), heart and lung sounds, and ECG results.

Referral

Medevac as soon as possible.

Coronary artery bypass surgery or angioplasty may be indicated for any client who continues to have significant symptoms despite maximal medical therapy.

CONGESTIVE HEART FAILURE

DEFINITION

A clinical syndrome caused by an accumulation of fluid peripherally (right ventricular failure) or in the lungs (left ventricular failure), or both, from inadequate functioning of the heart. Congestive heart failure is a complication of an underlying disease process.

Systolic heart failure (the more common form) is due to impaired systolic pumping action of the heart. Diastolic heart failure occurs when the systolic function is normal but the filling of the heart is impaired.

CAUSES (PRECIPITATING FACTORS IN ACUTE HEART FAILURE)

Increased Myocardial Demand

- Stress (physical, environmental or emotional)
- Infection or fever
- Anemia
- Hyperthyroidism
- Hypertension
- Pregnancy

Compliance and Lifestyle

- Inadequate or improper medication intake
- Dietary indiscretion (e.g., excess consumption of salt or water)
- Heavy alcohol consumption

Salt and Water Retention

- Medications: nonsteroidal anti-inflammatory drugs (NSAIDs), steroids, tricyclic antidepressants, chlorpropamide
- Renal disease

Decreased Pump Function of the Ventricles

- Negative inotropic medications: ß-blockers, calcium-channel blockers, antiarrhythmics, chemotherapeutic agents
- Arrhythmias
- Ischemia or infarction
- Pulmonary embolism
- Radiation treatment

HISTORY

- Shortness of breath (initially induced by exercise)
- Later progression to orthopnea, paroxysmal nocturnal dyspnea and dyspnea at rest
- Chronic, nonproductive cough, worse at night or when lying down
- Ankle edema
- Recent weight gain
- Nocturia
- Chronic fatigue
- Palpitations
- Symptoms of intercurrent illness (e.g., pneumonia)
- Anxiety may aggravate condition
- Alterations of mental status in elderly clients may be present as chronic heart failure progresses

PHYSICAL FINDINGS

There is a broad range in severity of findings.

- Heart rate elevated
- Respiratory rate increased
- Blood pressure may be normal, elevated or low
- Weight increased (reflecting fluid retention)
- Minimal to extreme distress when client lies down
- Jugular venous distension may be present
- Jugular venous pressure elevated (> 3 cm)
- Edema may be present (pedal, ankle or tibial; sacral if bedridden)
- Hepatomegaly
- Hepatojugular reflux
- Ascites (rare)
- Lung bases may be dull (pleural effusion) bilaterally, but only rarely
- Fine crackles in the bases of lungs
- S_3, S_4 or gallop rhythm may be present; murmurs may be present if there is associated valvular dysfunction

DIFFERENTIAL DIAGNOSIS

- *See "Causes," above.*
- Acute bronchitis in COPD or asthma
- Other causes of edema (renal disease, liver disease, local venous stasis, lymphedema)
- Pulmonary embolism

COMPLICATIONS

- Arrhythmias
- Hepatomegaly (ascites)
- Acute pulmonary edema
- Hypokalemia from use of diuretics
- Angina
- Decreased renal function, decreased renal clearance of drugs (digoxin toxicity)
- Pulmonary embolism
- Side effects of medication

DIAGNOSTIC TESTS

- Perform ECG and compare with any previous tracings
- Look for signs of ischemia (depression of ST segment, inversion of T wave), atrial fibrillation, bradycardia

Do the following diagnostic tests only if the person is not ill enough to require hospitalization:

- Complete blood count
- Blood glucose level
- Thyroid function
- Liver function
- Ferritin level
- Creatinine level
- Electrolyte levels
- Digoxin level (if applicable) and if not determined recently (within past 3 months)
- Chest x-ray (for cardiomegaly, pulmonary edema, pleural effusions), if available

MANAGEMENT OF CHRONIC HEART FAILURE

Goals of Treatment

- Control symptoms
- Identify and manage underlying cause
- Limit factors that precipitate or aggravate condition
- Prevent progression
- Improve quality of life and survival

Because there is a broad range of severity, assessment of severity will help guide management. Definitive and precise medical management depends on whether the failure is due to systolic or diastolic dysfunction and the underlying or precipitating cause (e.g., atrial fibrillation).

Appropriate Consultation

Consult a physician as soon as possible.

Nonpharmacologic Interventions

Client Education

- Ensure client understands disease process and outcome (progressive, can be controlled but not cured)
- Recommend dietary modifications: reduce sodium, increase dietary potassium (if renal function has been adequate in the past), reduce fat and cholesterol
- Recommend reduction in fluid intake to 1.2–2.0 L/day
- Recommend restriction of alcohol use
- Recommend weight loss, if applicable
- Recommend that client monitor we ight at home, and see the nurse if he or she gains more than 1.5 kg (3 lb) in a day
- Recommend rest after meals
- Encourage client to start an exercise program (walking) to improve exercise tolerance
- Stress the importance of long-term follow-up (every 3–6 months when stable)
- Counsel client about appropriate use of medications (dose, frequency, compliance, side effects)
- Teach clients taking digoxin to monitor pulse

Adjuvant Therapy

- Pneumococcal vaccine
- Influenza vaccine annually

Pharmacologic Interventions

Four classes of drugs are currently recommended to manage congestive heart failure: angiotensin-converting enzyme (ACE) inhibitors, diuretics, cardiac glycosides, and nitrates or direct vasodilators.

A stepwise approach is often used.

Step 1: ACE inhibitors, e.g., captopril (Capoten) (**B class drug**)

Step 2: Diuretics, e.g., furosemide (Lasix) (**B class drug**)

Step 3: Cardiac glycosides, e.g., digoxin (Lanoxin) (**B class drug**)

Step 4: Nitrates or vasodilator, e.g., topical nitroglycerin (Nitro-Paste) (**B class drug**), 1.25–2.5 cm q12h for 24 hours

Nitrates

A long-acting nitroglycerin preparation to reduce the workload of the heart is often recommended to reduce symptoms and improve exercise tolerance in clients who cannot tolerate ACE inhibitors or who remain symptomatic despite maximal therapy with ACE inhibitors, diuretics and digoxin or if there is myocardial ischemia (i.e., systolic blood pressure > 100 mm Hg).

Vasodilators

Vasodilators such as hydralazine may also be used in combination with nitrates in clients with refractory symptoms despite use of ACE inhibitors, diuretics and digoxin or those who cannot tolerate ACE inhibitors.

ß-Blockers

ß-Blockers such as metoprolol can be used in clients with chronic congestive heart failure to preserve or improve ventricular function. They can be used to control symptoms of ischemia in clients with congestive heart failure and angina.

ß-Blockers should be avoided in clients with low cardiac output and should be used only with extreme caution in clients with obstructive lung disease (e.g., asthma).

Calcium-Channel Blockers

Calcium-channel blockers may be used in clients with diastolic congestive heart failure to control arterial blood pressure and to help induce regression of myocardial hypertrophy. They are also useful in client with hypertrophic cardiomyopathy.

Calcium-channel blockers are generally contraindicated in systolic heart failure and in clients who have had myocardial infarction with left ventricular dysfunction.

Antiarrhythmic Drugs

Antiarrhythimc drugs are generally used for symptomatic clients with sustained ventricular arrhythmias or to help maintain sinus rhythm in atrial fibrillation.

Anticoagulation

Anticoagulation is strongly recommended for all clients with heart failure and associated atrial fibrillation.

Long-Term Monitoring and Follow-Up

- Review cardiac and respiratory systems for symptoms
- Weigh client and chart weight every visit
- Review current medications for use, dosage, frequency, compliance, side effects, drugs with sodium-retaining effects (e.g., NSAIDs)
- Instruct client to return to clinic if symptoms worsen or chest pain develops
- Laboratory tests every 3–6 months: complete blood count, creatinine level, electrolyte levels, uric acid level (if taking a thiazide diuretic), urinalysis for proteinuria, digoxin level

Referral

Refer client to a physician for a thorough evaluation and tailoring of drug therapy regimen.

MANAGEMENT OF ACUTE DECOMPENSATED HEART FAILURE

Appropriate Consultation

Consult a physician as soon as possible.

Adjuvant Therapy

- Oxygen 6–10 L/min; keep oxygen saturation > 97% to 98%
- Start IV therapy with normal saline to keep vein open

Nonpharmacologic Interventions

Bed rest with head elevated.

Pharmacologic Interventions

Diuretics:

furosemide (Lasix) (**D class drug**), 40–80 mg IV

The dose may have to be higher in a person who is already taking this drug on a maintenance basis for congestive heart failure; one guideline is to double the client's usual maintenance dose. Adjust the diuretic dose according to client's response. Look for improvement in respiratory status.

Nitrates (long-acting) to reduce the workload of the heart:

topical nitroglycerin (Nitro-Paste) (**B class drug**), 1.25–2.5 cm q6–8h, provided systolic blood pressure > 100 mm Hg

Monitoring and Follow-Up

- Monitor vital signs, pulse oximetry
- Airway, breathing and circulation (ABC)
- Level of consciousness
- Listen to heart and lung sounds
- Record intake and urinary output
- Monitor response to therapy

Referral

Medevac as soon as possible.

DEEP VEIN THROMBOSIS

DEFINITION

Acute formation of a blood clot or thrombus within a vein resulting in obstruction of venous return.

CAUSES

Unknown, but the triad of venous stasis, injury to vessel intima and altered blood coagulability are central to the process.

Risk Factors

- Prolonged bed rest for any reason
- Paralysis
- Malignant disease
- Childbirth
- Pregnancy
- Use of oral contraceptives
- Leg trauma
- Major surgery
- Infection after orthopedic surgery
- Acute myocardial infarction
- Stroke
- Old age (related to decreased activity)

HISTORY

- Symptoms may be subtle, variable or vague
- Usually occurs in leg or deep pelvic veins (popliteal, femoral, iliac)
- Presence of one or more risk factors (see above)
- Recent leg injury
- Leg pain may be mild or absent
- Pain described as a dull ache or tightness, rarely severe
- Leg discomfort worse when walking
- Swelling of lower leg
- Fever

Symptoms may be absent or minimal until shortness of breath and other pulmonary complaints appear because of embolism to the lungs. The risk of pulmonary emboli is low when only the calf veins are involved but increases to 40% when the thigh veins are involved.

PHYSICAL FINDINGS

- Variable; depend on size and location of clot and severity of venous obstruction
- Heart rate may be elevated
- Minimal to moderate distress
- Difficulty walking
- Minimal to marked swelling of lower leg
- Redness of affected calf or leg may be present
- Superficial leg veins may be distended
- Mild to moderate calf tenderness: flexion of the ankle may increase pain
- Localized warmth may be present
- Peripheral pulses (compare sides for symmetry)

DIFFERENTIAL DIAGNOSIS

- Calf-muscle strain
- Trauma with hematoma
- Cellulitis
- Ruptured Baker's cyst (popliteal cyst)

COMPLICATIONS

- Pulmonary embolism
- Chronic venous insufficiency

DIAGNOSTIC TESTS

None.

MANAGEMENT

Goals of Treatment

- Early detection
- Prevent complications

Appropriate Consultation

Consult a physician immediately if you have any suspicion of this disorder.

Nonpharmacologic Interventions for Acute Symptoms

- Bed rest
- Elevation of leg above level of the heart
- Anti-embolic stockings
- Monitor vital signs closely

Nonpharmacologic Interventions over the Long Term

Client Education

- Counsel client about appropriate use of medications (dose, frequency, side effects)
- Recommend use of anti-embolic stockings
- Recommend avoidance of restrictive clothing around knees (e.g., socks, garters)
- Ensure that bedridden clients are turned and repositioned frequently (q2h)
- Recommend active or passive leg exercises while in bed

Pharmacologic Interventions

Heparin therapy (if available) may be instituted on advice of physician before transfer.

Monitoring and Follow-Up

Acute Symptoms

Observe client for shortness of breath or unexplained tachycardia (signs of pulmonary embolism).

Long Term

- Follow up every 3–6 months when stable
- Review prevention strategies, medication use, side effects

Referral

Medevac the acutely symptomatic client as soon as possible.

HYPERTENSION

DEFINITION

Persistently elevated blood pressure from increased peripheral arterial resistance related to salt or water retention or endogenous pressure activity.

CAUSES

Cause of essential hypertension (which accounts for 90% of cases of hypertension) is unknown.

Risk Factors for Primary (Essential) Hypertension

- Heredity
- Obesity
- High salt intake
- Smoking
- High alcohol consumption
- Chronic stress
- Age
- Hyperlipidemia

Risk Factors for Secondary Hypertension (10% of Cases)

- Renal disease
- Polycystic kidneys
- Renal vascular disease
- Estrogen use
- Pregnancy
- Hyperthyroidism (Cushing's syndrome)
- Primary hyperaldosteronism
- Pheochromocytoma
- Coarctation of aorta
- Use of oral contraceptives
- Chronic alcohol abuse

HISTORY

- Presence of one of the risk factors (see above)
- Client usually > 35 years of age
- Condition usually discovered only on routine screening of blood pressure; Canadian Task Force on the Periodic Health Examination (1994) (now the Canadian Task Force on Preventive Health Care) suggests screening everyone between 21 and 64 years of age at every office visit (B recommendation; i.e., good evidence to include in the periodic health examination)
- Usually asymptomatic
- Headache on rising in the morning, gradually subsiding during the day (rare)
- Fatigue
- Transient ischemic attack
- Nausea or vomiting
- Altered level of consciousness
- Palpitations
- Angina
- Symptoms of cardiac failure
- Epistaxis

PHYSICAL FINDINGS

Diastolic Blood Pressure Readings

- High-normal diastolic pressure (85–89 mm Hg)
- Mild diastolic hypertension (90–99 mm Hg)
- Moderate diastolic hypertension (100–109 mm Hg)
- Severe diastolic hypertension (110–119 mm Hg)
- Very severe hypertension (≥ 120 mm Hg)

Systolic Blood Pressure Readings

- Normal systolic pressure (< 140 mm Hg)
- Mild systolic hypertension (140–159 mm Hg), if diastolic readings are within normal range
- Moderate systolic hypertension (160–179 mm Hg)
- Severe systolic hypertension (180–209 mm Hg)
- Very severe hypertension (≥ 210 mm Hg)
- Isolated systolic hypertension (≥160 mm Hg), if diastolic readings are within normal range

Other Findings

- Ocular funduscopic exam may reveal retinal changes
- Augmented second aortic heart sound
- Enlarged heart (left ventricular hypertrophy)
- Bruits (carotid, abdominal aortic, renal and femoral)

DIFFERENTIAL DIAGNOSIS

- Essential hypertension
- Secondary hypertension

General Clues to Secondary Hypertension

- Severity of high blood pressure: severe hypertension is more likely secondary to a specific underlying cause
- Speed of onset: if hypertension develops rapidly, it should be considered secondary until proven otherwise
- Age at onset: rapid onset in people younger than 25 years or older than 55 years should suggest secondary hypertension
- Female sex: the presence of hypertension in a young woman in whom an abdominal bruit is heard suggests stenosis of the renal arteries

COMPLICATIONS

- Congestive heart failure
- Angina
- Stroke or transient ischemic attacks
- Hypertensive crisis
- Kidney disease
- Retinal disease
- Peripheral disease
- Complications related to therapy (e.g., thiazide diuretics increase risk of gout)
- Poor response to therapy

DIAGNOSTIC TESTS

- Urinalysis (routine and for microalbuminuria in diabetic clients)
- Obtain complete blood count
- Determine blood glucose, cholesterol and triglyceride levels (while fasting)
- Determine creatinine and electrolyte levels
- Obtain baseline ECG and chest x-ray (if available) if > 50 years of age

MANAGEMENT

Goals of Treatment

- Decrease morbidity and mortality associated with high blood pressure
- Control symptoms with an effective, well-tolerated treatment regimen

Appropriate Consultation

Consult a physician if there is a need to treat hypertension with medications.

Nonpharmacologic Interventions

Lifestyle modifications are first-line therapy for mild elevation of blood pressure.

Client Education

- Ensure that client understands disease process and prognosis
- Encourage client to lose weight if appropriate
- Recommend dietary modifications (e.g., reduce salt to < 150 mmol/day, reduce cholesterol, and reduce intake of stimulant substances and caffeine)
- Recommend smoking cessation
- Recommend restriction of alcohol consumption
- Recommend regular exercise, especially if sedentary
- Counsel client about appropriate use of medications (dose, frequency, side effects and importance of compliance)
- Ask client to return to clinic if any unusual symptoms occur or there is a change in status

Pharmacologic Interventions in Moderate to Severe Hypertension

Antihypertensive medications should be started. The physician will determine the therapy of choice (which depends on the person's age and the presence of other medical problems).

The following is a common approach to drug therapy in hypertension.

Step 1: Monotherapy:

thiazide diuretics (e.g., hydrochlorothiazide [Hydrodiuril]) or ß-blockers (e.g., atenolol [Tenormin])

From large controlled studies of the treatment of mild hypertension, it is clear that in at least 50% of patients, blood pressure can be controlled with a thiazide diuretic. ß-Blockers may be used alone or in combination if not effective alone.

Step 2: Monotherapy with one of the following:

ACE inhibitor (e.g., captopril, enalapril)

α-blocker (e.g., terazosin [Hytrin], prazosin)

calcium-channel blocker (e.g., diltiazem [Cardizem], amlodipine [Norvasc], nifedipine [Adalat])

autonomic agent (e.g., reserpine, clonidine)

angiotensin II receptor antagonist (e.g., losartan)

Step 3: If blood pressure is still not controlled, a drug from step 2 may be combined with a low-dose diuretic. In patients with moderate to severe hypertension, three or four drugs are often required to adequately control blood pressure.

ß-Blockers

A ß-blocker is the drug of first choice to lower blood pressure in patients with angina pectoris. Although evidence is lacking, it also seems reasonable to use a ß-blocker as the drug of first choice in clients for whom the drug can be used to treat more than hypertension, e.g., those with frequent recurrent migraine, sympathetic hyperactivity, resting tachycardia or palpitations.

ß-Blockers should not be used in clients with asthma or other forms of obstructive airways disease.

ACE Inhibitors

ACE inhibitors have been clearly shown to prolong survival in patients with congestive heart failure. They are therefore the obvious first choice for patients with hypertension and congestive heart failure. It has not yet been established whether ACE inhibitors have a unique renal protective effect in diabetic nephropathy.

A recent study suggests that ACE inhibitors *increase the risk of hypoglycemia in treated diabetic patients*. There are no proven therapeutic differences among ACE inhibitors; the choice of drug can be made on the basis of convenience and cost.

Calcium-Channel Blockers

There are currently no outcome studies identifying a specific group of patients with hypertension who would benefit from a calcium-channel blocker. A recent unpublished but highly publicized study suggested that patients receiving calcium-channel blockers for hypertension are at *significantly higher risk for myocardial infarction* than patients receiving either diuretics or ß-blockers.

Monitoring and Follow-Up

Follow up three or four times yearly if hypertension is well controlled or more frequently if client's condition warrants.

Routine Follow-up Assessment Related to Hypertension

Determine history related to the following:

- Headaches
- Dizziness
- Angina
- Congestive heart failure
- Transient ischemic attack
- Stroke
- Nausea and vomiting
- Vision changes
- Medication compliance
- Drug side effects

The physical examination should include the following:

- Blood pressure (supine and standing)
- Funduscopy (dilated)
- Neck examination (carotid artery for bruits, JVP [jugular venous pressure] for congestive heart failure)
- Cardiovascular examination
- Respiratory examination
- ECG (annually)
- Chest X-ray (annually) if cardiomegaly documented
- Ophthalmologic exam (if funduscopic changes have been documented)
- Blood work q3–6months: complete blood count, blood glucose level, creatinine level, electrolyte levels, uric acid level (if client is taking thiazide diuretics)
- Urinalysis (for protein)

Referral

Arrange follow-up with physician at least yearly if the client's hypertension is stable or as soon as possible if poorly controlled.

Repeat physician consultation is necessary for chronically hypertensive clients if any of the following situations apply:

- Client not responding to therapy
- Target organ damage caused by poorly controlled blood pressure
- Symptoms and signs of complications

ARRHYTHMIAS

DEFINITION

Abnormal heart rhythm. The following are the most common types.

Bradycardia

Heart rate < 60 bpm; impulse originates in SA node

Tachycardia

Heart rate >100–160 bpm; impulse originates in SA node

Supraventricular Tachydysrhythmias

Heart rate >100 bpm; impulse originates above the ventricles. There are two major types:

- *Atrioventricular (AV) nodal re-entrant tachycardia* is intranodal re-entry by means of fast and slow conduction pathways within the AV junction
- *Orthodromic AV re-entrant tachycardia* is tachycardia across accessory pathways associated with pre-excitation

Atrial Fibrillation

Chaotic electrical activity caused by rapid discharges from numerous ectopic foci in the atria. Atrial rate is difficult to count. There are three types of atrial fibrillation:

- *Paroxysmal atrial fibrillation* occurs in people who usually have normal sinus rhythm.
- *Chronic atrial fibrillation* occurs in people who have a permanent fibrillation rather than brief episodes of symptoms
- *Premature ventricular contractions* are impulses that form within the Purkinje network

PREDISPOSING FACTORS

- Bradycardia
- Increased vagal tone
- Decreased sympathetic drive
- Ischemia to sinoatrial node
- Drug use: digoxin, propranolol, sedatives, nicotine, sympathomimetic drugs
- Caffeine use
- Alcohol consumption
- Athletic activity (normal variant in athletes)
- Injury or other insult (normal body response)
- Atrial enlargement
- Acute myocardial infarction
- Congestive heart failure
- Rheumatic heat disease
- Hypertensive heart disease
- Hypothermia
- Electrolyte abnormality
- Acidosis
- Infection

For Tachycardia

- Decreased vagal tone
- Increased sympathetic tone
- Myocardial infarction

For Supraventricular Tachycardia

- Digoxin toxicity
- Catecholamines

For Atrial Fibrillation

- Myocardial ischemia
- Thyrotoxicosis

For Premature Ventricular Contractions

- Stress

HISTORY

- Symptoms may not be present; however, client may note irregular heartbeat
- Palpitations
- Chest discomfort
- Shortness of breath
- Dizziness
- Diaphoresis
- Weakness
- Syncope
- Nausea

PHYSICAL FINDINGS

- Changes in rhythm on ECG
- *Sinus bradycardia*: heart rate decreased, ECG results normal
- *Sinus tachycardia*: pulse regular, systolic blood pressure constant
- *Atrial fibrillation*: pulse irregular, systolic blood pressure changing
- *Atrioventricular nodal re-entrant tachycardia*: pulse regular, atrioventricular block usual, systolic blood pressure constant, electrical alternans rare
- *Orthodromic atrioventricular re-entrant tachycardia*: pulse regular, atrioventricular block not present, systolic blood pressure constant, electrical alternans common (especially at high heart rates)
- *Premature ventricular contractions (PVC)*: pulse volume diminished or absent during PVC

DIFFERENTIAL DIAGNOSIS

- Multifocal atrial tachycardia
- Sinus tachycardia with multiple premature atrial contractions
- Atrial flutter
- Ventricular tachycardia
- Atrioventricular block

COMPLICATIONS

- Heart failure
- Myocardial infarction
- Cerebrovascular accident, stroke
- Thromboembolism
- Wolff–Parkinson–White syndrome

DIAGNOSTIC TESTS

- Obtain ECG and arrange for 24-hour Holter monitoring
- Determine level of thyroid-stimulating hormone (TSH)
- Obtain complete blood count
- Determine international normalized ratio (INR), partial thromboplastin time (PTT)

MANAGEMENT

Goals of Treatment

- Convert to sinus rhythm
- Relieve symptoms
- Prevent recurrence
- Prevent complications (e.g., congestive heart failure, myocardial infarction, life-threatening arrhythmia)

Appropriate Consultation

Consult a physician if client has abnormal ECG pattern, refractory atrial fibrillation, suspicion of Wolff–Parkinson–White or "sick sinus" syndrome.

Nonpharmacologic Interventions

Identify and remove any contributing factors.

Client Education

- Teach client some relaxation techniques
- Teach client and family members the signs of hemodynamic compromise, including rapid heart rate, unexplained weight gain, worsening dyspnea on exertion, decreased exercise tolerance
- Teach client about long-term medication and its side effects

Pharmacologic Interventions

Initial treatment prescribed only by a physician.

Selection of treatment modality should be based on underlying pathophysiology.

For re-entrant cases, agents that block the re-entrant circuit are more effective:

digoxin (Lanoxin)

ß-blockers, such as nadolol (Corgard) or atenolol (Tenormin)

calcium-channel blockers, such as verapamil (Calan)

diltiazem (Cardizem)

For episodes caused by increased automaticity:

quinidine (Quinaglute)

procainamide (Procan SR)

disopyramide (Norpace CR)

Chronic atrial fibrillation is also treated with anticoagulants such as warfarin (Coumadin).

Therapy is started as soon as possible if there is a history of underlying heart disease.

Monitoring and Follow-Up

- For clients taking antiarrhythmic agents, liver enzyme levels should be measured during first 4–8 weeks of therapy
- Clients with risk factors for cardiac complications of therapy should undergo ECG during first weeks of therapy and every 3–6 months thereafter
- Clients taking digoxin should be monitored carefully for toxic effects
- Evaluate INR on a regular basis to monitor therapeutic response to warfarin

Referral

Medevac clients with hemodynamic instability.

ATRIAL FIBRILLATION

DEFINITION

Atrial fibrillation is a cardiac arrhythmia in which chaotic electrical activity replaces the orderly activation sequence of normal sinus rhythm.

ASSOCIATED CONDITIONS

- Hypertensive heart disease
- Valvular or rheumatic heart disease
- Coronary artery disease
- Acute myocardial infarction
- Pulmonary embolus
- Cardiomyopathy
- Congestive heart failure
- Infiltrative heart disease
- Pericarditis

HISTORY

- Palpitations
- Lightheadedness, poor capacity for exercise
- Fatigue
- Dyspnea
- Angina
- Syncope or near syncope
- Stroke
- Arterial embolization

PHYSICAL FINDINGS

Do a complete cardiovascular and respiratory examination. Also assess the eyes for lid lag (hyperthyroid sign) and the neck for thyroid enlargement and elevated JVP.

- Irregular pulse
- Tachycardia
- Possible heart failure
- Hypotension
- ECG shows rapid, irregular atrial rate and no P waves

DIFFERENTIAL DIAGNOSIS

- Multifocal atrial tachycardia
- Sinus tachycardia with frequent atrial premature beats
- Atrial flutter

COMPLICATIONS

- Embolic stroke
- Peripheral arterial embolization
- Complications of pharmacologic therapy, including bradycardiac arrhythmias
- Inherent risk of bleeding with anticoagulation

DIAGNOSTIC TESTS

For asymptomatic people:

- Obtain ECG
- Determine level of TSH
- Determine INR and PPT
- Obtain chest x-ray if there are concerns about cardiomegaly

MANAGEMENT

Goals of Treatment

- Search for and treat all predisposing factors (*see "Associated Conditions," above*)
- Reduce symptoms
- Prevent complications

Appropriate Consultation

Consult a physician for a symptomatic client as soon as possible.

Nonpharmacologic Interventions

Client Education

- Ensure that client understands disease process and prognosis
- Counsel client about appropriate medication use, including side effects
- Teach client signs and symptoms of complications that require immediate follow-up (rapid heart rate, palpitations, edema, shortness of breath on exertion, chest pain)
- Recommend avoidance of alcohol, caffeine
- Recommend smoking cessation (if applicable)
- Counsel client to avoid sleep deprivation

Pharmacologic Interventions

- Drug therapy is directed at correcting the atrial arrhythmia, slowing the ventricular rate and effecting anticoagulation. Examples of antiarrhythmic agents are quinidine, procainamide and disopyramide. ß-Blockers, such as amiodarone, and calcium-channel blockers, such as diltiazem and verapamil, are used to control ventricular rate.
- Anticoagulant therapy consisting of long-term warfarin (Coumadin) therapy is recommended to prevent stroke and other embolic complications.

Monitoring and Follow-Up

- Clients with stable atrial fibrillation should be followed up regularly to assess for symptoms and signs of recurrence, complications, compliance with therapy and side effects of medication
- ECG should be done every 3–6 months
- Clients on anticoagulation must have INR levels monitored regularly

Referral

Medevac clients who are hemodynamically unstable. Electrical cardioversion in hospital is sometimes necessary if symptoms are severe.

Refer stable symptomatic clients to a physician for thorough evaluation and initiation of therapy as soon as possible.

ACUTE PERICARDITIS

DEFINITION

An inflammatory process with a wide spectrum of causes, occurring with or without effusion. The most common cause is idiopathic or non-specific pericarditis.

CAUSES

- Idiopathic (unknown)
- Viral infection (e.g., coxsackievirus, ECHO virus, adenovirus, Epstein–Barr virus, mumps)
- Bacterial infection: *Hemophilus influenzae* (especially children), *Meningococcus, Pneumococcus, Salmonella, Staphylococcus*
- Fungal infection: *Aspergillus, Candida, Histoplasmosis, Nocardia*
- Mycobacterial infection: *Mycobacterium tuberculosis*
- Parasites: protozoa
- Neoplasm: breast, lung, lymphoma
- Drug-induced: procainamide, hydralazine, phenytoin and perhaps others
- Connective-tissue disease: systemic lupus erythematosus, rheumatoid arthritis, scleroderma, acute rheumatic fever
- Radiation therapy
- Post-myocardial infarction (Dressler's syndrome)
- Chest trauma
- Uremia
- Myxedema
- Aortic dissection
- Sarcoidosis
- Pancreatitis
- Inflammatory bowel disease
- AIDS

HISTORY

- Chest pain, typically sharp; retrosternal with radiation to the trapezial ridge
- Pain frequently sudden in onset
- Pain reduced by leaning forward and sitting up
- Splinted breathing
- Odynophagia
- Fever
- Myalgia
- Anorexia

PHYSICAL FINDINGS

- Temperature may be elevated (low-grade fever)
- Respiration fast and shallow
- Anxiety
- Mild distress
- Flushing
- Splinted breathing
- Shortness of breath (only in cases of pericardial tamponade or constrictive pericarditis)
- Pericardial friction rub
- Localized lung crackles may be present

DIFFERENTIAL DIAGNOSIS

- Acute myocardial infarction
- Pneumonia with pleurisy
- Pulmonary emboli
- Aortic dissection
- Pneumothorax
- Mediastinal emphysema
- Cholecystitis
- Pancreatitis

COMPLICATIONS

- Pericardial tamponade
- Recurrence of pericarditis
- Noncompressive effusion
- Chronic constrictive pericarditis

DIAGNOSTIC TESTS

- ECG
- Chest x-ray (if available), to rule out complications such as pleural effusion or enlarged heart

MANAGEMENT

Goals of Treatment

- Prevent complications
- Identify underlying treatable causes

Appropriate Consultation

Consult a physician if you suspect this diagnosis.

The otherwise healthy client is safely treated on an outpatient basis.

Nonpharmacologic Interventions

Client Education

- Ensure that client understands disease process and prognosis
- Counsel client about appropriate medication use and side effects
- Recommend avoidance of heavy physical labor
- Teach client about symptoms and signs of complications, and instruct client to report any that occur
- Stress the importance of follow up

Pharmacologic Interventions

Anti-inflammatory medication for at least two weeks:

ASA (Aspirin) (**A class drug**), 650 mg q4h

or

ibuprofen (Motrin) (**A class drug**), 200 mg, 2–3 tabs q6h

In some clients, the condition becomes refractory and corticosteroids or pericardiectomy may be required.

Monitoring and Follow-Up

- Follow up in 2 or 3 days, to make sure no complications develop, and then again in 2 weeks
- Repeat ECG and chest x-ray should be considered at about 4 weeks
- In most clients complete resolution occurs after 2 weeks of therapy
- 15% of clients will have at least one recurrence within the first few months

ARTERIAL PERIPHERAL VASCULAR DISEASE

DEFINITION

Chronic decrease in blood flow to one or more extremities, caused by atherosclerotic narrowing of aorta and large arteries supplying the lower limb and leading to ischemia of the leg muscles.

CAUSES

- Atherosclerosis, congenital lesions, trauma
- Frequently associated with diabetes mellitus
- Predisposing factors: smoking, hypertension, hyperlipidemia, diabetes, obesity, genetics

HISTORY

- Warning signal that oxygen demands of the leg exceed oxygen supply
- Symptoms initially intermittent, reversible, reproducible (intermittent claudication)
- Pain, ache, cramp located in calf, instep, buttock, hip or thigh (rarely in an arm)
- Pain precipitated by exercise
- Discomfort quickly and consistently relieved with rest (in 2–5 minutes)
- Distance client can walk before experiencing claudication (should be documented)
- As disease progresses, symptoms occur with less effort and last longer
- With advanced disease, foot pain occurs at night (nocturnal pain)
- Nocturnal pain relieved by placing the leg into a dependent position or by standing on a cold floor
- With severe disease the involved area becomes chronically ischemic, and pain is present during rest
- Impotence may occur
- Associated vascular disease of other target organs may be present (angina, previous stroke or transient ischemic attacks)

PHYSICAL FINDINGS

- Blood pressure may be elevated if client is also hypertensive
- Ischemic skin changes in foot and distal limb may be present (thin, fragile skin; loss of hair on distal leg; shiny and atrophic skin; leg muscle atrophy)
- Arterial ulcers on toes or feet
- Toenails may be hypertrophic
- Rubor of foot with dependency, blanching of foot with elevation
- Capillary refilling time slowed (> 2 seconds)
- Peripheral pulses decreased or absent
- Pulsating abdominal mass (aortic aneurysm)
- Arterial bruits may be present (abdominal aortic, iliac, femoral, popliteal)

DIFFERENTIAL DIAGNOSIS

- Acute arterial occlusion
- Raynaud's disease
- Raynaud's phenomenon
- Venous stasis
- Scleroderma

COMPLICATIONS

- Ischemic ulcer
- Infection of ischemic ulcer
- Loss of distal ischemic limb
- Acute arterial occlusion

DIAGNOSTIC TESTS

- Obtain complete blood count
- Determine electrolyte and creatinine levels
- Determine fasting blood glucose, cholesterol and triglyceride levels
- Obtain ECG (if a recent one is not available)

MANAGEMENT

Goals of Treatment

- Slow progression of disease
- Identify, modify and treat risk factors
- Promote formation of collateral circulation
- Prevent complications

Appropriate Consultation

Consult a physician immediately if any of the following are present: angina, ischemic ulcer, pain at rest, nocturnal pain, recent transient ischemic attack, pulsatile abdominal mass.

Nonpharmacologic Interventions

Client Education

- Recommend strongly that client stop smoking
- Recommend weight loss (if appropriate)
- Recommend daily exercise to improve fitness and exercise tolerance of the leg muscles, which will also help to improve collateral circulation (walking is the best exercise)
- Recommend that client elevate the head of the bed (using 5- to 8-cm [2- to 3-inch] wooden blocks)
- Recommend that client keep feet and legs cool while sleeping
- To reduce skin irritation, client should put sheepskin or bubble pads on the bed
- Teach proper foot care: avoid clipping nails too close to the skin, avoid tight-fitting shoes, keep feet dry and protected from injury (no slippers or bare feet, even in the house)
- For diabetic clients, teach proper foot care to a family member, if possible, so that this person can carry out the necessary tasks; alternatively, have the client attend a clinic on a monthly basis for care of nails and feet

Monitoring and Follow-Up

- Identify new symptoms or changes in existing symptoms
- Assess control of diabetes and encourage compliance with medication and diet
- Advise client to attend clinic if foot injury occurs, no matter how small

Referral

Refer to a physician as soon as feasible to establish whether there are indications for surgery (intolerable pain in low-risk client, pain at rest, ulcers, impending gangrene). A consult with a vascular surgeon may be necessary.

VENOUS INSUFFICIENCY (CHRONIC)

DEFINITION

Impairment of the venous system that inhibits normal return of blood from the legs to the heart.

CAUSES

Incompetent valves in veins of the legs.

Risk Factors

- Familial predisposition
- Prolonged standing
- Pregnancy
- Obesity
- Constricting garments worn over a long period of time

HISTORY

- Dull aching heaviness or fatigue in legs, often occurring at the end of the day and relieved by elevation of the legs
- Mild edema at end of day
- Cramps in legs at night
- Itching may be present (due to stasis dermatitis)
- Stasis dermatitis, brownish red discoloration

PHYSICAL FINDINGS

- Dilated, tortuous, elongated varicose veins in foot, lower leg, medial thigh or behind knee
- Varicose veins seen more readily when person is standing
- Skin changes may be present (erythema, brownish pigmentation, flaking and scaling, skin breakdown)
- Venous ulcers may be present on medial side of lower leg just above medial malleolus or on medial aspect of ankle
- Edema of foot and ankle may be present
- Dilated veins easily palpable when person is standing

DIFFERENTIAL DIAGNOSIS

- Chronic occlusive arterial disease with arterial ulcers
- Orthopedic problems

COMPLICATIONS

- Stasis dermatitis
- Cellulitis
- Stasis ulcer
- Thrombophlebitis
- Deep vein thrombosis (if deep veins involved)

DIAGNOSTIC TESTS

None.

MANAGEMENT

Goals of Treatment

- Facilitate venous return
- Prevent complications

Nonpharmacologic Interventions

Client Education

- Teach client proper skin hygiene and care of lesions
- Recommend support hose or support stockings
- Recommend elevation of legs above the level of the hip when sitting
- Recommend avoidance of prolonged standing (client should sit with legs elevated whenever possible and should avoid crossing legs)
- Recommend avoidance of restrictive clothing around the knees (e.g., knee socks, garters)
- Recommend weight loss (if appropriate)
- Recommend smoking cessation (if appropriate)
- Instruct client to return to clinic if signs of skin breakdown or skin irritation occur, or if a vein becomes sore and tender
- Instruct client to do leg exercises qid in bed to prevent deep vein thrombosis

Monitoring and Follow-Up

Arrange follow-up in 1 month to assess adherence to and efficacy of interventions.

Referral

Refer to a physician if condition does not improve with conservative treatment or if complications arise.

AORTIC ANEURYSM (PULSATILE ABDOMINAL MASS)

DEFINITION

A pulsatile abdominal mass is considered and treated as an abdominal aortic aneurysm until proven otherwise. It may be asymptomatic and discovered by accident.

HISTORY

If an aneurysm is leaking:

- Sudden onset of pain in mid-abdomen or back (or both)
- Sudden weakness and faintness

PHYSICAL FINDINGS

- Pulse rapid and weak
- Blood pressure low-normal to low
- Blood pressure may drop with change in posture
- Pulsating mid or upper abdominal mass

If an aneurysm has ruptured:

- Shock (hypovolemia)
- In severe distress, client may be unconscious
- Pulse diminished or absent
- Blood pressure low or cannot be determined
- A pulsating abdominal or flank mass may be palpable
- Subcutaneous bruising may be present
- Death usually occurs

MANAGEMENT OF ASYMPTOMATIC CLIENT

Goals of Treatment

- Identify and monitor the asymptomatic abdominal aneurysm

Appropriate Consultation

Consult a physician when an asymptomatic aortic aneursym is suspected or detected.

Monitoring and Follow-Up

- Annual follow-up by physician
- Annual abdominal ultrasonography to measure size

Referral

Referral for vascular surgery (depending on size of the aneurysm) will usually be done by a physician.

MANAGEMENT OF SYMPTOMATIC CLIENT

Goals of Treatment

– Replace blood loss

Appropriate Consultation

Consult a physician immediately.

Adjuvant Therapy

– Oxygen 6–10 L/min by mask; keep oxygen saturation at 97% to 98%
– IV (14- to 16-gauge) with normal saline (or lactated Ringer's solution)
– Insert the needle into the largest vein available
– Start a second IV line for rapid fluid replacement if client is in shock (*see "Shock" in chapter 14, "General Emergencies and Major Trauma"*)

Nonpharmacologic Interventions

– Bed rest
– Maintain "nothing-by-mouth" order
– Insert a nasogastric tube (because paralytic ileus is common)
– Insert a urinary catheter (optional unless transfer delayed)

Monitoring and Follow-Up

– Monitor ABC and vital signs closely, including oxygen saturations
– Aim for pulse < 100 bpm and systolic blood pressure >100 mm Hg
– Monitor urinary output

Referral

Medevac as soon as possible.

EMERGENCIES OF THE CARDIOVASCULAR SYSTEM

MYOCARDIAL INFARCTION

DEFINITION

Interruption of blood supply to the heart, resulting in ischemic injury and necrosis of a portion of the myocardium. As many as 15% to 25% of cases are silent or atypical in presentation.

CAUSES

– Atherosclerosis of coronary arteries, coronary artery spasm

Risk Factors

– Smoking
– Family history of heart disease
– Hypertension
– Dyslipidemia
– Obesity
– Diabetes mellitus
– Sedentary lifestyle

HISTORY

– Acute retrosternal chest pain (heaviness, aching, squeezing)
– Pain may radiate into left arm, neck, fingers, shoulders, epigastrium, right chest, right upper quadrant, right arm or upper back
– Pain usually occurs at rest, with gradual or sudden onset, and can be precipitated by stress
– Pain not relieved by nitroglycerin
– Pain lasts longer than 30 minutes
– Shortness of breath
– Nausea and vomiting
– Diaphoresis
– Weakness
– Loss of consciousness may occur

PHYSICAL FINDINGS

– Respiration rapid and shallow
– Pulse variable (rapid or slow, regular or irregular, full volume, "thready")
– Blood pressure increased, decreased or normal
– Oxygen saturation may be abnormal if client is in shock or has congestive heart failure
– Acute distress
– Pale
– Diaphoresis
– Cyanosis (central or peripheral, or both)
– Client may be unconscious
– Skin may be cool and clammy
– Lungs are usually clear; crackles present if congestive heart failure develops
– S_1, S_2 normal; S_3 and/or S_4, murmurs, pericardial friction rub may be present if there are complications

DIFFERENTIAL DIAGNOSIS

- Peptic ulcer disease
- Esophageal spasm or esophagitis
- Gallbladder disease
- Large pulmonary embolism
- Indigestion
- Pancreatitis
- Acute anxiety attack
- Acute pericarditis
- Dissecting aortic aneurysm
- Spontaneous pneumothorax

COMPLICATIONS

- Arrhythmias and conductive disturbances
- Hypotension
- Congestive heart failure
- Pericarditis
- Thromboembolism
- Cardiogenic shock
- Cardiac arrest
- Rupture of the heart
- Death

DIAGNOSTIC TESTS

- Obtain a 12-lead ECG tracing; compare with a previous tracing, if available
- Identify new changes if possible; check for Q waves, elevation of ST segment and inversion of T wave (signs of myocardial infarction)
- Check for depression of ST segment, inversion of T wave (angina)
- If the patient has continuing pain, repeat 12-lead ECG twice more at 30-minute intervals, noting any evolving changes
- Blood may need to be drawn for baseline cardiac enzymes (troponin) before transferring client

MANAGEMENT

Goals of Treatment

- Improve oxygenation of myocardium
- Prevent complications
- Keep infarct from extending

Appropriate Consultation

Consult a physician.

Adjuvant Therapy

- Oxygen 6–10 L/min (or more, if necessary); keep oxygen saturation to 97% to 98%
- Start IV therapy with normal saline to keep vein open

Nonpharmacologic Interventions

- Bed rest with head elevated (unless hypotensive)
- Offer support and reassurance to reduce anxiety

Pharmacologic Interventions

Nitrates:

nitroglycerin (**C class drug**), 0.3-mg SL tab stat, but only if systolic blood pressure >100 mm Hg

Observe response and monitor severity of pain; if pain not relieved, repeat:

nitroglycerin, 0.3-mg SL tab q3–5min for another 2 doses, but only if systolic blood pressure remains >100 mm Hg

Nitroglycerin can cause hypotension.

Then give:

uncoated children's ASA (**A class drug**), 80 mg, 2 tabs stat PO, unless ASA contraindicated

If pain unrelieved by nitrates, administer analgesia:

morphine (**D class drug**), 2–5 mg IV or 5–10 mg IM; repeat dose only under the direction of a physician

Every client who presents with acute myocardial infarction should be considered for IV thrombolytic therapy. If onset of pain occurred within the past 6 hours there is a definite benefit to thrombolytic therapy.

Other Pharmacologic Measures (Prescribed by a Physician)

To reduce workload on the heart:

topical nitroglycerin (Nitro-Paste) (**B class drug**), 1.25–2.5 cm immediately, then q4–6h, but only if systolic blood pressure >100 mm Hg

For arrhythmias, particularly sustained bouts of ventricular tachycardia:

lidocaine (Xylocaine) (**B class drug**), 1 mg/kg to a maximum of 100 mg as a single IV bolus; reduce dose by 50% in people > 65 years of age

When using lidocaine, watch for disorientation, confusion, twitching, seizure

For hypotension associated with bradycardia (heart rate < 60 bpm):

atropine sulfate (**B class drug**), 0.4 mg IV q5min, until heart rate > 60 bpm and systolic blood pressure > 100 mm Hg (maximum dose 2 mg)

IV diuretics (only if shortness of breath and lung crackles are present, i.e., heart failure):

furosemide (Lasix) (**D class drug**), 40 mg IV bolus

Monitoring and Follow-Up

- Monitor vital signs (including pulse oximetry)
- Repeat ECG (to check for arrhythmias)
- Monitor lungs and heart sounds frequently for signs of heart failure

Referral

Medevac as soon as possible.

PULMONARY EDEMA

DEFINITION

Accumulation of fluid within the lungs that interferes with ventilation and oxygenation.

CAUSES

Acute left-heart failure, with or without right-heart failure (*see "Differential Diagnosis," below*)

HISTORY

- Severe shortness of breath
- Orthopnea, paroxysmal nocturnal dyspnea (left ventricular failure)
- Fluid retention peripherally and weight gain (right heart failure) may also be present
- Cough productive of frothy pink sputum may be present

PHYSICAL FINDINGS

- Pulse rapid and may be "thready" or weak
- Respiratory rate elevated
- Blood pressure normal, elevated or decreased
- Acute respiratory distress
- Diaphoresis
- Central cyanosis may be present
- Peripheral cyanosis with cool, mottled extremities
- Swelling of ankles may be present
- JVP may be elevated
- Hepatojugular reflux and hepatomegaly may be present
- Peripheral pitting edema may be present
- Crackles and wheezes in lower half of lung fields
- S_3 gallop rhythm in the heart

DIFFERENTIAL DIAGNOSIS

- Chronic congestive heart failure
- Acute myocardial infarction
- Acute pulmonary embolism
- Atrial fibrillation
- Valvular heart disease
- Adult respiratory distress syndrome

COMPLICATIONS

- Dependent on underlying disease process
- Angina
- Hypotension, shock
- Respiratory failure

DIAGNOSTIC TESTS

- Obtain ECG: look for signs of myocardial ischemia or infarction

MANAGEMENT

Goals of Treatment

- Improve oxygenation
- Promote diuresis of accumulated fluids
- Reduce venous return to the heart
- Treat any reversible precipitants (e.g., cardiac ischemia, hypertension, arrhythmia)

Appropriate Consultation

Consult a physician immediately.

Adjuvant Therapy

- Oxygen 6–10 L/min; keep oxygen saturation to 97% or 98%
- Start IV therapy with normal saline to keep vein open

Nonpharmacologic Interventions

- Bed rest with head elevated
- Insert an indwelling urinary cathter

Pharmacologic Interventions

IV diuretics:

furosemide (Lasix) (**D class drug**), 40–80 mg IV push

For any client who receives this drug regularly, a much larger dose may be required (a quick guide is to double the usual PO daily total to determine the acute IV dose).

To reduce workload on the heart (discuss with physician, preferably before administering):

morphine (**D class drug**), 2–5 mg IV over several minutes; this can be repeated under the direction of a physician

To reduce venous return and workload on the heart, the physician may order topical nitrates:

nitroglycerin topical (Nitro-Paste) (**B class drug**), 1.25–2.5 cm stat, then q4–6h, but only if systolic blood presssure >100 mm Hg

Monitoring and Follow-Up

– Monitor vital signs (watch for hypotension) and ABCs frequently, including oxygen saturation
– Monitor urine output hourly (if not diuresing, the client requires more IV diuretics)

Referral

Medevac as soon as possible.

ACUTE ARTERIAL OCCLUSION OF A MAJOR PERIPHERAL ARTERY

DEFINITION

Sudden obstruction of a peripheral artery with acute ischemia of the distal limb.

CAUSES

– Acute thrombosis of an artery, trauma or arterial embolus
– Predisposing factors: peripheral vascular disease, atrial fibrillation, recent myocardial infarction, prosthetic heart valve

HISTORY

– Sudden onset of severe pain in distal part of a limb
– Paresthesia, coldness and pallor in distal limb follow later
– Previous symptoms of intermittent claudication may be present
– History of cardiac disease may be present

PHYSICAL FINDINGS

– Heart rate elevated
– Pulse may be irregular
– Respiratory rate normal or increased
– Blood pressure normal or increased
– Anxious, in acute distress
– Signs of longstanding peripheral vascular disease in the opposite limb
– Color of limb normal initially, becomes pale later
– Skin temperature may be normal initially, becomes cool or cold later
– Peripheral pulses lower than in opposite limb or absent altogether
– Cutaneous sensation decreased or absent
– Tenderness in calf on dorsiflexion of foot
– Arterial bruits may be present (aortic, iliac, femoral, popliteal)

The 5 P's of acute arterial occlusion are pain, pallor, pulseless, paresthesia and paralysis.

DIFFERENTIAL DIAGNOSIS

– Compartment syndrome if trauma has been involved

COMPLICATIONS

– Ischemic muscular contracture
– Loss of limb

MANAGEMENT

Goals of Treatment

– Improve oxygenation of the limb
– Prevent injury to or loss of limb

Appropriate Consultation

Consult a physician immediately.

Nonpharmacologic Interventions

– Bed rest
– Prevent injury to limb: handle carefully, protect from pressure or injury
– Do not elevate ischemic limb (keep horizontal or slightly dependent)

Adjuvant Therapy

– Oxygen 6–10 L/min
– Start IV therapy with normal saline to keep vein open

Pharmacologic Interventions

Analgesia for pain:

morphine (**D class drug**), 10 mg IM

Monitoring and Follow-Up

Monitor vital signs, general condition, cardiac and respiratory status frequently.

Referral

Medevac as soon as possible. There is only a 4- to 6-hour window of opportunity to perform surgical intervention to save limb from irreparable damage.

CHAPTER 5 – GASTROINTESTINAL SYSTEM

Table of Contents

ASSESSMENT OF THE GASTROINTESTINAL SYSTEM

HISTORY OF PRESENT ILLNESS AND REVIEW OF SYSTEM

GENERAL

The following characteristics of each symptom should be elicited and explored:

- Onset (sudden or gradual)
- Chronology
- Current situation (improving or deteriorating)
- Location
- Radiation
- Quality
- Timing (frequency, duration)
- Severity
- Precipitating and aggravating factors
- Relieving factors
- Associated symptoms
- Effects on daily activities
- Previous diagnosis of similar episodes
- Previous treatments
- Efficacy of previous treatments

CARDINAL SYMPTOMS

In addition to the general characteristics outlined above, additional characteristics of specific symptoms should be elicited, as follows.

Abdominal Pain

Ask about all of the characteristics listed in the section above (*see "General," above*).

Nausea and Vomiting

- Frequency, severity
- Presence of blood and its color (e.g., bright red, dark, color of coffee grounds)

Bowel Habits

- Frequency, color and consistency of stool
- Presence of blood or melena
- Pain before, during or after defecation
- Use of laxatives
- Hemorrhoids
- Belching, bloating and flatulence

Jaundice

- History of hepatitis A, hepatitis B or hepatitis C
- Tea-colored urine
- Clay-colored bowel movements
- Itchy skin

Dysphagia

- Solids or liquids
- Site where food gets stuck

Other Associated Symptoms

- Fever
- Malaise
- Headache
- Dry skin
- Dehydration
- Dry mouth
- Diet recall, appetite and foods avoided (including reasons for avoidance)
- Meal pattern (e.g., small, frequent meals)
- Anorexia
- Recent weight loss or gain that is not deliberate

MEDICAL HISTORY (SPECIFIC TO GASTROINTESTINAL SYSTEM)

- Gallbladder disease
- Diabetes mellitus
- Liver disease (hepatitis A, hepatitis B, hepatitis C or cirrhosis)
- Esophageal cancer
- Inflammatory bowel disease
- Hiatus hernia
- Irritable bowel syndrome (IBS)
- Gastroesophageal reflux disease (GERD)
- Peptic ulcer disease (PUD)
- Pancreatitis
- Diverticulosis
- Abdominal surgery
- Presence of hernia, masses
- Blood transfusion
- Past and current use of medications: over-the-counter medications (e.g., acetylsalicylic acid [ASA], acetaminophen [Tylenol]), estrogen, progesterone, calcium-channel blockers, anticholinergics, antacids, triple therapy for peptic ulcer disease, thiazide diuretics, steroids, digoxin

FAMILY HISTORY (SPECIFIC TO GASTROINTESTINAL SYSTEM)

- Alcoholism
- Household contact with hepatitis A or hepatitis B
- Household contact with gastroenteritis
- Food poisoning
- GERD
- Peptic ulcer disease
- Gallbladder disease
- Gastric or colon cancer
- Polyps
- Pancreatitis
- Metabolic disease (e.g., diabetes mellitus, porphyria)
- Cardiac disease
- Renal disease

PERSONAL AND SOCIAL HISTORY (SPECIFIC TO GASTROINTESTINAL SYSTEM)

- Alcohol use
- Smoking
- Caffeine use
- Use of street drugs, including injection drugs
- Use of anabolic steroids
- Travel to area where infectious gastrointestinal conditions are endemic
- Body piercing or tattoos
- Stress at work, home or school
- Dietary intake of nitrates (e.g., smoked foods)
- High-fat diet
- Obesity
- Exposure to polluted drinking water
- Sanitation problems at home or in the community

OCCUPATIONAL OR SCHOOL ENVIRONMENT

- Healthcare occupation
- Institutional environment — workers or residents (e.g., nursing home)
- Environmental exposure
- Chemical e xposure

EXAMINATION OF THE ABDOMEN

GENERAL

- Apparent state of health
- Appearance of comfort or distress
- Color (e.g., flushed, pale, jaundiced)
- Nutritional status (obese or emaciated)
- State of hydration (skin turgor)
- Match between appearance and stated age

VITAL SIGNS

- Temperature and pulse
- Respiratory rate
- Blood pressure

ABDOMINAL INSPECTION

- Abdominal contour, symmetry, scars, dilatation of veins
- Movement of abdominal wall with respiration
- Visible masses, hernias, pulsations, peristalsis
- Jaundice (scleral icterus, skin)
- Spider nevi on face, neck or upper trunk
- Palmar erythema, Dupuytren's contracture (associated with chronic liver disease)
- Clubbing of fingers (late sign associated with inflammatory bowel disease)

AUSCULTATION

Auscultation should be performed *before* percussion and palpation so as not to alter bowel sounds.

- Presence, character and frequency of bowel sounds
- Presence of bruits (renal, iliac or abdominal aortic)

PERCUSSION

- Percuss from resonant to dull areas
- Liver: define upper and lower borders, measure span
- Spleen: confirm presence of normal resonance over lowest rib interspace in anterior axillary line
- Bladder: identify distension and fullness
- Identify other areas of dullness, increased resonance or tenderness

LIGHT PALPATION

- Tenderness, muscle guarding, rigidity
- Superficial organs or masses

DEEP PALPATION

- Tender areas, rebound tenderness
- Liver: size, tenderness, whether edge is smooth or irregular, firm or hard
- Spleen: enlargement, tenderness, consistency
- Kidney: tenderness, enlargement, tenderness of costovertebral angle
- Masses: location, size, shape, mobility, tenderness, movement with respiration, pulsation, hernias (midline, incisional, groin)
- Inguinal lymph nodes: enlargement, tenderness

RECTAL EXAMINATION

- For occult blood (which would indicate gastrointestinal [GI] bleeding)
- For referred pain (which occurs in appendicitis)
- For masses, hemorrhoids, anal fissures, sphincter tone, etc.

CARDIOVASCULAR AND PULMONARY EXAMINATION

A cardiovascular and pulmonary exam should also be performed.

- Tachycardia, lungs (crackles)
- Abdominal pain (may be referred from the lungs in pneumonia)

COMMON PROBLEMS OF THE GASTROINTESTINAL SYSTEM

DEHYDRATION (HYPOVOLEMIA)

DEFINITION

Abnormal decrease in volume of circulating plasma.

CAUSES

- Excessive urine production (e.g., use of diuretics, unexplained polyuria or polydipsia)
- Excessive GI losses (through vomiting, diarrhea, third spacing of fluid in the abdomen as a result of ascites or pancreatitis)
- Excessive losses through the skin (because of burns, fever, exfoliative dermatitis)
- Inadequate intake of food or fluids (because of immobility, loss of consciousness, cognitive impairment, medications that blunt the thirst response such as antipsychotics)

PHYSICAL EXAMINATION

- Search for orthostatic hypotension if supine blood pressure appears normal
- Estimate volume deficit (see Table 1)

TYPES

Hypotonic Dehydration

- Symptomatic earlier than isotonic or hypertonic dehydration (use estimated weight loss as a guide: 3% = mild dehydration, 6% = moderate dehydration, 9% = severe dehydration)
- Usually results from replacing losses (vomiting and diarrhea) with low-solute fluids, such as dilute juice, cola, weak tea
- Lethargy and irritability are common, and vascular collapse can occur early

Isotonic Dehydration

Symptoms less dramatic than in hypotonic dehydration (use estimated weight loss as a guide: 5% = mild dehydration, 10% = moderate dehydration, 15% = severe dehydration)

Hypertonic Dehydration

- Usually occurs as a result of using inappropriately high solute load as replacement, or because of renal concentrating defect with large free-water losses or heat exposure with large insensible losses
- Typical symptoms include thick, doughy texture to skin (tenting is uncommon), tachypnea, intense thirst
- Shock is very late manifestation

Table 1: Physical Findings in Association with Degree of Dehydration

Clinical Sign	Mild Dehydration	Moderate Dehydration*	Severe Dehydration*
Fluid loss (% of body weight)	< 6%	6% to 10%	> 10%
Radial pulse	Normal	Rapid, weak	Very rapid, feeble
Respiration	Normal	Deep	Deep, rapid
Systolic blood pressure	Normal	Low	Very low or undetectable
Skin turgor	Retracts rapidly	Retracts slowly	Retracts very slowly
Eyes	Normal	Sunken	Very sunken
Mentation	Alert	Restless	Drowsy, comatose
Urine output	Normal	Scant	Oliguria
Voice	Normal	Hoarse	Inaudible

*If dehydration is moderate to severe, there may be associated electrolyte disturbances.

MANAGEMENT

Goals of Treatment

– Restore normal state of hydration
– Identify and rectify cause of dehydration

General Principles of Treatment

– Be sure to add ongoing losses to maintenance + deficit fluids and electrolytes
– In hypotonic or isotonic dehydration, calculate total fluids and electrolytes (maintenance + deficit replacement) for the first 24 hours, and give half this amount over the first 8 hours, and the other half over the next 16 hours
– In hypertonic dehydration, correct the fluid and electrolyte deficits slowly (over about 48 hours)
– Do not add potassium (**B class drug**) to IV line until urine output established (diabetic ketoacidosis may be an exception, where correction of hyperglycemia and acidosis may lead to rapid development of hypokalemia)
– Increase maintenance fluids by 12% for each degree Celsius of fever
– If GI losses continue, replace with 10 mL/kg for each diarrheal stool and 2 mL/kg for each episode of vomiting (this should approximate losses)

The search for the underlying cause of the dehydration should be concurrent with rehydration therapy to prevent the re-emergence of dehydration from ongoing fluid losses.

Pharmacologic Interventions

Oral rehydration therapy is the initial method of treatment unless the volume of the deficit and the resulting severity of symptoms or the lack of feasibility of oral intake make IV therapy necessary.

Oral rehydration fluids are effective, and rehydration should be attempted in clients with adequate blood pressure who are able to take fluids orally.

Oral rehydration fluids should contain both sodium and sugar to maximize absorption of these two components.

An oral rehydration solution can be made at home with table salt and sugar: 1/2 tsp (2.5 mL) salt, 8 tsp (40 mL) sugar, 4 cups (1 L) water. Commercially prepared solutions (e.g., Gastrolyte, Rehydralyte) are also available.

Mild Dehydration

– Administer 50 mL/kg of oral rehydration solution over the first 4 hours of treatment; give frequently, in small amounts
– Re-evaluate at 4 hours for maintenance fluid requirements (general daily maintenance fluid requirement for an adult is 2000–2400 mL)
– Fluid intake in the first 24–48 hours should be enough to replace the initial deficit plus any ongoing loss of fluid through the GI and genitourinary tracts and the skin

Moderate Dehydration

– Administer 100 mL/kg of oral rehydration solution over the first 4 hours of treatment; give frequently, in small amounts
– Re-evaluate at 4 hours for maintenance fluid requirements (general daily maintenance fluid requirement for an adult is 2000–2400 mL)
– Fluid intake in the first 24–48 hours should be enough to replace the initial deficit plus any ongoing loss of fluid through the GI and genitourinary tracts and the skin

Severe Dehydration

– Start 2 large-bore IV lines (14- or 16-gauge) with normal saline
– Give 20 mL/kg IV rapidly as a bolus
– Reassess for signs of continuing hypovolemic shock
– If shock persists, continue to administer fluid in boluses and reassess
– Adjust IV rate according to clinical response (ongoing IV therapy is based on response to initial fluid resuscitation, continuing losses and underlying cause of dehydration)
– Aim for pulse rate < 100 bpm and systolic blood pressure > 90 mm Hg

Potassium

– For mild dehydration, potassium may not be required
– For moderate-to-severe dehydration caused by GI or renal losses , *potassium replacement is usually required* (**B class drug**)

ANAL FISSURE

DEFINITION

Painful, linear tear in anal mucosa.

CAUSES

- Chronic constipation
- Trauma to anal canal

HISTORY

- Acute pain during and after defecation
- Spotting of bright red blood with defecation
- Bleeding tends to be minimal
- Constipation caused by fear of pain
- Tends to occur in young and middle-aged adults
- Most common cause of chronic perianal pain

PHYSICAL FINDINGS

- May be concealed by overlying anal mucosa
- Firm retraction of buttocks is required for adequate visualization
- Usually one fissure
- Usually in midline
- Digital rectal exam causes acute pain

DIFFERENTIAL DIAGNOSIS

- Thrombosed external hemorrhoids
- Perianal or perirectal abscess
- Crohn's disease or sexually transmitted infections (if fissures fail to heal)

COMPLICATIONS

- Constipation
- Chronic anal fissure

DIAGNOSTIC TESTS

None.

MANAGEMENT

Goals of Treatment

- Relieve pain
- Relieve underlying constipation
- Prevent recurrence

Nonpharmacologic Interventions

- Most fissures are superficial and will heal spontaneously
- Sitz baths 3 or 4 times daily for 20 minutes with warm salt water

Client Education

- Instruct client about proper perianal hygiene and prevention of infection
- Counsel client about lifestyle and diet (e.g., dietary fiber, fluids, exercise)

Pharmacologic Interventions

Local topical preparations without corticosteroids may be useful:

zinc sulfate ointment (Anusol) (**A class drug**), bid and after each bowel movement

An ointment is better than a suppository because it remains within the affected area.

Start stool-bulking agents and stool softeners if constipated (*see "Constipation," below, this chapter*).

Monitoring and Follow-Up

Follow up in 1–2 weeks.

Referral

Arrange consultation with a physician if fissure does not heal in 4–6 weeks.

HEMORRHOIDS

DEFINITION

Blood vessels beneath the anal canal mucosa (internal) and perianal skin (external) that enlarge, protrude and cause symptoms.

CAUSES

- Late pregnancy
- Chronic constipation with straining at bowel movements
- Prostatic enlargement with chronic straining to urinate
- Prolonged sitting
- Anal infection

HISTORY

Symptoms suggestive of bowel pathology absent.

Internal Hemorrhoid

- Sensation of something "sticking out" of rectum
- Bright red bleeding with bowel movements
- Blood on stool surface only, not mixed in with stool; often seen on toilet tissue
- Anal itching or discharge may be present
- Painless unless complications present

External Hemorrhoid (Perianal Lump)

- Soft skin tags may be present
- Discomfort or irritation frequently present
- Tendency to thrombose
- Sudden acute pain if thrombosed

PHYSICAL FINDINGS

To examine anal area, have client lie on left side with the knees drawn up to the chest; retract the buttocks.

- Both internal and external hemorrhoids may be present
- Usually located in left lateral, right anterior and right posterior positions
- Internal hemorrhoids covered by thin, pink anal mucosa
- External hemorrhoids covered by skin (Note: a thrombosed external hemorrhoid is a bluish purple, globular, irreducible, tender lump at the edge of the anus)
- Typically 1 to 3 swellings around anal opening, the size of a finger tip; pink, purple or blue in color
- Rectal examination may reveal concealed internal hemorrhoids
- Assess whether prolapsing hemorrhoids are easily reducible

DIFFERENTIAL DIAGNOSIS

- Rectal polyp or prolapse
- Skin tag
- Other causes of pruritus ani and perianal dermatitis
- Perianal or perirectal abscess
- Anal fissure
- Complicated hemorrhoid
- Tumor

COMPLICATIONS

- Thrombosed or strangulated internal hemorrhoid
- Thrombosed external hemorrhoid

DIAGNOSTIC TESTS

- Stool may test positive for occult blood

MANAGEMENT

Goals of Treatment

- Relieve symptoms
- Keep anal region clean
- Promote easy passage of stool on a regular basis

Appropriate Consultation

If unable to reduce the prolapsed internal hemorrhoid, contact a physician.

Nonpharmacologic Interventions

- Gently try to reduce painful prolapsed internal hemorrhoid
- Apply a topical anesthetic (e.g., lidocaine [Xylocaine] jelly 2%), wait 15 minutes, then gently try to reduce it. Do not use force!
- Instruct client to gently reduce (push back up) painless prolapsed internal hemorrhoid(s)
- Instruct client to cleanse the perianal area after each bowel movement with plain water, salt water or medicated witch-hazel cotton pads (Tucks)
- Instruct person to take Sitz baths 3 or 4 times daily for 15 to 20 minutes to cleanse the area, soothe local irritation and relax the anal sphincter
- Manage underlying constipation (*see "Constipation," below, this chapter*)

Client Education

- Counsel client about appropriate use of medications (dose, frequency, dangers of overuse)
- Teach client proper perianal hygiene
- Instruct client to return to clinic for reassessment if severe pain or bleeding develops (incision drainage of thrombosed external hemorrhoid may be required)
- Instruct client to apply an ice pack (20 minutes on, 20 minutes off) to help reduce swelling and pain if a thrombosed hemorrhoid is suspected

Pharmacologic Interventions

For mildly sore and edematous "inflamed" external hemorrhoid, treat with hemorrhoidal ointments or suppositories without steroids (ointments are better):

zinc sulfate 0.5% ointment or suppository (Anusol) (**A class drug**) every morning and evening and after each bowel movement for 3–6 days

For perianal dermatitis, hemorrhoidal ointment with steroids (for anti-inflammatory properties) may be used to reduce itch and discharge (these preparations may cause local irritation if misused):

zinc sulfate 0.5% ointment (Anusol) (**A class drug**)

or

hydrocortisone 1% ointment (Unicort) (**C class drug**) every morning and evening and after each bowel movement for 3–6 days

Monitoring and Follow-Up

Follow up in 1 week to determine if symptoms have improved.

Referral

For acute pain of recent onset (1–2 days) that is increasing despite treatment, contact a physician for advice and to rule out an abscess.

CONSTIPATION

DEFINITION

Condition in which stool is hard, dry, often small and round; difficult and painful to pass. Constipation is a symptom, not a diagnosis. In all cases the underlying cause must be sought, as many causes are correctable.

CAUSES

- Ignoring urge to defecate
- Insufficient fiber and fluid in diet
- Poor bowel habits
- Physical inactivity
- Pregnancy
- Side effect of medications
- Abuse of laxatives
- Anal fissure
- Hemorrhoids
- Cancer of colon or rectum
- Other diseases of large bowel
- Endocrine problems
- Neurological diseases

Medications Associated with Constipation

- Aluminum antacids
- Tricyclic antidepressants
- Antipsychotics
- Anticholinergics
- Antiparkinsonian drugs
- Opiate narcotics
- Seizure medication (phenobarbital [Phenobarb], phenytoin [Dilantin], carbamazepine [Tegretol])
- Antihypertensive medications (e.g., calcium-channel blockers)
- Iron preparations
- Nonsteroidal anti-inflammatory drugs (NSAIDs)
- Antihistamines
- Sympathomimetics (e.g., pseudoephedrine)
- Terbutaline
- Bismuth products (e.g., Pepto-Bismol)

HISTORY

Constipation is a symptom, not a diagnosis, so a careful, accurate history and physical examination are mandatory. The consistency of the movement and the ease with which stool is passed are more important then the frequency of bowel movements.

- Duration of constipation (recent or chronic problem)
- Recent change in pattern of defecation, consistency of stool or other features
- Any associated rectal blood, melena
- Diarrhea (overflow)
- Abdominal pain, cramping and bloating
- Difficulty or pain on defecation
- Tenesmus
- Time of most recent bowel movement
- Fluid intake
- Dietary intake
- Activity and exercise patterns
- Current medication, previous and current use of laxatives
- Stressors and psyche
- Depression
- Eating disorders
- Pregnancy (current)
- Endocrine disorders (e.g., diabetes mellitus, hypothyroidism)
- Neurological disease (e.g., Parkinson's disease, multiple sclerosis)
- Collagen vascular disease (e.g., systemic sclerosis)

PHYSICAL FINDINGS

- Usually no distress
- Client looks well
- Abdomen may be distended
- Bowel sounds normal but may be reduced in chronic constipation
- Bowel sounds normal to dull in left lower quadrant
- Sometimes similar findings in right lower quadrant
- Stool may be palpable in left or right lower quadrant
- Left and right lower quadrant may be tender
- Hard, pebbly stool in rectum, or rectum may be empty
- Hemorrhoids and anal fissures may be present

DIFFERENTIAL DIAGNOSIS

- Irritable bowel syndrome
- Diverticular disease
- Partial bowel obstruction
- Rectal fissure
- Anal fissure or hemorrhoids
- Physical inactivity
- Side effects of medications or laxative abuse
- Cancer of colon, rectum or other organ
- Diseases of the large bowel
- Endocrine problems (e.g., hypothyroidism)
- Neurological diseases (e.g., Parkinson's disease)

COMPLICATIONS

- Chronic abdominal pain
- Hemorrhoids
- Anal fissure
- Fecal impaction
- Fecal and urinary incontinence
- Urinary retention
- Inguinal hernia from straining
- Intestinal obstruction

DIAGNOSTIC TESTS

Test stool for occult blood.

MANAGEMENT

Goals of Treatment

- Establish regular bowel function
- Eliminate contributing factors
- Identify and manage underlying disease
- Prevent and treat complications (e.g., fecal impaction, hemorrhoids, anal fissures, rectal prolapse, fecal incontinence, bowel obstruction)
- Eliminate need to strain and prevent adverse effects of straining (e.g., hernia, gastroesophageal reflux, coronary and cerebral dysfunction in the elderly)

Nonpharmacologic Interventions

- Client should increase dietary fluids to 1.5–2.0 L/day
- Client should increase dietary fiber to 20–30 g/day: bran, whole grains, fruits and vegetables should be encouraged; prune juice, stewed prunes and figs can be tried
- Encourage physical exercise if client is able
- Discontinue medications with constipating effects if possible
- Establish regular time for toileting to help develop a conditioned reflex for bowel action (e.g., immediately after breakfast)
- Encourage relaxation exercises for the pelvic floor and external anal sphincter muscles
- Advise client that bowel retraining may take months (patience and persistence are required and dietary changes must be maintained over the long term)

Pharmacologic Interventions

To relieve initial constipation, medications may be required. Avoid starting client on a long-term course of laxatives.

Acute Constipation

Step 1: Start a bulk-forming agent:

psyllium hydrophilic mucilloid (Metamucil) (**A class drug**), 1 tsp (5 mL) in 8 oz (250 mL) fluid bid or tid

or

psyllium (Prodiem Plain) (**A class drug**), 1 tsp (5 mL) PO with 8 oz (250 mL) fluid bid

Step 2: If bulk-forming agent not tolerated or ineffective, add or substitute osmotic saline laxative agents for a short period (3–4 days):

magnesium hydroxide (Milk of Magnesia) (**A class drug**), 1.2–3.2 g (15–40 mL) od

or

stimulant laxatives such as bisacodyl (Dulcolax) (**A class drug**), 5–15 mg hs or senna (Senokot) (**A class drug**), 2–4 tabs hs to bid

Step 3: If no relief, consult a physician regarding orders for:

electrolytes (GoLytely, Colyte) or polyethylene glycol (**B class drug**)

For clients with difficulty initiating evacuation, add:

glycerin suppository, 1 or 2 prn

or

Fleet enema prn

When fecal impaction is present, disimpact as necessary. Use enemas (e.g., Fleet, saline, oil retention). Follow up closely until regular bowel function is achieved.

Docusate sodium (Colace), a stool softener, is better used in situations where straining needs to be avoided for a discrete period than as a laxative.

Chronic Constipation

The following medications may be used in conjunction with nonpharmacologic approaches if these interventions are unsuccessful after a 1-month trial:

Step 1: Regular use of bulk-forming agent:

psyllium hydrophilic mucilloid (Metamucil) (**A class drug**), 1 tsp (5 mL) in 8 oz (250 mL) fluid bid or tid

or

psyllium (Prodiem Plain) (**A class drug**), 1 tsp (5 mL) PO with 8 oz (250 mL) fluid bid

Step 2: Intermittent use of osmotic saline laxatives for short periods (e.g., 3–4 days):

magnesium hydroxide (Milk of Magnesia) (**A class drug**), 1.2–3.2 g (15–40 mL) od

Monitoring and Follow-Up

Follow up regularly every 2–4 weeks until regular bowel function is achieved. Review and adjust dose of bulking agents to obtain a soft, formed stool.

Referral

Refer to a physician to arrange further investigation if

- testing of stool for occult blood is positive
- hemoglobin is low
- there is evidence of other organic disease
- this constipation represents a new change in bowel habit in a person > 50 years of age
- the constipation is not resolving with appropriate treatment.

Severe straining at stool or a continued sensation of rectal fullness even when rectum is empty warrants a more thorough evaluation.

DIARRHEA

DEFINITION

Frequent loose or liquid stool (may be of large or small volume). Diarrhea is a symptom, not a diagnosis. A careful, accurate history and physical examination are mandatory to establish the underlying cause.

CAUSES

Acute Diarrhea

- Viral infection (most common cause): rotavirus or (less commonly) hepatitis A, hepatitis B or hepatitis C
- Bacterial infection: *Campylobacter*, *Clostridium difficile*, *Escherichia coli*, *Salmonella*, *Shigella*, *Staphylococcus aureus*, *Yersinia*
- Inflammatory bowel disease (e.g., ulcerative colitis, Crohn's disease)
- Medications (e.g., antibiotics, antacids, laxatives)
- Parasitic infection (e.g., *Giardia*, hookworm)

Chronic Diarrhea

- Inflammatory bowel disease (e.g., ulcerative colitis, Crohn's disease)
- Malabsorption syndromes (e.g., lactase deficiency, post-abdominal surgery)
- Endocrine conditions (e.g., hyperthyroidism, diabetes mellitus)
- HIV or AIDS
- Irritable bowel syndrome
- Diverticular disease (e.g., acute diverticulitis)
- Fecal impaction (overflow)

During "spring break-up" and in late summer, community outbreaks of *E. coli* diarrhea are common if water quality is poor. *E. coli* and parasites may be involved if there has been recent travel. Botulism is a rare form of clostridial infection.

HISTORY

- Sudden onset of frequent, loose, watery bowel movements
- Blood, pus or mucus may be present
- Melena
- Steatorrhea (fatty, greasy, bulky stool)
- Abdominal pain, possibly crampy
- May be related to current or recently used medications
- May be related to recent travel
- May be related to dietary and fluid intake in past 24 hours
- Nausea or vomiting
- Fever
- Headache
- Thirst
- Decreased urine output (may be present if diarrhea is severe or prolonged)

If the client is passing bloody diarrhea, consider infection with *Shigella* or *Salmonella*, or inflammatory or ischemic bowel disease.

PHYSICAL FINDINGS

- Temperature may be elevated (if cause is infectious)
- Heart rate may be increased (if dehydration, fever or metabolic derangement)
- Weight loss (if chronic)
- Blood pressure low if severely dehydrated
- Postural blood pressure drop if moderately dehydrated
- Client appears mildly to severely ill (depending on cause and severity)
- Mucous membranes may be dry
- Eyes may be sunken with dark circles underneath
- Sclera or skin may be jaundiced (in hepatitis)
- Skin may feel dry, turgor may be poor
- Abdomen may be slightly distended with gas
- Bowel sounds hyperactive
- Abdomen hyperresonant if excess gas is present
- Abdomen may be mildly tender in all areas
- Abdominal mass may be present (depending on underlying cause)
- Rectal exam reveals tenderness and mass

DIFFERENTIAL DIAGNOSIS

- Viral infection (e.g., rotavirus)
- Bacterial infection (e.g., *E. coli*, *Salmonella* or *Shigella*)
- Parasitic infection (e.g., *Giardia*)
- Excess consumption of alcohol or fruit
- Antibiotic use (current or recent)
- Laxative abuse
- Irritable bowel syndrome
- Inflammatory bowel disease
- Fecal impaction with overflow diarrhea
- HIV or AIDS
- Malabsorption syndrome (e.g., lactase deficiency)

COMPLICATIONS

- Dehydration
- Systemic infection (sepsis)

DIAGNOSTIC TESTS

- Test stool for occult blood
- Test stool for culture and sensitivity, ova and parasites, and *C. difficile* (if recent antibiotic therapy)
- Test for HIV (in chronic diarrhea or if risk behaviors present)

MANAGEMENT

Goals of Treatment

- Establish normal bowel function
- Prevent complications (e.g., dehydration)
- Avoid complications of antidiarrheal medications (e.g., constipation, toxic megacolon)

Appropriate Consultation

Consult a physician if the client is moderately or severely dehydrated.

Nonpharmacologic Interventions

Dietary Adjustments

- Client should avoid coffee, alcohol, most fruits and vegetables, red meats, heavily seasoned foods
- Client should stop eating dairy products (except yogurt and aged cheese) for 7–10 days
- Client may need to stop solid foods for a brief period (6 hours) if stool is frequent and watery or if vomiting occurs in association with diarrhea
- There is evidence that early reinstitution of a lactose-free general diet will decrease the duration and severity of diarrhea
- Gradually reintroduce solid foods (e.g., clear soup, salted crackers, dry toast or bread), and then move on to bland foods (e.g., baked potato, poultry, baked fish, noodles)
- A combination of clear broths, oral rehydration solutions and a modest amount of hypotonic fluids (e.g. water, juices, soft drinks) may be the best strategy for managing acute diarrhea

Elderly and debilitated clients in particular are at risk for dehydration, and early use of oral rehydration fluids is recommended.

Water, juices and soft drinks do not replace electrolytes because they are low in sodium. Too much of these hypotonic fluids can lead to hyponatremia.

Client Education

- Inform client that proper hand-washing prevents the spread of infection
- Teach client how to prevent recurrent diarrhea (by boiling drinking water for at least 20 minutes)
- Teach client to recognize symptoms and signs of dehydration and advise client to return to clinic if they occur
- Witch-hazel cotton pads (Tucks) may provide relief to the raw perianal area

Pharmacologic Intervention

Oral rehydration fluid therapy is effective in treating acute diarrheal illness and should be used for clients with adequate blood pressure who are able to take fluids orally.

Oral rehydration fluids should contain both sodium and sugar to maximize absorption of these two components.

An oral rehydration solution can be made at home with table salt and sugar: 1/2 tsp (2.5 mL) salt, 8 tsp (40 mL) sugar, 4 cups (1 L) water. Commercially prepared solutions (e.g., Gastrolyte, Rehydralyte) are also available.

Mild Dehydration

- Administer 50 mL/kg of oral rehydration solution in the first 4 hours of treatment; give frequently, in small amounts
- Re-evaluate at 4 hours for maintenance fluid requirements (general daily maintenance fluid requirement for an adult is 2000–2400 mL)
- Fluid intake in the first 24–48 hours should be enough to replace the initial deficit plus any ongoing loss of fluid through the GI and genitourinary tracts and the skin

Moderate Dehydration

- Administer 100 mL/kg of oral rehydration solution in the first 4 hours of treatment; give frequently, in small amounts
- Re-evaluate at 4 hours for maintenance fluid requirements (general daily maintenance fluid requirement for an adult is 2000–2400 mL)
- Fluid intake in the first 24–48 hours should be enough to replace the initial deficit plus any ongoing loss of fluid through the GI and genitourinary tracts and the skin

Severe Dehydration

- Start 2 large-bore IV lines (14- or 16-gauge) with normal saline
- Give 20 mL/kg IV rapidly as a bolus
- Reassess for signs of continuing hypovolemic shock
- If shock persists, continue to administer fluid in boluses and reassess
- Adjust IV rate according to clinical response (ongoing IV therapy is based on response to initial fluid resuscitation, continuing losses and the underlying cause of dehydration)
- Aim for pulse rate < l00 bpm, systolic blood pressure > 90 mm Hg

Control nausea and vomiting if significant:

dimenhydrinate (Gravol) (**A class drug**), 25–50 mg IM as a single dose, then 50 mg PO q4–6h prn

Antidiarrheals may help to relieve symptoms:

loperamide hydrochloride (Imodium) (**C class drug**), 4 mg to start, then 2 mg after each loose bowel movement to a maximum of 16 mg/day, then 2–4 mg bid

Monitoring and Follow-Up

Monitor hydration, general condition and vital signs frequently until stable. Follow up in 24 hours (sooner if oral intake is not keeping up with losses).

Referral

Refer any client who

- is dehydrated by more than 6% to 10%, if he or she does not respond rapidly to rehydration therapy
- is elderly and has multiple medical problems
- is unable to tolerate fluids by mouth
- in whom bowel sounds are absent
- has abdominal tenderness or rebound tenderness
- has high fever and appears acutely ill.

GASTROESOPHAGEAL REFLUX DISEASE (GERD)

DEFINITION

Reflux of gastric contents into the esophagus, which results in esophageal irritation or inflammation.

CAUSES

Presence of acidic stomach contents in the esophagus due to laxity of the lower esophageal sphincter.

Predisposing Factors

- Obesity
- Pregnancy
- Estrogen therapy
- Medications
- Tobacco use
- Alcohol use
- Genetic factors
- Defective esophageal clearance
- Hypersecretion of gastric acid
- Delayed gastric emptying

HISTORY

- Heartburn
- Retrosternal burning sensation radiating upward (may radiate as far up as the throat)
- Acidic stomach contents may be regurgitated
- Associated with large meals, lying down and bending over
- Often awakens client during the night
- May be associated with cough, sore throat, hoarseness, painful swallowing
- Hypersalivation (water brash)
- Aggravating factors identifiable
- Relief with antacids and sitting up
- Stress makes condition worse

PHYSICAL FINDINGS

Mild epigastric tenderness may be present.

DIFFERENTIAL DIAGNOSIS

- Peptic ulcer disease
- Esophageal motility disorder
- Esophageal tumor

COMPLICATIONS

- Esophagitis
- Esophageal ulcer
- Upper GI bleeding
- Esophageal stricture
- Nocturnal aspiration
- Barrett's esophagus

Barrett's esophagus

People who have had regular or daily heartburn for more than 5 years may be at risk for Barrett's esophagus, a condition that develops in some people with chronic GERD or inflammation of the esophagus (esophagitis). In Barrett's esophagus, the normal cells that line the esophagus, called squamous cells, change into a type of cell not usually found in humans, called specialized columnar cells. Damage to the lining of the esophagus (e.g., by acid reflux from GERD) causes these abnormal changes.

Once the cells in the lining of the esophagus have become columnar cells, they will not revert to normal. The goal of treatment is to prevent further damage by stopping any acid reflux from the stomach.

In about 5% to 10% of people with Barrett's esophagus, cancer of the esophagus occurs. Because of the risk of cancer, people with Barrett's esophagus should be screened regularly for esophageal cancer.

DIAGNOSTIC TESTS

- Test stool for occult blood
- Measure hemoglobin level
- Test for *Helicobacter pylori* (by serology or breath test)

MANAGEMENT

Goals of Treatment

- Relieve symptoms
- Promote healing of the esophagus
- Prevent complications such as stricture, bleeding, Barrett's esophagus
- Prevent recurrence

Appropriate Consultation

Consult a physician if the following are detected:

- Weight loss due to severity or duration of symptoms
- Difficult or painful swallowing
- Sticking of solids or liquids
- Persistent vomiting
- Nocturnal cough or shortness of breath
- Anemia
- Stool positive for occult blood
- Client > 45 years of age with new onset of symptoms

Nonpharmacologic Interventions

- Elevate the head of the bed using 6-inch (15-cm) wooden blocks
- Encourage weight loss (if appropriate)
- Eliminate (when possible) drugs that impair esophageal motility and lower esophageal sphincter tone (e.g., calcium-channel blockers, β-blockers, tricyclic antidepressants, anticholinergics, theophyllines)

Client Education

- Counsel client about appropriate use of medications (dose, frequency)
- Recommend dietary modifications (decrease or eliminate coffee, tea, chocolate, nicotine, alcohol and fatty foods)
- Recommend small, frequent meals to prevent overdistension of the stomach
- Recommend avoidance of eating for 2–3 hours before bedtime
- Recommend postural modifications (daytime and nocturnal) to prevent acid from entering the esophagus
- Recommend that client avoid bending at the waist (especially after meals), as well as lying down immediately after a meal
- Recommend avoidance of tight-fitting clothing

Antireflux Surgery

Antireflux surgery is effective in controlling GERD in 80% of well-selected clients. Indications for surgery include intractable reflux esophagitis (in a young person) and major complications such as aspiration, recurrent stricture or major GI bleeding.

Pharmacologic Interventions

Mild GERD

Antacids as needed to control symptoms:

aluminum hydroxide/magnesium hydroxide (Maalox) (**A class drug**), 30 mL PO pc and hs, increase prn

or

aluminum/magnesium/simethicone (Mylanta) (**A class drug**), 30 mL PO pc and hs, increase prn

Moderate to Severe GERD

H_2-receptor antagonists:

ranitidine (Zantac) (**C class drug**), 150 mg PO bid for 6 weeks

or

ranitidine (Zantac) (**C class drug**), 300 mg PO hs for 6 weeks

In elderly clients and those with reduced renal function, the doses should be one-half to one-quarter the usual doses.

Proton Pump Inhibitors

Proton pump inhibitors (e.g., Losec) are a class of drugs used to treat refractory symptoms of GERD. They are more effective for healing esophageal ulceration and maintain the remission of symptoms much better than H_2-receptor antagonists. These drugs do not reverse Barrett's esophagus.

Maintenance therapy for moderate to severe GERD is often needed, as the recurrence rate is high (75% to 90%). Cost and safety are concerns with long-term use of proton pump inhibitors. The lowest dose possible should be used.

Monitoring and Follow-Up

Follow up in 2–3 weeks; if better, continue to treat for another 6–8 weeks.

Referral

Refer to a physician if symptoms are not controlled with therapy.

PEPTIC ULCER DISEASE

DEFINITION

An ulceration of the mucous membrane of the upper digestive tract. Usually refers to a duodenal or gastric ulcer.

CAUSE

Bacterial infection with *Helicobacter pylori*.

Risk Factors

- Anti-inflammatory drugs
- Severe stress
- Chronic gastritis
- Chronic lung or kidney disease
- Smoking
- Genetic factors

HISTORY

- Symptoms may be vague or absent, classical or atypical (some people with a duodenal ulcer have no symptoms, whereas some with ulcer-like symptoms have no ulcer)
- Chronic benign disease with recurrent exacerbations and remissions
- Epigastric burning, gnawing, heartburn
- Discomfort of variable intensity, from mild to moderate to severe
- Discomfort located near midline between xiphoid and umbilicus or in right upper quadrant
- Symptoms begin 1–3 hours after meals, when stomach becomes empty
- May awaken person from sleep
- Quickly relieved by food, milk or antacids
- Nausea may be present
- Melena or hematemesis indicates complications
- Assess use of alcohol, ASA, anti-inflammatory drugs, steroids

The natural history of a benign ulcer is that two-thirds will recur in the first year after treatment.

PHYSICAL FINDINGS

Epigastric tenderness (mild).

DIFFERENTIAL DIAGNOSIS

- Gastritis
- GERD
- Irritable bowel syndrome
- Malignant gastric ulcer
- Diverticulitis
- Pancreatitis

COMPLICATIONS

- Chronic blood loss
- Iron deficiency anemia
- Severe pain
- Sudden hemorrhage, which can lead to hypotension
- Perforation
- Peritonitis
- Obstruction of the gastric outlet

DIAGNOSTIC TESTS

- Test stool for occult blood
- Measure hemoglobin level
- Urinalysis
- Diagnostic testing to confirm presence of *H. pylori*

MANAGEMENT

Goals of Treatment

- Relieve pain
- Reduce stomach acid
- Promote healing
- Prevent complications

Appropriate Consultation

Consult a physician if complications are identified or active bleeding is present (*see "Gastrointestinal Bleeding," under "Emergencies of the Gastrointestinal System," below, this chapter*).

Nonpharmacologic Interventions

Client Education

- Explain the nature of the disease and the expected outcome
- Counsel client about appropriate use of medications (dose, frequency, purpose and importance of compliance)
- Recommend small, frequent meals that are lightly spiced or not spiced at all
- Recommend avoidance of all foods known to increase pain (e.g., large fatty meals)
- Recommend avoidance of all caffeinated beverages (tea, coffee, colas)
- Recommend avoidance of alcohol
- Recommend avoidance of ASA and other anti-inflammatory drugs
- Recommend smoking cessation
- Counsel client about reducing stress at home and at work
- Teach client the signs of complications that should be followed up immediately

Pharmacologic Interventions

Antacids as needed to control symptoms:

aluminum hydroxide/magnesium hydroxide (Maalox) or aluminum/magnesium/simethicone (Mylanta) (**A class drug**), 30 mL PO 1 and 3 h pc, hs and prn

Reduce production of stomach acid:

ranitidine (Zantac) (**C class drug**), 150 mg PO bid for 6 weeks

or

ranitidine (Zantac) (**C class drug**), 300 mg PO hs for 6 weeks

Triple Therapy for *H. pylori*

Anyone testing positive for *H. pylori* will need to undergo triple-drug therapy for eradication, *as ordered by a physician*.

Monitoring and Follow-Up

Follow up in 2 weeks to assess response to therapy. Follow up again in 4–6 weeks. Discontinue medications if symptoms have resolved.

Referral

Refer to a physician if there is no improvement with treatment or if complications develop.

GALLBLADDER DISEASE: BILIARY COLIC AND CHOLECYSTITIS

DEFINITION

The spectrum of gallbladder disease ranges from asymptomatic gallstones to biliary colic, cholecystitis, choledocholithiasis and cholangitis.

Cholecystitis is inflammation of the gallbladder caused by obstruction of the cystic duct, usually by a gallstone (calculous cholecystitis). The inflammation may be sterile or bacterial. The obstruction may be acalculous or caused by sludge.

Choledocholithiasis occurs when the stones become lodged in the common bile duct; from this, cholangitis and ascending infections can occur.

CAUSES

Biliary Colic

Gallstones temporarily obstruct the cystic duct or pass into the common bile duct.

Cholecystitis

The cystic duct or common bile duct becomes obstructed for hours, or gallstones irritate the gallbladder. Bacterial infection is thought to be a consequence, not a cause, of cholecystitis.

The most common organisms are *E. coli*, *Klebsiella* spp. and enterococci. Stones of the common bile duct (occurring in 10% of patients with gallbladder disease) are secondary (from the gallbladder) or primary (formed in the bile ducts).

Risk Factors

The phrase "fair, fat and fertile female" summarizes the major risk factors for gallstones. Although gallstones and cholecystitis are more common in women, men with gallstones are more likely to experience cholecystitis than women with gallstones.

It is unknown if women who are pregnant or have multiple pregnancies are more likely to have gallstones or if they simply have more symptoms of the stones.

Some oral contraceptives and estrogen replacement therapy may increase the risk of gallstones.

Rates of gallstones, cholecystitis and stones of the common bile duct increase with age. Elderly clients are more likely to have asymptomatic gallstones that result in serious complications without gallbladder colic.

The causes of gallstones in teenagers are the same as for adults, and there is a higher prevalence among girls and during pregnancy.

HISTORY

Most gallstones (60% to 80%) are asymptomatic. Small stones are more likely to be symptomatic than large ones. Almost all patients experience symptoms before complications occur.

Indigestion, belching, bloating and intolerance of fatty food are thought to be typical symptoms of gallstones; however, these symptoms are just as common in people without gallstones and frequently are not cured by cholecystectomy.

Biliary Colic

- 1–5 hours of constant pain, commonly in the epigastrium or right upper quadrant
- Pain may radiate to the right scapular region or back
- Client tends to move around to seek relief from pain
- Onset of pain occurs hours after a meal, frequently at night, waking the client from sleep
- Peritoneal irritation by direct contact with the gallbladder localizes the pain to the right upper quadrant
- Pain is severe, dull, or boring and constant (not colicky)
- Associated symptoms include nausea, vomiting, pleuritic pain and fever

Cholecystitis

- Persistence of the biliary obstruction leads to cholecystitis
- Persistent right upper quadrant pain
- The character of the pain is similar to the pain associated with gallbladder colic, except that it is prolonged and lasts for hours or days
- Nausea, vomiting and low-grade fever are more commonly associated with cholecystitis

PHYSICAL FINDINGS

- Vitals signs parallel the degree of illness
- Clients with biliary colic have relatively normal vital signs
- Clients with cholangitis are more likely to have tachycardia or hypotension (or both) and fever
- Fever may be absent, especially in elderly clients
- Jaundice (in < 20% of patients)

Abdominal Examination in Gallbladder Colic and Cholecystitis

- Epigastric or right upper quadrant tenderness
- Murphy's sign (an inspiratory pause on palpation of the right upper quadrant; specific but not sensitive for gallbladder disease)
- Guarding on palpation
- Fullness in the right upper quadrant may be palpated

As in anyone with abdominal pain, a complete physical examination must be performed (including rectal and pelvic examinations in women). In elderly and diabetic clients, occult cholecystitis or cholangitis may be the source of fever, sepsis or changes in mental status.

DIFFERENTIAL DIAGNOSIS

- Appendicitis
- Acute bowel obstruction
- Small cholangitis
- Cholelithiasis
- Diverticular disease
- Gastroenteritis
- Hepatitis
- Inflammatory bowel disease
- Mesenteric ischemia
- Myocardial infarction
- Pancreatitis
- Bacterial pneumonia
- Eclampsia
- Hyperemesis gravidarum
- Urinary tract infection
- Renal calculi

COMPLICATIONS

Biliary Colic

- Cholecystitis

Acute Cholecystitis

- Perforation
- Gangrene
- Peritonitis
- Cholangitis
- Abscess
- Fistula
- Hepatitis
- Pancreatitis
- Ileus

DIAGNOSTIC TESTS

The choice of laboratory tests will depend on whether the client is well enough to be treated as an outpatient or requires admission to hospital. The results of lab tests should be completely normal if the client has cholelithiasis or gallbladder colic.

- White blood cell (WBC) count and liver function tests (LFTs) (AST, ALT, bilirubin and alkaline phosphate levels) may be helpful in the diagnosis of cholecystitis
- An elevated WBC count is expected, but is not a reliable indicator; however, a normal value does not rule out cholecystitis
- Bilirubin >3.5 µmol/L may indicate stone in the common bile duct stone or ascending cholangitis
- Mild elevation of amylase (to up to 3 times normal level) may be present in cholecystitis, especially if there is gangrene
- Urinalysis
- Pregnancy test for women of childbearing age

MANAGEMENT OF BILIARY COLIC

Goals of Treatment

- Relieve pain, nausea and vomiting
- Prevent complications

Appropriate Consultation

Consult physician if pain does not resolve, if fever develops or if significant vomiting continues, as these symptoms indicate that a complication may be developing.

Nonpharmacologic Interventions

- Bed rest
- Clear fluids if vomiting

Client Education

- Explain disease process and prognosis
- Counsel client about appropriate use of medications (dose, frequency)
- Recommend low-fat food as tolerated, once pain resolves

Pharmacologic Interventions

Analgesia

Primary pain should be controlled with anticholinergic antispasmodics:

scopolamine butylbromide (Buscopan) (**C class drug**), 10 mg q6h prn

Secondary pain should be controlled with meperidine; do not to use morphine, which may increase tone in the Oddi's sphincter:

meperidine (Demerol) (**D class drug**), 50–100 mg IM q3–4h prn

Antiemetics to relieve vomiting and nausea:

dimenhydrinate (Gravol) (**A class drug**), 25–50 mg IM q4–6h prn

Monitoring and Follow-Up

Monitor for a few hours. When nausea and vomiting have resolved, push clear fluids.

Follow-up in 24 hours is recommended. If pain increases, fever develops, or the client is unable to tolerate intake by mouth because of vomiting, manage as for acute cholecystitis.

MANAGEMENT OF CHOLECYSTITIS

Goals of Treatment

- Relieve pain, nausea and vomiting
- Prevent complications

Appropriate Consultation

Consult physician if pain does not resolve, if fever develops or if significant vomiting continues, as these symptoms indicate that a complication may be developing.

Adjuvant Therapy

For clients with severe pain (e.g., differential diagnosis includes abdominal aortic aneurysm) and for clients with hypotension or fever who may have cholecystitis or cholangitis, prehospital care should include the following:

- Oxygen, if client is unstable on presentation
- IV therapy with normal saline, rate adjusted according to age, state of hydration and pre-existing medical problems
- Two large-bore IV lines and administration of IV fluids to unstable clients

Nonpharmacologic Interventions

- Bed rest
- Nothing by mouth
- Insert a nasogastric tube and attach to straight drainage

Pharmacologic Interventions

Analgesia

Several recent studies have shown that early pain control in patients with abdominal pain does not hinder the diagnosis. Therefore, pain control should be given early, without waiting for the diagnosis or surgical consult.

Primary pain control should be with anticholinergic antispasmodics:

scopolamine butylbromide (Buscopan) (**C class drug**), 10 mg q6h prn

Secondary pain control should be with meperidine; do not use morphine, which may increase tone in the Oddi's sphincter:

meperidine (Demerol) (**D class drug**), 50–100 mg IM q3–4h prn

Antiemetics

dimenhydrinate (Gravol) (**A class drug**), 25–50 mg IM q4–6h

Meperidine and dimenhydrinate can be mixed in the same syringe.

Antibiotics

For mild cholecystitis, where inflammation is the primary process, antibiotics are prophylactic but are usually used.

For acute cholecystitis (if client is febrile and acutely ill), draw a blood sample for culture and start IV antibiotics. Use broad-spectrum antibiotic coverage:

ampicillin (Novo-Ampicillin) (**D class drug**), 1.0 g IV q4–6h

and

metronidazole (Flagyl) (**B class drug**), 500 mg IV q6–8h

or

cefoxitin (Mefoxin) (**B class drug**), 2.0 g IV q6–8h alone

For clients with allergy to penicillin use only metronidazole.

Monitoring and Follow-Up

Monitor pulse oximetry, vital signs (frequent), blood glucose, intake and output.

Severe cholecystitis can evolve into sepsis or cholangitis, especially in diabetic or elderly clients in whom the diagnosis may be delayed.

Referral

Medevac as soon as possible; surgical consult is required.

HERNIA

DEFINITION

Protrusion of part of the abdominal contents through a weakness in the abdominal wall.

CAUSES

- Weakness of abdominal wall muscles
- Predisposing factors: abdominal surgery, age, heavy lifting, chronic cough, chronic straining to pass stool or to urinate

HISTORY

- Presence of predisposing factor
- Soft, non-tender swelling
- Pain absent
- Hernia usually appears when client is standing or when straining at bowel movements
- Hernia disappears when client is lying down
- Pain indicates development of complications
- Inguinal (groin), abdominal (incisional) hernias common

PHYSICAL FINDINGS

- Swelling may be seen in groin, may extend into scrotum
- Swelling may be seen on upper anterior thigh (femoral hernia) or abdomen
- Hernia disappears upon lying down, reappears upon standing up or bearing down
- Defect in abdominal wall may be palpable
- Hernia can be pushed back (reduced) through the opening into the abdomen

A painful or non-reducible inguinal mass should be considered a strangulated hernia until it is proven otherwise.

DIFFERENTIAL DIAGNOSIS

- Enlarged inguinal lymph node
- Hydrocele
- Testicular mass
- Dilated vein

COMPLICATIONS

- Strangulated hernia
- Bowel obstruction

DIAGNOSTIC TESTS

None.

MANAGEMENT

Goals of Treatment

- Reduce swelling
- Support weak abdominal wall
- Relieve discomfort
- Prevent recurrence and further enlargement

Appropriate Consultation

Consult a physician immediately if the hernia is not reducible, if it is painful, or if it is associated with symptoms and signs of bowel obstruction. Consult a physician immediately if a painless femoral hernia is suspected.

Nonpharmacologic Interventions

With client lying down, attempt to reduce the inguinal or incisional hernia with gentle manual reduction.

- Do not use force
- Do not attempt to reduce a femoral hernia
- Use abdominal or groin truss for support

Client Education

- Explain disease process, expected course and need for follow-up
- Demonstrate application of truss, and encourage its daily use
- Demonstrate proper lifting techniques
- Teach client signs and symptoms of complications and advise him or her to return to the nursing station if these occur

Pharmacologic Interventions

Analgesia for discomfort:

acetaminophen (Tylenol) (**A class drug**), 325 or 500 mg, 1–2 tabs PO q4–6h prn

or

acetaminophen with codeine (Tylenol #2 with codeine) (**C class drug**), 1–2 tabs PO q4h prn (maximum 15 tabs)

Monitoring and Follow-Up

Follow as necessary until surgical consult takes place. Monitor for the development of bowel obstruction. *See "Obstruction of the Small or Large Bowel," under "Emergencies of the Gastrointestinal System," below, this chapter*).

Referral

Arrange elective follow-up with physician for surgical consult. Medevac if there are symptoms of strangulation or bowel obstruction.

IRRITABLE BOWEL SYNDROME

DEFINITION

Functional disturbance of intestinal motility.

CAUSE

- Largely unknown
- Predisposing factors: insufficient dietary fiber, emotional stress, food sensitivity or allergy, laxative abuse, antibiotics

HISTORY

- Usually begins before age 40
- More common in women
- Symptoms vague and long term
- Chronic condition with remissions and exacerbations
- Various combinations of constipation, diarrhea, abdominal pain and gaseousness
- Constipation may be dominant pattern
- Diffuse lower-abdominal pain or discomfort
- Pain of variable intensity; may persist for hours or days
- Looser, more frequent bowel movements may occur with onset of pain
- Pain exacerbated by meals, bowel movements or stress
- Pain relieved by defecation
- No fever, weight loss or malaise
- No interference with daily activities
- Nocturnal pain and diarrhea absent
- No rectal bleeding or blood in stool
- White mucus frequently present

PHYSICAL FINDINGS

- Client may appear quite well or in mild distress
- Abdomen may be distended
- Bowel sounds may be increased or decreased
- Colon may be tender and "rope-like"
- Compression of colon may reproduce symptoms

DIFFERENTIAL DIAGNOSIS

- Constipation
- Uncomplicated diverticular disease
- Gastroenteritis
- Food intolerance
- Inflammatory bowel disease
- Drug-induced diarrhea or constipation
- Biliary colic

COMPLICATIONS

- Chronic abdominal symptoms
- Absenteeism from work with flare-ups of pain

DIAGNOSTIC TESTS

- Test stool for occult blood
- Sample stool for culture and sensitivity
- Measure hemoglobin level
- Perform urinalysis

MANAGEMENT

Goals of Treatment

- Relieve symptoms
- Establish regular bowel habits
- Identify or modify precipitating stresses

Nonpharmacologic Interventions

Client Education

- Recommend dietary modifications (e.g., regular meals, gradual increase of fiber)
- Recommend increase in fiber content of diet (e.g., raw bran, brown bread, popcorn, All-Bran, Puffed Wheat or Shredded Wheat cereal); when raw (miller's) bran is used, start with a small amount and increase gradually to ¼ to ½ cup daily to avoid bloating and flatulence
- Recommend avoidance of foods that are known to cause symptoms (these vary from person to person)
- Recommend that client consume an adequate amount of fluid when using bulking agents
- Recommend elimination of nicotine and codeine-containing drugs
- Teach relaxation techniques and emphasize the importance of exercise to help with stress-induced symptoms
- Assist client to identify specific stress factors that exacerbate symptoms
- Assist client to gain insight into identifiable emotional factors
- Offer understanding and support, as this is an incompletely and poorly understood syndrome

Pharmacologic Interventions

Start a stool-bulking agent:

psyllium hydrophilic mucilloid (Metamucil) (**A class drug**), 1–2 tsp (5–10 mL) bid or tid with 8 oz (250 mL) fluid

or

psyllium (Prodiem Plain) (**A class drug**), 1 tsp (5 mL) PO bid or tid followed by 8 oz (250 mL) fluid

Monitoring and Follow-Up

- Follow up in 1–2 weeks
- Adjust the dose of fiber depending on response
- Use less fiber temporarily if gas and bloating are prominent
- Use more fiber if there has been little clinical response

Referral

Refer to a physician if symptoms or signs of organic disease are present or if symptoms do not improve with management.

DIVERTICULOSIS

DEFINITIONS

Diverticulum (pl. Diverticula)

Outpocketing from bowel wall. The most common colonic diverticula are pseudodiverticula, which are herniations of mucosa and submucosa through the muscularis at sites of penetration of nutrient arteries. Most occur in the sigmoid and descending colon.

Diverticulosis

Presence of multiple diverticula. Does not imply a pathologic condition.

HISTORY

- Most people with colonic diverticula are asymptomatic
- Some have chronic or intermittent abdominal pain in the left lower quadrant
- Constipation or diarrhea
- Symptoms overlap with those of irritable bowel syndrome

PHYSICAL FINDINGS

- Tenderness may be present
- Firm, feces-filled sigmoid colon in the left lower abdomen
- Rectal exam may reveal firm, guaiac-negative stool

DIFFERENTIAL DIAGNOSIS

- Irritable bowel syndrome
- Diverticulitis
- Colon cancer
- Inflammatory bowel disease
- Urologic or gynecologic disorder

DIAGNOSTIC TESTS

- Tests may not be indicated if symptoms are mild and the client is otherwise healthy
- If symptoms are more severe or if the client has occult blood in stool, weight loss or other symptoms of concern, a complete blood count should be obtained
- Consult a physician about sigmoidoscopy, barium enema or colonoscopy

MANAGEMENT

- Similar to IBS
- Recommend high-fiber diet
- Recommend avoidance of cathartic laxatives

Nonpharmacologic Interventions

- Recommend dietary modifications (e.g., regular meals, gradual increase of fiber)
- Recommend increase in fiber content of diet (e.g., raw bran, brown bread, popcorn, All-Bran, Puffed Wheat or Shredded Wheat cereal); when raw (miller's) bran is used, start with a small amount and increase gradually to ¼ to ½ cup daily to avoid bloating and flatulence
- Recommend avoidance of foods that are known to cause symptoms (these vary from person to person)
- Recommend that client consume an adequate amount of fluid when using bulking agents
- Recommend elimination of nicotine and codeine-containing drugs

Pharmacologic Interventions

Start a stool-bulking agent:

psyllium hydrophilic mucilloid (Metamucil) (**A class drug**), 1–2 tsp (5–10 mL) bid or tid with 8 oz (250 mL) fluid

or

psyllium (Prodiem Plain) (**A class drug**), 1 tsp (5 mL) PO bid or tid followed by 8 oz (250 mL) fluid

Monitoring and Follow-Up

- Follow up in 1–2 weeks
- Adjust the dose of fiber depending on response
- Use less fiber temporarily if gas and bloating are prominent
- Use more fiber if there has been little clinical response

Referral

Refer to a physician if symptoms or signs of organic disease are present or if symptoms do not improve with management.

DIVERTICULITIS

DEFINITION

Inflammation and infection in one or more diverticula.

HISTORY

- Abdominal pain may present acutely, but more often develops over hours to days, with left lower quadrant pain
- Fever and chills
- Tachycardia
- Anorexia
- Nausea and vomiting

PHYSICAL FINDINGS

- Fever
- Tachycardia
- Abdominal tenderness to palpation with possible rebound tenderness
- Palpable mass may be present, representing an abscess or inflammatory phlegmon
- Bowel sounds may be active if there is partial obstruction, or hypoactive or absent if peritonitis has developed
- Rectal exam may help to localize the abscess or inflammatory mass

DIFFERENTIAL DIAGNOSIS

- Appendicitis
- Inflammatory bowel disease
- Ischemic colitis
- Colon cancer
- Other causes of bowel obstruction
- Urologic or gynecologic disorders

COMPLICATIONS

- Abscess
- Perforation
- Fistula
- Peritonitis
- Sepsis

DIAGNOSTIC TESTS

- Test stool for occult blood
- Perform urinalysis

MANAGEMENT

Goals of Treatment

- Rest the bowel
- Relieve symptoms
- Prevent complications

Appropriate Consultation

Consult a physician.

Nonpharmacologic Interventions

- Nothing by mouth
- Nasogastric tube

Ajuvant Therapy

Start IV therapy with normal saline to maintain hydration in client with moderate to severe symptoms.

Pharmacologic Interventions

- Broad-spectrum antibiotics such as ampicillin, gentamicin, clindamycin or cefoxitin are used; consult a physician before starting IV antibiotics
- Antibiotics should be continued for 7–10 days

Referral

Medevac. Surgery may be required if there is peritonitis, with or without evidence of perforation, unresolved obstruction or development of a fistula. Other indications for surgical intervention are failure to improve after several days of medical treatment and recurrence after successful treatment.

EMERGENCIES OF THE GASTROINTESTINAL SYSTEM

ABDOMINAL PAIN (ACUTE)

HISTORY

The area of the pain, including its origin and pattern of radiation, time of onset, nature and associated symptoms, will frequently help in making the diagnosis. A menstrual history should be obtained.

ASSOCIATED SYMPTOMS

- Weight loss may indicate malignancy or malabsorption
- Vomiting may be associated with small-bowel obstruction or volvulus
- Diarrhea and constipation may suggest inflammatory bowel disease, cancer, obstipation, malabsorption
- Melena or blood per rectum indicates GI bleeding, which may be associated with peptic ulcer disease, esophageal varices or colon cancer, or may be drug induced
- Check stool by hemoculture; if negative, consider foods (e.g., Kool-Aid, beets) or medicines (iron) as cause
- Jaundice may suggest pancreatic cancer (painless), hepatitis, hemolysis, sickle cell anemia (G6PD [glucose-6-phosphate dehydrogenase] deficiency), alcoholic hepatitis, choledocholithiasis or primary biliary cirrhosis
- Urinary symptoms (dysuria, frequency, urgency, hematuria)
- Renal problems often present with abdominal pain; consider urolithiasis, urinary tract infection or testicular torsion
- Sexual activity, last period, birth control use, history of sexually transmitted disease, vaginal discharge, spotting or bleeding: consider ectopic pregnancy, pelvic inflammatory disease, ovarian torsion or ruptured ovarian cyst

MEDICAL HISTORY

- Other major illnesses
- Prior surgery
- Prior studies performed for evaluation of abdominal problems
- Family history of similar complaints
- Medications, especially digoxin, theophylline, steroids and tetracycline (for esophageal ulcers), analgesics, antipyretics, antiemetics, barbiturates, diuretics, alendronate (for esophageal ulcers)

PHYSICAL EXAMINATION

Vital Signs

- Signs of shock, infection (elevated temperature)
- Signs of dehydration, with dry mucous membranes and decreased skin turgor

Abdominal Examination

Inspection

Scaphoid appearance or distension, point of most severe pain, hernia, scars.

Ausculation

- High-pitched bowel sounds suggest obstructive process
- Absent bowel sounds suggest ileus

Palpation and Percussion

- Muscle rigidity (voluntary or involuntary)
- Localized tenderness, masses, pulsation, hernias, peritoneal irritation (cough or jumping may also elicit "rebound")
- Involuntary guarding
- Obturator sign (pain on internal and external rotation of hip)
- Psoas sign (pain when straight leg is raised by using obturator muscle; may indicate abscess)
- Murphy's sign (right upper quadrant pain when breathing in and pressing over the liver)
- Liver dimension and spleen dimension
- Tenderness of costovertebral angle
- Pelvic exam in women
- Rectal exam to rule out GI bleeding, prostatitis, etc. (rectal examination should be used to add to the entire clinical picture)
- Absence of rectal tenderness does not preclude or confirm diagnosis of appendicitis

DIAGNOSTIC TESTS (IF AVAILABLE)

- Hemoglobin
- WBC count
- Urinalysis
- Pregnancy test for all reproductive-age females, unless status is post-hysterectomy
- Chest x-ray (if available) to rule out pneumonia

DIFFERENTIAL DIAGNOSIS

See Table 2.

MANAGEMENT

Initial Decision

Decide whether to admit and observe, discharge, or refer for surgical opinion.

Appropriate Consultation

Consult a physician if the diagnosis is unclear and the presentation appears serious.

Nonpharmacologic Interventions

- Nothing by mouth until diagnosis is clear
- Nasogastric tube for vomiting, bleeding or suspected bowel obstruction
- Foley catheter

Adjuvant Therapy

- Start IV therapy with normal saline; decide on expected fluid losses and current level of hydration
- Hydrate accordingly

Pharmacologic Interventions

Although classic surgical teaching has been that medication for pain may confuse the diagnosis of abdominal pain in the emergency setting, this is not supported by the literature. In fact, if anything, the diagnosis may be clarified by pain relief, which would result in fewer unnecessary surgical procedures.

Choice of medication will depend on the presentation and the severity of the pain as judged by the client.

Monitoring and Follow-Up

- Monitor pain, airway, breathing, circulation (ABC), vital signs and any associated fluid losses closely
- Serial exams over a few hours may clarify the diagnosis

Referral

Medevac for evaluation if diagnosis is uncertain and the client's condition warrants urgent evaluation.

Table 2: Differential Diagnosis of Abdominal Pain

Diagnosis	Usual Location of Pain	Comments
Hepatitis, subphrenic abscess, hepatic abscess	RUQ; may radiate to right shoulder	Elevated liver enzymes, jaundice
Cholecystitis, cholelithiasis, cholangitis	RUQ, mid-epigastric region; radiates to back and right scapula	Sudden onset with associated nausea
Pancreatitis	Mid-epigastric region; radiates to back	May have signs of peritonitis
Duodenal ulcer or gastric ulcer	Mid-epigastric region, LUQ; radiation to back if posterior ulcer; peritonitis with perforation	
Splenic hematoma or enlargement	LUQ	Hypotension and peritonitis if ruptured
Aortic aneurysm	Periumbilical, especially into back flanks; may present as epigastric or back pain, flank or hip pain	May be colicky; hypotension if ruptured
Appendicitis	Early: periumbilical; late: RLQ	May present with peritoneal signs, especially in elderly people
Crohn's disease or ulcerative colitis	RLQ, but may be LLQ	Diarrhea (bloody in ulcerative colitis), cramps, elevated sedimentation rate
Mesenteric adenitis	RLQ	Pain secondary to enlarged mesenteric nodes from streptococcal pharyngitis
Spontaneous bacterial peritonitis	Generalized, with peritoneal signs	Usually in alcoholic people, people with indwelling catheters and those on dialysis
Diverticulitis	Generally LLQ, very rarely RLQ; may be generalized	Clinical diagnosis (pain + diarrhea, vomiting, fever)
Meckel's diverticulum	Below or to left of umbilicus	May be recurrent; presents with rectal bleeding or intestinal obstruction
Urolithiasis or nephrolithiasis	Either flank; may radiate to labia or testicles	Colicky; may have blood in urine; need intravenous pyelogram
Cystitis	Suprapubic	Urinalysis may show blood and leukocytes
Gynecologic disease, including ovarian cyst, ovarian torsion, ectopic pregnancy, Mittelschmerz, PID	Pain in pelvis, either adnexal area; radiation to groin; may also radiate to right shoulder if free intraperitoneal bleeding	Pregnancy test, cervical cultures, ultrasonography to rule out ectopic pregnancy if this possibility exists
Metabolic disease such as diabetic ketoacidosis, Addison's disease	Pain may be diffuse; may have guarding	Associated with nausea, vomiting
Pneumonia	May mimic appendicitis	Cough and chest pain may also be present
Cardiac disease	May present as epigastric pain	ECG to rule out cardiac disease, especially if risk factors present; may be confused with esophageal reflux

RUQ = right upper quadrant, LUQ = left upper quadrant, RLQ = right lower quadrant, LLQ = left lower quadrant, PID = pelvic inflammatory disease, ECG = electrocardiogram.

PANCREATITIS (ACUTE)

DEFINITION

Inflammation of the pancreas.

CAUSES

- Excessive or chronic alcohol abuse
- Recent alcohol binge
- Acute cholecystitis
- Abdominal trauma
- Penetrating duodenal ulcer

HISTORY

- Steady, boring abdominal pain
- Pain located in epigastrium and periumbilical area
- Pain radiates through to back, flanks, lower abdomen and chest
- Pain is relieved by sitting up and leaning forward, aggravated by lying down
- Nausea, vomiting, abdominal distension present
- History of biliary disease or gallstones
- Past or current use of thiazide diuretics, estrogen, azathioprine steroids, sulfasalazine

PHYSICAL FINDINGS

- Temperature elevated
- Heart rate elevated
- Blood pressure may be low
- Postural blood pressure drop may be present
- Client anxious, in acute distress
- Distress increased when lying down
- Abdomen may be distended
- Bowel sounds reduced to absent (paralytic ileus)
- Respiratory findings may be present: basal crackles, left-sided atelectasis, pleural effusion
- Acutely tender with muscle guarding and rigidity
- Rebound tenderness present

DIFFERENTIAL DIAGNOSIS

- Peptic ulcer disease
- Severe gastritis
- Acute cholecystitis
- Lower lobe pneumonia
- Intestinal obstruction

COMPLICATIONS

- Hypotension
- Shock
- Paralytic ileus
- Sepsis
- Hyperglycemia
- Adult respiratory distress syndrome
- Death

DIAGNOSTIC TESTS

- Measure blood glucose level (may be elevated)
- Perform urinalysis
- Perform WBC count (if possible)

MANAGEMENT

Goals of Treatment

- Relieve symptoms
- Maintain hydration
- Prevent complications

Appropriate Consultation

Consult a physician for help with diagnosis and treatment plan.

Nonpharmacologic Interventions

- Bed rest
- Nothing by mouth
- Insert a nasogastric tube
- Insert a urinary catheter

Adjuvant Therapy

- Start a large-bore IV (14- or 16-gauge) with normal saline; replace volume deficits (*see "Shock," in chapter 14, "General Emergencies and Major Trauma"*)
- Adjust rate according to pulse, postural blood pressure drop, systolic blood pressure
- Aim for pulse < 100 bpm, systolic blood pressure >100 mm Hg

Pharmacologic Interventions

Analgesia:

meperidine (Demerol) (**D class drug**), 50–100 mg IM

Antiemetics:

dimenhydrinate (Gravol) (**A class drug**), 50 mg IM q6h prn

Monitoring and Follow-Up

- Measure hourly urinary output; adjust IV rate to maintain urine output
- Monitor blood glucose (hyperglycemia is common)
- Monitor pulse and blood pressure frequently until the client's condition stabilizes—*watch for shock*
- Observe for alcohol withdrawl if a recent binge is a known cause of pancreatitis

Referral

Medevac as soon as possible.

APPENDICITIS

DEFINITION

Inflammation of appendix.

CAUSE

Obstruction of the opening of the appendix by stool. Infection may occur later.

HISTORY

The following outlines the classic pattern for acute appendicitis; however, the client may complain of various forms of abdominal, rectal and back pain depending on the location of the appendix.

- Vague, diffuse periumbilical or epigastric pain
- Pain shifts within hours to right lower quadrant
- Anorexia
- Nausea
- Vomiting usually occurs a few hours after onset of pain, but may not be present
- Low-grade fever may be present
- Urinary frequency, dysuria and diarrhea may develop if tip of appendix irritates the bladder or bowel
- In women, date of the last normal menstrual period and any history of recent menstrual irregularity should be noted

PHYSICAL FINDINGS

Presentation is variable, depending on whether the client presents early or late in the evolution of the disease process.

- Temperature mildly elevated
- Heart rate elevated (may be normal in early stage)
- Variable level of distress
- Client holds abdomen, walks slowly and slightly bent over
- Bowel sounds variable: hyperactive to normal in early stages; reduced to absent in later stage
- Localized tenderness in right lower quadrant
- Muscle guarding in right lower quadrant
- Rebound tenderness may be present
- Rectal exam: tenderness in right lower quadrant if tip of appendix is near the rectum
- Psoas stretch test positive

DIFFERENTIAL DIAGNOSIS

Appendicitis is known as the "great mimic." The actual signs and symptoms depend on the location of the appendix within the abdomen.

- Gastroenteritis
- Crohn's disease
- Stone in ureter
- Mittelschmerz (ruptured follicular cyst)
- Ectopic pregnancy
- Pelvic inflammatory disease
- Twisted ovarian cyst
- Pyelonephritis
- Biliary colic
- Cholecystitis
- Peptic ulcer disease

COMPLICATIONS

- Abscess
- Localized peritonitis
- Perforation
- Generalized peritonitis
- Sepsis

DIAGNOSTIC TESTS

- Perform WBC count, if possible
- Perform urinalysis

MANAGEMENT

Goals of Treatment

- Maintain hydration
- Prevent complications

Appropriate Consultation

Consult a physician as soon as possible.

Nonpharmacologic Interventions

- Bed rest
- Nothing by mouth
- Insert a nasogastric tube if abdominal distension is present

Adjuvant Therapy

- Start IV therapy with normal saline
- Adjust IV rate according to age and state of hydration

Pharmacologic Interventions

Although classic surgical teaching has been that medication for pain may confuse the diagnosis of abdominal pain in the emergency setting, this is not supported by the literature. In fact, if anything, the diagnosis may be clarified by pain relief, which would result in fewer unnecessary surgical procedures.

Analgesia:

meperidine (Demerol) (**D class drug**), 50–100 mg IM

If transfer is delayed, discuss starting IV antibiotics with a physician:

ampicillin (Novo-Ampicillin) (**D class drug**), 1.0 g IV q4–6h

and

metronidazole (Flagyl) (**B class drug**), 500 mg IV q6–8h

For clients with allergy to penicillin, use only metronidazole.

Monitoring and Follow-Up

Monitor vital signs and general condition frequently.

Referral

Medevac as soon as possible; surgical consult is required.

OBSTRUCTION OF THE SMALL OR LARGE BOWEL

DEFINITION

Blockage of small or large bowel (partial or complete, mechanical or paralytic).

CAUSES

- Small bowel: strangulated hernia (40%), adhesions (30%), cancer, Crohn's disease
- Large bowel: cancer (70%), volvulus, diverticulitis, fecal impaction

HISTORY

- Pain
- Vomiting
- Inability to pass stool or gas
- Bloating
- Other symptoms, depending upon underlying disease process

The exact symptoms of obstruction depend on the location and severity of the obstruction. The higher the level of obstruction, the more acute and rapid the onset of symptoms.

Small-Bowel Obstruction

- Pain moderate to severe
- Intermittent waves of pain
- Relative comfort between waves of pain
- Vomiting frequent, violent, bilious when obstruction is high
- Vomiting feculent when obstruction is lower
- Abdominal bloating variable; prominent when obstruction is low
- Reduced rectal gas and stool
- Weakness

Large-Bowel Obstruction

- Pain moderately severe (generally less acute than in small-bowel obstruction)
- Colicky
- Distension present, occurs early, may be severe
- Vomiting usually late and infrequent, may be feculent
- Reduced or absent rectal gas and stool
- Sudden, severe pain characteristic of volvulus

Paralytic Ileus

- Obstruction of the bowel due to paralysis of the muscle of the bowel wall, caused by generalized peritonitis, any acute inflammation of the abdomen, severe chest injury or any acute illness
- Major symptom is distension, resulting in moderate discomfort
- Pain absent
- Frequent vomiting or regurgitation of gastric contents
- "Silent" distended abdomen on examination

PHYSICAL FINDINGS

- Heart rate normal or increased
- Respiration normal or increased
- Blood pressure normal or low
- Postural blood pressure drop may be present
- Client appears mildly to severely ill
- Client doubles over with waves of pain in small-bowel obstruction
- Client pale, sweaty, anxious
- Various degrees of abdominal distension
- Hernia may be visible
- Contractions of bowel wall (peristalsis) may be seen
- Bowel sounds increased in early stages
- Peristaltic rushes, high-pitched tinkling sounds present
- Later, bowel sounds are diminished or absent
- Tenderness due to distension may be present
- Tender localized mass or hernia may be present
- Rebound tenderness and rigidity not present unless perforation, peritonitis or strangulation have occurred
- Rectal exam: blood or stool may be present, rectum may be empty
- Examine all hernial orifices, including both femoral rings

DIFFERENTIAL DIAGNOSIS

- Gastroenteritis
- Appendicitis
- Inflammatory bowel disease with distension
- Perforated ulcer
- Pancreatitis

COMPLICATIONS

- Perforation
- Peritonitis
- Strangulated segment of bowel
- Sepsis
- Hypotension, shock
- Death

DIAGNOSTIC TESTS

- Test stool for occult blood
- Perform urinalysis
- Measure hemoglobin (optional; may help with diagnosis and treatment)

MANAGEMENT

Goals of Treatment

- Relieve distension
- Maintain hydration
- Prevent complications

Appropriate Consultation

Consult physician as soon as possible.

Nonpharmacologic Interventions

- Bed rest
- Nothing by mouth
- Insert a nasogastric tube, attach to low suction or to straight drainage
- Insert urinary catheter; measure hourly urinary output

Adjuvant Therapy

- Start a large-bore IV (14- or 16-gauge) with normal saline; replace volume deficits
- Adjust IV rate according to pulse, postural blood pressure drop, blood pressure, state of hydration, age, pre-existing medical problems (*see "Shock," in chapter 14, "General Emergencies and Major Trauma"*)
- Aim for pulse < 100 bpm, systolic blood pressure > 100 mm Hg

Pharmacologic Interventions

IV antibiotics may be prudent if transfer is delayed. Discuss with physician first if possible.

Antibiotic of choice:

ampicillin (Novo-Ampicillin) (**D class drug**), 1.0 g IV q4–6h

and

metronidazole (Flagyl) (**B class drug**), 500 mg IV q6–8h

For clients with allergy to penicillin use only metronidazole.

Analgesia may be necessary:

meperidine (Demerol) (**D class drug**), 50–100 mg IM

Monitoring and Follow-Up

Monitor ABC, vital signs, urinary output and general condition frequently.

Referral

Medevac as soon as possible.

GASTROINTESTINAL BLEEDING (UPPER AND LOWER)

DEFINITION

Sudden, rapid loss of blood from the gastrointestinal tract. GI bleeding is a complication of some other disease process.

CAUSES

See Table 3.

Table 3: Causes of Gastrointestinal Bleeding

Category	Upper GI Bleeding	Lower GI Bleeding
Inflammatory	Peptic ulcer	Diverticulitis
	Severe gastritis	Crohn's disease
	Esophagitis	Ulcerative colitis
	Stress ulcer	Enterocolitis
Mechanical	Mallory Weiss tear	Anal fissure
	Hiatal hernia	Diverticulosis
Vascular	Esophageal varices	Hemorrhoids
Neoplastic	Carcinoma	Carcinoma and polyps
Systemic	Blood dyscrasias	Blood dyscrasias

HISTORY

- Usually a prior history of GI disease
- Hematemesis (vomiting of bright red blood or coffee-ground emesis)
- Melena (black, tarry stools)
- Hematochezia (passage of bright red blood from rectum)
- Sudden weakness or fainting
- Peptic ulcer disease: there may be a history of increasingly severe abdominal pain before onset of vomiting; vomiting will abruptly relieve pain

PHYSICAL FINDINGS

- Signs of shock if bleeding is significant
- Pulse rapid and weak
- Respirations rapid
- Blood pressure low-normal or decreased
- Postural blood pressure drop
- Client pale and anxious
- Client weak and sweaty
- Bright red blood in vomitus or stool
- Bowel sounds initially hyperactive due to blood in bowel
- Bowel sounds may become reduced or absent
- Mild-to-severe tenderness may be present
- Signs of peritonitis may be present

DIFFERENTIAL DIAGNOSIS

Upper GI Bleeding

- Peptic ulcer
- Esophageal varices
- Severe gastritis

Lower GI Bleeding

- Diverticular disease
- Inflammatory bowel disease
- Cancer colon

COMPLICATIONS

- Hypotension
- Shock
- Peritonitis
- Death

DIAGNOSTIC TESTS

- Measure hemoglobin
- Test stool for occult blood
- Check stool for gross blood

MANAGEMENT

Goals of Treatment

- Replace circulating blood volume

Appropriate Consultation

Consult a physician as soon as possible, after client is stable.

Nonpharmacologic Interventions

- Bed rest
- Nothing by mouth
- Insert nasogastric tube and empty the stomach for upper GI bleeding
- Insert urinary catheter; monitor hourly urinary output

Adjuvant Therapy

- Oxygen 6–10 L/min or more prn; keep oxygen saturation greater than 97% or 98%
- Large-bore IV (14- to 16-gauge) with normal saline
- Start a second IV line for volume replacement if there are signs of hypovolemia (*see "Shock," in chapter 14, "General Emergencies and Major Trauma"*)
- Adjust IV rate according to estimated volume depletion, pulse rate, blood pressure, postural blood pressure drop and age

Monitoring and Follow-Up

Monitor ABC, vital signs and general condition closely, as active re-bleeding can occur.

Referral

Medevac as soon as possible.

CHAPTER 6 – URINARY AND MALE GENITAL SYSTEMS

Table of Contents

ASSESSMENT OF THE URINARY AND MALE GENITAL SYSTEMS

HISTORY OF PRESENT ILLNESS AND REVIEW OF SYSTEM

GENERAL

The following characteristics of each symptom should be elicited and explored:

- Onset (sudden or gradual)
- Chronology
- Current situation (improving or deteriorating)
- Location
- Radiation
- Quality
- Timing (frequency, duration)
- Severity
- Precipitating and aggravating factors
- Relieving factors
- Associated symptoms
- Effects on daily activities
- Previous diagnosis of similar episodes
- Previous treatments
- Efficacy of previous treatments

CARDINAL SYMPTOMS

In addition to the general characteristics outlined above, additional characteristics of specific symptoms should be elicited, as follows.

Urinary System

- Frequency of urination
- Amount of urine (large or small)
- Urgency (client's sense that he or she must void now, cannot wait)
- Dysuria and its timing during voiding (at beginning or end, throughout)
- Nocturia (new onset or increase in usual pattern)
- Retention
- Incontinence
- Color and odor of urine
- Hematuria
- Colicky pain
- Pain in costovertebral angle, flank or abdomen
- Suprapubic pain
- Perineal, genital, groin or low-back pain

Male Genital System

- Difficulty in starting or stopping urinary stream
- Voluntary bearing down (straining) to urinate
- Nature of stream (speed, strength, volume)
- Post-void dribbling or post-void fullness
- Discharge from penis, itching
- Lesions on the external genitalia
- Genital, groin, suprapubic or low-back pain
- Testicular pain or swelling
- Painful intercourse
- Sexual orientation
- Number of sexual partners
- Libido
- Sexual practices, including risk behaviors (e.g., unprotected oral, anal or vaginal intercourse)
- Fertility (number of children)
- History of sexually transmitted disease (STD), including HIV and hepatitis B
- Testicular self-examination (frequency, regularity)
- History of hydrocele, epididymitis, prostatism, varicocele, hernia, undescended testis, spermatocele, recent vasectomy

Other Associated Symptoms

- Fever, chills, malaise
- Nausea, vomiting
- Diarrhea, constipation
- Decrease in appetite
- Change in sleep pattern

MEDICAL HISTORY (SPECIFIC TO GENITOURINARY SYSTEM)

- Cystitis, pyelonephritis
- Renal disease
- Congenital structural abnormalities in the genitourinary (GU) tract
- Renal stones
- Recent onset of or increase in sexual activity
- Recent GU tract instrumentation (e.g., catheter, urethral dilatation, cystoscopy)
- Menopause (with no hormone replacement therapy)
- Use of tampons, douches
- Diabetes mellitus
- Immunocompromise
- STDs
- Sexual abuse
- Allergies
- Exposure to chemical irritants
- Medications (e.g., immunosuppressants, oral contraceptives, antihypertensives, antipsychotics)
- Risk behaviors (e.g., unprotected sex, alcohol or drug abuse, use of illicit injection drugs)

FAMILY HISTORY (SPECIFIC TO GENITOURINARY SYSTEM)

- Urinary tract infections
- Renal disease (e.g., renal cancer, polycystic kidneys)
- Diabetes mellitus
- Kidney stones
- Sexual or physical abuse

PERSONAL AND SOCIAL HISTORY (SPECIFIC TO GENITOURINARY SYSTEM)

- Personal hygiene, toileting habits
- Sexual practices (risk behaviors, sexual orientation)
- Symptomatic sexual partner
- Use of contraceptive creams, foam, condoms, etc.
- Use of bubble bath, douches
- Tight-fitting underwear or other clothing
- Multiple sexual partners
- Disruption in sex life (from GU symptoms)
- Fear, embarrassment, anxiety
- Missing work, school or social functions because of GU symptoms (e.g., incontinence)

PHYSICAL EXAMINATION OF THE SYSTEM

GENERAL

- Apparent state of health
- Appearance of comfort or distress
- Color (e.g., flushed, pale)
- Nutritional status (emaciated or obese)
- Match between appearance and stated age

VITAL SIGNS

- Temperature
- Heart rate
- Respiratory rate
- Blood pressure

URINARY SYSTEM (ABDOMINAL EXAMINATION)

Inspection

- Previous abdominal or flank surgical scars
- Edema (facial, peripheral)

Palpation

- Suprapubic tenderness
- Bladder distension
- Abdominal tenderness or masses
- Costovertebral angle tenderness
- Enlargement of kidney (normal kidneys are usually not palpable unless client is thin)
- Inguinal nodes or swellings

Percussion

- Suprapubic or costovertebral angle tenderness
- Bladder distension

Remember to also examine the following areas as part of your assessment:

- Head, eyes, ears, nose, throat: assess for pharyngitis and conjunctivitis (chlamydial infection, gonorrhea)
- Skin: assess for skin lesions, rashes, polyarthralgias of systemic gonorrhea and hydration status

MALE GENITAL TRACT

Inspection

- Penis, scrotum and pubic area: inflammation, discharge, lesions, swelling, asymmetry, changes in hair distribution, nits, warts
- Rectum: lesions, discharge, swelling, hemorrhoids
- Inguinal and femoral areas (for hernia)

Palpation

- Penis: tenderness, induration, nodules, lesions
- Testes and scrotal contents: size, position, atrophy of testes, tenderness, swelling, warmth, masses, hydrocele
- Rectum: anal sphincter tone, rectal wall tumors, prostate gland
- Prostate: size, shape, contour, consistency, tenderness or nodules
- Superficial inguinal ring (for hernia)
- Inguinal and femoral areas (for hernia)

FEMALE GENITAL TRACT

This examination is covered in *chapter 13, "Women's Health and Gynecology."*

LABORATORY EVALUATION

- Urine: color, cloudy or clear
- Dipstick testing: blood, protein, white blood cells (WBC), nitrites, pH
- Microscopic (spun urine): white and red blood cells, bacteria or casts, epithelial cells
- Culture and sensitivity of urethral discharge or prostatic secretions

COMMON PROBLEMS OF THE MALE GENITOURINARY SYSTEM

BENIGN PROSTATIC HYPERPLASIA

DEFINITION

Benign enlargement of prostate gland, which may result in obstruction of the bladder outlet.

CAUSES

- Unknown
- Predisposing factor: age > 55 years

HISTORY

Urinary symptoms occur when the prostate gland has enlarged to a size that produces partial obstruction of the bladder outlet.

- Hesitancy
- Overflow incontinence
- Straining to start flow
- Loss of stream force
- Frequent urination in small amounts
- Sense of urgency
- Post-void dribbling
- Nocturia
- Continued sense of bladder fullness even after voiding

Urinary tract infection or urinary retention may be the presenting complaint. Hematuria may be an early symptom.

PHYSICAL FINDINGS

- Abdomen: bladder may be enlarged if acute urinary retention present; enlarged bladder may be palpable
- Rectal exam: prostate gland enlarged
- Prostate: normal consistency, top or margins may not be palpable, median sulcus may be indistinct

The clinical size of the prostate gland correlates poorly with the severity of symptoms. A client with mild clinical enlargement may present with very troublesome symptoms.

DIFFERENTIAL DIAGNOSIS

- Cystitis
- Cancer of the prostate
- Bladder tumor
- Calculi
- Prostatitis (chronic)
- Urethral stricture

COMPLICATIONS

- Recurrent urinary tract infections
- Acute urinary retention
- Hemorrhoids or hernias caused by straining with urination
- Renal damage secondary to chronic obstruction

DIAGNOSTIC TESTS

- Obtain urine for urinalysis (routine and microscopy, culture and sensitivity)
- Rule out infection, hematuria and glycosuria
- Determine creatinine level
- Prostate surface antigen (PSA): optional and controversial but is generally recommended when a diagnosis of prostate cancer would alter treatment in a healthy man between 50 and 70 years of age

MANAGEMENT

Goals of Treatment

- Improve or eliminate symptoms
- Prevent the complications of long-term obstruction of bladder outlet (e.g., urinary tract infections, bladder stones, hydronephrosis)

Appropriate Consultation

Consult a physician if client's symptoms are severe and bothersome enough that he wants immediate treatment or if there is hematuria, nodularity of the prostate or unexpected back pain.

Prostatic carcinoma with metastasis to bone must be ruled out in men > 35 years of age who have symptoms of bladder-neck obstruction and new onset of back pain.

Nonpharmacologic Interventions

- Instruct client to avoid fluids — especially tea, coffee and alcohol — before bedtime, as they tend to cause diuresis in the night
- Review any medications that the client is taking; discontinue if possible
- Cold remedies with decongestants, antihistamines, anticholinergics, antipsychotics, antidepressants and anxiolytics can cause poor bladder emptying and increase obstruction of the bladder outlet
- Advise client to report any sudden change in symptoms for re-evaluation
- Surgery to reduce the size of the prostate: transurethral prostatectomy, transurethral incision prostatectomy or laser prostatectomy

Pharmacologic Interventions

To improve symptoms, the 5-α-reductase inhibitor finasteride (Proscar) (**B class drug**) and α_1-adrenergic blockers such as terazosin (Hytrin) (**B class drug**) are useful.

Monitoring and Follow-Up

If symptoms are mild, arrange elective follow-up with a physician. Client's symptoms should be monitored every 6 months, and a digital rectal exam performed annually. If symptoms are moderate to severe, refer for consultation (*see "Referral," below*).

Referral

Refer for urological consultation if symptoms are moderate to severe, causing inconvenience to the client, or if there are complications.

EPIDIDYMITIS

DEFINITION

Bacterial infection of epididymis.

CAUSES

- Client ≤ 35 years of age: usually an STD (*Neisseria gonorrhea, Chlamydia*)
- Client > 35 years of age: usually caused by urinary tract pathogen (*Escherichia coli, Klebsiella, Proteus*) or tuberculosis (TB)
- Predisposing factors in older age group: urinary tract infection, outflow obstruction, prostatic infection, instrumentation of the lower GU tract (e.g., catheterization)

HISTORY

- Unilateral scrotal pain and swelling
- Elevation of scrotum provides relief of pain
- Fever, chills, malaise may be present
- Symptoms of cystitis or urethritis may be present (frequency, urgency, dysuria)

PHYSICAL FINDINGS

- Temperature may be elevated
- Moderate distress
- Client walks slowly and carefully, often holding scrotum
- Unilateral scrotal swelling and redness
- Urethral discharge may be present
- Scrotum acutely tender and warm to touch
- Epididymis enlarged, cord-like and acutely tender

DIFFERENTIAL DIAGNOSIS

- Testicular torsion
- Infected sebaceous cyst, folliculitis
- Trauma
- Mumps orchitis
- Testicular tumor
- Spermatocele
- Hydrocele
- Varicocele

COMPLICATIONS

- Spread of infection to testis
- Abscess
- Sterility

DIAGNOSTIC TESTS

- Obtain urine for urinalysis (routine and microscopy, culture and sensitivity)
- Take urethral swabs for culture (*N. gonorrhea* and *Chlamydia*)
- Offer HIV testing
- Perform VDRL testing

MANAGEMENT

In general, **mild infections** are treated on an outpatient basis; more **severe infections**, which are associated with fever and chills, require inpatient care.

Goals of Treatment

- Relieve symptoms
- Prevent complications of infection
- Prevent recurrence

Appropriate Consultation

Mild Infection

Consult a physician if there is concern about underlying non-infectious pathology, especially in a client > 35 years of age, or if symptoms are moderate to severe.

Severe Infection

Consult a physician regarding choice of IV antibiotics.

Nonpharmacologic Interventions

Mild Infection

- Bed rest during acute phase (1–2 days)
- Elevation of scrotum to relieve pain
- Client should use a scrotal support when ambulatory
- Ice should be applied to scrotum for 20 minutes q2–3h to relieve pain
- Client should avoid heavy lifting, straining with stool and sexual intercourse during acute phase
- Advise client to return to the clinic for reassessment if symptoms worsen

Client Education

- Explain disease process and expected course
- Counsel client about appropriate use of medication (dose, frequency, side effects, completion of entire course prescribed)
- Counsel client about preventing spread of STDs to sexual partners

Severe Infection

- Bed rest
- Ice packs should be applied to scrotum

Pharmacologic Interventions

Mild Infection

Analgesia and antipyretics for fever and pain:

acetaminophen (Tylenol) (**A class drug**), 500 mg, 1–2 tabs PO q4–6h prn

Antibiotics for young client with sexually transmitted infection:

cefixime (Suprax) (**C class drug**), 400 mg, 2 tabs PO stat

and

tetracycline (Tetracyn) (**A class drug**), 500 mg PO qid for 10 days

or

doxycycline (Vibramycin) (**A class drug**), 100 mg PO bid for 10 days

or

azithromycin (Zithromax) (**C class drug**), 1 g PO (single dose)

For clients with allergy to tetracycline:

erythromycin (E-Mycin) (**A class drug**), 500 mg PO qid for 10 days

Antibiotics for older client with nonsexually transmitted infection:

sulfamethoxazole/trimethoprim (Septra DS) (**A class drug**), 1 tab PO bid for 14 days

or

cephalexin (Keflex) (**C class drug**), 250 mg PO qid for 14 days

Severe Infection

Start IV therapy with normal saline to keep vein open.

Analgesia and antipyretics for fever and pain:

acetaminophen (Tylenol) (**A class drug**), 500 mg, 1–2 tabs PO q4–6h prn

For relief of moderate to severe pain:

acetaminophen with codeine (Tylenol #2 or #3) (**C class drug**), 1–2 tabs PO q4h prn

Antibiotics for young client:

ampicillin (Ampicin) (**D class drug**), 1.0 g IV q6h

and

doxycycline (Vibramycin) (**A class drug**), 100 mg PO q12h

Antibiotic for older client:

ampicillin (Ampicin) (**D class drug**), 1.0 g IV q6h

For clients with allergy to penicillin, consult physician for alternative.

Monitoring, Follow-Up and Referral

Mild Infection

- Follow up in 48 hours and note response to therapy
- Follow up again in 10–14 days, when the course of antibiotics is completed

Severe Infection

Medevac as soon as possible.

PROSTATITIS (ACUTE)

DEFINITION

Acute infection of the prostate gland.

CAUSES

The same organisms that cause cystitis (*E. coli*, *Proteus*, *Klebsiella*).

Risk Factors

- Urinary tract infection
- Prostatic calculi
- Age > 50 years

HISTORY

- Abrupt onset of fever and chills
- Genital pain
- Pain in sacrum and low back may be present
- Perineal pain
- Dysuria, frequency, urgency (all symptoms of cystitis), nocturia
- Symptoms of bladder-neck obstruction may be present
- Flow and stream may be abnormal
- Pain with bowel movements

PHYSICAL FINDINGS

- Temperature may be elevated
- Heart rate may be elevated
- Client in moderate-to-severe distress, may appear acutely ill
- Client walks slowly, with legs apart
- Bladder may be visibly distended on abdominal inspection
- Prostate gland enlarged, acutely tender, warm, with soft consistency
- Small amounts of pus may be expressed from urethra
- Avoid vigorous massage of prostate (may cause bacteremia)
- Urine cloudy or clear
- Dipstick test: blood and protein may be present
- Microscopic examination of urine: bacteria, WBC and a few red blood cells (RBC) may be present

DIFFERENTIAL DIAGNOSIS

- Benign prostatic hyperplasia with urinary tract infection
- Epididymitis
- Urethritis
- Cystitis
- Pyelonephritis
- Malignancy

COMPLICATIONS

- Epididymitis
- Pyelonephritis
- Acute urinary retention
- Sepsis
- Abscess
- Chronic prostatitis

DIAGNOSTIC TESTS

- Obtain urine for urinalysis (routine and microscopy, culture and sensitivity)
- Take urethral swabs for culture (*N. gonorrhea* and *Chlamydia*) if an STD is suspected (because of history) or a urethral discharge is detected
- Offer HIV testing
- Perform VDRL testing

MANAGEMENT

If the symptoms are **mild to moderate**, treat on an outpatient basis. If the symptoms are **severe** and the client appears **acutely ill**, inpatient care is required.

Goals of Treatment

- Relieve symptoms
- Prevent complications

Appropriate Consultation

Consult a physician, especially if the symptoms are severe or the client appears systemically unwell.

Nonpharmacologic Interventions

Severe Symptoms

Bed rest.

Pharmacologic Interventions

Mild to Moderate Symptoms

Antibiotics:

sulfamethoxazole/trimethoprim (Septra DS) (**A class drug**), 1 tab PO bid for 21 days

or

amoxicillin (Amoxil) (**A class drug**), 500 mg PO tid for 21 days

Severe Symptoms

Start IV therapy with normal saline for fluids and IV antibiotics.

Manage fever and pain:

acetaminophen (Tylenol) (**A class drug**), 500 mg, 1–2 tabs PO q4h prn

Discuss IV antibiotics with physician. First-line choices:

ampicillin (Penbritin) (**D class drug**), 500 mg IV q6h

and

gentamycin (**B class drug**), 3 mg/kg IV daily, in divided doses q8h

For clients with allergy to penicillin, sulfamethoxazole/trimethoprim (Septra DS) is an alternative.

Monitoring and Follow-Up

Severe Symptoms

- Watch for distended bladder
- If the client is unable to void and has a distended bladder, have him sit in a tub filled with warm water and attempt to void into the water
- Do not catheterize

See "Acute Urinary Retention," this chapter, if treatment as described here is not successful.

Referral

Severe Symptoms

Medevac as soon as possible for continued inpatient IV therapy.

BALANITIS

DEFINITION

Inflammation of glans penis.

CAUSES

- Allergic reaction (e.g., to condom latex, contraceptive jelly)
- Fungal (e.g., *Candida albicans*) or bacterial (e.g., *Streptococcus*) infection
- Risk factor: presence of foreskin

HISTORY

- Penile pain
- Dysuria
- Drainage at site of infection
- Erythema
- Swelling of prepuce
- Ulceration
- Plaques

PHYSICAL FINDINGS

- Redness, swelling of the glans penis
- Discharge around glans

DIFFERENTIAL DIAGNOSIS

- Leukoplakia
- Lichen planus
- Psoriasis
- Reiter's syndrome

COMPLICATIONS

- Urinary meatal stenosis
- Premalignant changes resulting from chronic irritation
- Urinary tract infection

DIAGNOSTIC TESTS

Sample any discharge for culture and sensitivity.

MANAGEMENT

Goals of Treatment

- Relieve symptoms
- Prevent recurrence

Nonpharmacologic Interventions

- Warm compresses or sitz baths
- Local hygiene: ensure foreskin is easily retractable

Pharmacologic Interventions

Start topical therapy. Choice depends on whether you think it is a bacterial or a fungal infection or a dermatitis.

Fungal

clotrimazole 1% (Canesten) (**A class drug**), bid on affected area

or

nystatin (Mycostatin) (**A class drug**), bid to qid on affected area

Bacterial

bacitracin ointment (Baciguent) (**A class drug**), qid on affected area

or

neomycin sulfate (Neosporin) (**A class drug**), qid on affected area

Dermatitis

hydrocortisone 0.5% ointment (Unicort) (**A class drug**), qid on affected area

COMMON PROBLEMS OF THE URINARY SYSTEM

ASYMPTOMATIC BACTERIURIA

DEFINITION

Presence of bacteria in urine without symptoms.

CAUSES

- Anatomic structure (more common in women because the urethra is short and located close to the vagina)
- Hormonal changes (e.g., pregnancy, oral contraceptives)
- Relaxation of pelvic muscles (in elderly clients)
- Chronic prostatitis
- Contamination of specimen
- Indwelling catheters

HISTORY

- No urinary complaints
- Usually discovered on routine examination of urine
- Common in women 20–50 years of age
- Chronic low-grade prostatitis often present in men > 50 years of age
- Common in elderly clients and those with an indwelling urinary catheter

PHYSICAL FINDINGS

Normal.

LABORATORY FINDINGS

- Urine: clear
- Dipstick test: normal
- Microscopic examination: bacteria evident
- Culture: positive in 24–48 hours

Ensure that the specimen is a properly collected sample of midstream urine.

MANAGEMENT

Goals of Treatment

- Recognize the significance of asymptomatic bacteriuria in the various subgroups (prenatal, immunocomprised, elderly)
- Eradicate bacteria from GU tract in pregnant women

Nonpharmacologic Interventions

Client Education

- Recommend adequate fluid intake to flush bacteria from the bladder and prevent stasis of urine (6–8 glasses of fluid per day)
- Instruct client about proper hygiene (wiping from front to back)
- Teach client the signs and symptoms of acute infection and advise client to return to the clinic if these occur

Pharmacologic Interventions

Pregnant Women

Treat all pregnant women with this condition to ensure resolution of the bacteriuria:

amoxicillin (Amoxil) (**A class drug**), 250–500 mg PO tid for 7 days

For clients with allergy to penicillin:

nitrofurantoin (Macrodantin) (**A class drug**), 100 mg PO bid for 7 days

Other Groups

Older Men with Benign Prostatic Hyperplasia

Ask if there has been any change in symptoms, however small. If symptoms have increased, treat as for cystitis (see below); otherwise repeat urinalysis (routine and microscopy, culture and sensitivity).

Clients with Urinary Catheter

Consult with a physician, who may decide that condition may be left untreated. Antibiotic therapy would only encourage the growth of resistant strains of bacteria.

Elderly Clients

Antibiotic treatment is not needed. Simple measures such as increasing fluid intake, proper wiping, regular toileting and use of a commode help to reduce the bacterial numbers.

Healthy Non-Pregnant Women

If there have been no GU problems in the past and there are currently no symptoms, the problem is probably only contamination. Repeat the urinalysis (routine and microscopy, culture and sensitivity).

CYSTITIS

DEFINITION

Bacterial infection of the bladder.

CAUSES

- *E. coli* (most common organism, in 80% to 90% of cases)
- Also *Klebsiella, Pseudomonas*, group B *Streptococcus* and *Proteus mirabilis*

Risk Factors

- Female
- Poor perineal hygiene
- Diabetes mellitus
- Urinary instrumentation (e.g., catheter)
- Neurogenic bladder (because of stroke or multiple sclerosis)
- Congenital abnormality of GU tract
- Renal calculi
- Tumor
- Urethral stricture
- Pregnancy
- Increased sexual activity (in women)
- Use of spermicides, diaphragm
- Prostatic hypertrophy
- Immunocompromise (e.g., HIV infection)

HISTORY

- Dysuria
- Frequent urination, small amounts
- Urgency
- Suprapubic discomfort

In women, note presence of vaginal discharge, menstrual flow and use of a diaphragm.

In men, note presence of urethral discharge or symptoms suggestive of benign prostatic hyperplasia.

PHYSICAL FINDINGS

- Temperature may be elevated
- Mild-to-moderate suprapubic tenderness
- Prostate may be enlarged

LABORATORY FINDINGS

- Urine: cloudy, concentrated
- Dipstick test: blood and protein in urine, nitrite positive
- Microscopic (spun urine): WBC, RBC and bacteria may be present

DIFFERENTIAL DIAGNOSIS

- Urethritis
- Vulvovaginitis
- Urinary calculi
- Renal TB
- STD
- Benign prostatic hyperplasia
- Diabetes mellitus
- Chronic prostatitis

COMPLICATIONS

- Ascending infection (pyelonephritis)
- Chronic cystitis

DIAGNOSTIC TESTS

- Obtain urine for urinalysis (routine and microscopy, culture and sensitivity) only if the client is known to have an abnormality of the GU tract, if there is diagnostic uncertainty or if the client is pregnant. Otherwise, empiric antibiotic therapy is appropriate.
- Obtain urine for culture and sensitivity if there is failure to respond to empiric therapy or a relapse occurs less than a month after therapy.
- Obtain a vaginal swab for analysis (routine and microscopy, culture and sensitivity) prn.
- Obtain appropriate swabs for *N. gonorrhoea* and *Chlamydia* if an STD is suspected.
- Check the blood glucose level if symptoms suggest diabetes mellitus.

MANAGEMENT

Goals of Treatment

- Relieve symptoms
- Eradicate bacteria from the bladder

Nonpharmacologic Interventions

Client Education

- Counsel client about appropriate use of medications (dose, frequency, side effects, need to complete entire course of medications)
- Recommend increasing fluid intake (to 8–10 glasses per day)
- Instruct client in proper perineal hygiene (wiping from front to back) to prevent recurrence
- Recommend triple voiding (i.e., voiding before and immediately after intercourse, then drinking a large glass of water and voiding again within 1 hour) if client is a sexually active woman with recurrent cystitis. This process flushes out any organisms that may enter the urethra during intercourse.

Pharmacologic Interventions

Uncomplicated cystitis in women can be treated with a 3- or a 7-day course of antibiotics; men should have a 7-day course:

sulfamethoxazole/trimethoprim (Septra or Bactrim DS) (**A class drug**), 2 tabs PO bid for 3 or 7 days

or

nitrofurantoin (Macrodantin) (**A class drug**), 100 mg PO bid for 3 or 7 days

or

amoxicillin (Amoxil) (**A class drug**), 250–500 mg PO tid for 7 days

Cystitis in pregnancy should be treated with a 7-day course of antibiotics:

amoxicillin (Amoxil) (**A class drug**), 250–500 mg PO tid for 7 days

or

nitrofurantoin (Macrodantin) (**A class drug**), 100 mg PO bid for 7 days

Nitrofurantoin is contraindicated near term and during labor. Contact a physician for help in choosing an antibiotic if the client is allergic to penicillin or is near term.

Older men with cystitis and women with complicated cystitis (obstruction of bladder outlet, spinal cord injury, long-term catheterization) should be given a 7- to 10-day course of the antibiotics outlined above.

Second-line options:

ciprofloxacin (Cipro) (**B class drug**), 500 mg PO bid for 7–10 days

norfloxacin (Noroxin) (**B class drug**), 400 mg PO bid for 7–10 days

Monitoring and Follow-Up

- If symptoms do not begin to resolve in 72 hours or if symptoms progress despite treatment, client should return to the clinic for reassessment
- Arrange follow-up after the completion of therapy and repeat the urinalysis and culture to ensure resolution of cystitis

Referral

Clients with chronic or recurrent cystitis should be referred to a physician. Men ≥ 50 years of age who present with a true (culture-positive) urinary tract infection for the first time should also be referred to a physician for further evaluation.

PYELONEPHRITIS

DEFINITION

Bacterial infection of the kidney.

CAUSES

- *E. coli* (most common)
- Also *Enterobacter, Klebsiella, Pseudomonas* and *Proteus* (among others)
- In unresolving pyelonephritis, suspect TB of the kidney

HISTORY

- Flank pain
- Fever, shaking chills
- Nausea and vomiting
- Dysuria, frequency, urgency may be present
- Abdominal pain may be present

PHYSICAL FINDINGS

- Temperature elevated
- Heart rate may be elevated
- Blood pressure may be mildly elevated
- Client appears moderately-to-acutely ill
- Mild, generalized abdominal discomfort
- Marked or severe pain with deep abdominal palpation of kidney
- Marked or severe costovertebral angle tenderness with percussion over kidney

LABORATORY FINDINGS

- Urine: cloudy, dark or bloody
- Dipstick test: positive for WBC, blood and nitrates, possibly protein
- Microscopic examination (spun urine): WBC, RBC, bacteria

DIFFERENTIAL DIAGNOSIS

- Pneumonia
- Acute cholecystitis with fever
- Appendicitis
- Acute pancreatitis

DIAGNOSTIC TESTS

- Obtain urine for urinalysis (routine and microscopy, culture and sensitivity)

MANAGEMENT

Early or mildinfections may be treated on an outpatient basis. **Moderate or severe** infections usually require inpatient treatment.

Goals of Treatment

- Eradicate bacterial infection
- Prevent complications

Appropriate Consultation

Moderate or Severe Infection

- Consult a physician regarding choice of IV antibiotics
- If unable to consult, start empiric IV antibiotic therapy

Adjuvant Therapy

Moderate or Severe Infection

- Start IV therapy with normal saline
- Adjust IV rate according to age and other medical problems (e.g., diabetes mellitus, heart disease)

Nonpharmacologic Interventions

Mild Infection

- Increase fluid intake (to 8–10 glasses of fluid per day)
- Bed rest until symptoms improve

Client Education

- Counsel client about appropriate use of medications (dose, frequency, completion of entire course of antibiotics)
- Instruct client about proper hygiene to prevent recurrence of infection

Pharmacologic Interventions

Mild Infection

Early or mild infections may be treated on an outpatient basis.

Oral antibiotics—use one of the following for 10–14 days:

sulfamethoxazole/trimethoprim (Septra or Bactrim DS) (**A class drug**), 2 tabs PO bid

or

trimethoprim (Proloprim) (**A class drug**), 100 mg PO bid or 200 mg PO od

or

amoxicillin (Amoxil) (**A class drug**), 1.0 g PO stat then 500 mg PO tid

Empiric therapy with amoxicillin will be 20% less effective than with Septra because of resistant strains of *E. coli*, but this is the best choice if there is an allergy to sulfa drugs.

Analgesia and antipyretics:

acetaminophen (Tylenol) (**A class drug**), 500 mg, 1–2 tabs PO q4–6h

Moderate to Severe Infection

Analgesia and antipyretics for fever and pain:

acetaminophen (Tylenol) (**A class drug**),
325 or 500 mg, 1 or 2 tabs PO q4–6h prn

Antiemetics to control severe nausea and vomiting:

dimenhydrinate (Gravol) (**A class drug**),
50–75 mg IM

Antibiotics:

Ampicillin (Novo-Ampicillin) (**D class drug**),
1.0 g IV, then 1.0 g IV q4–6h

For clients with allergy to penicillin:

sulfamethoxazole/trimethoprim (Septra DS)
(**B class drug**), IV q12h

Extra consideration is required in choosing drugs for a pregnant woman. Consult a physician.

Monitoring and Follow-Up

Mild Infection

- Follow up in 2–3 days to determine clinical response to therapy
- In 14 days, repeat the urinalysis and culture to ensure resolution of the infection

Moderate to Severe Infection

- Monitor response to therapy, vital signs and urinary output

Referral

Moderate to Severe Infection

Medevac to hospital as soon as possible.

Young men who present with pyelonephritis for the first time and clients with recurrent pyelonephritis should be referred to physician for further investigation.

RENAL COLIC (CALCULI)

DEFINITION

Pain produced by the presence and movement of a stone within the ureter or renal pelvis.

CAUSES

- Familial predisposition to formation of calcium stones
- Increased dietary intake of calcium
- Dehydration
- Gout (uric acid stones)
- Recurrent urinary tract infections
- Bone resorption
- Prolonged immobilization
- Other genetic disorders (e.g., cystine stones, an inborn error of amino acid metabolism)

Risk Factors

- Family history
- Low fluid intake
- Thiazide diuretics
- Bowel or kidney disease
- Malignant disease

HISTORY

- Sudden onset of severe colicky pain in the flank
- Pain may radiate to lower abdomen, groin, labia or testicle
- Exact location of pain depends on location of stone, level of obstruction
- Hematuria may be present
- Dysuria, urgency, frequency may develop
- Nausea and vomiting are often present

PHYSICAL FINDINGS

- Temperature elevated (if infection is also present)
- Heart rate may be elevated
- Blood pressure may be elevated
- Client appears in acute distress
- Client pale and sweaty
- Client restless, tossing about, unable to find a comfortable position
- Abdomen may be distended
- Costovertebral angle and abdominal tenderness
- Bowel sounds may be decreased (because of reactive ileus)

LABORATORY FINDINGS

- Urine: may be normal or blood may be present

DIFFERENTIAL DIAGNOSIS

- Acute pyelonephritis
- Acute cholecystitis
- Acute abdomen (cholecystitis, appendicitis, gastroenteritis, diverticulitis)
- Peptic ulcer disease
- Salpingitis
- Gastroenteritis
- Peritonitis
- Pancreatitis

COMPLICATIONS

- Recurrent infection of the lower urinary tract
- Hydronephrosis (asymptomatic obstruction of the kidney leading to decreased renal function or renal failure)
- Pyelonephritis
- Sepsis

DIAGNOSTIC TESTS

Obtain urine for urinalysis (routine and microscopic).

MANAGEMENT

If symptoms are **mild** client is afebrile and diagnosis is clear, treat on outpatient basis. If symptoms are **severe** or the diagnosis is questionable, consultation with a physician and inpatient treatment will be needed.

Goals of treatment

- Relieve symptoms
- Identify complications
- Collect stone or stone fragments

Appropriate Consultation

Severe Condition or Questionable Diagnosis

Consult a physician as soon as possible.

Nonpharmacologic Interventions

Mild Condition

- Encourage increase in fluid intake
- Strain urine to collect stones

Severe Condition or Questionable Diagnosis

- Bed rest
- Nothing by mouth if vomiting

Ajuvant Therapy

Severe Condition or Questionable Diagnosis

- Start IV therapy with normal saline
- Adjust rate according to severity of vomiting and dehydration, client's age and underlying medical problems
- Generally, it is desirable to push the fluids to help the stone pass, i.e., administer enough fluid to produce urine output of 100–200 mL/h

Pharmacologic Interventions

Mild Condition

To control pain:

acetaminophen with codeine (Tylenol #2 or #3) (**C class drug**), 1–2 tabs PO q4h prn (maximum 15 tabs)

Severe Condition or Questionable Diagnosis

Analgesia:

meperidine (Demerol) (**D class drug**), 50–100 mg IM

Antiemetics for nausea and vomiting:

dimenhydrinate (Gravol) (**A class drug**), 50–75 mg IM q4–6 hr prn

Monitoring and Follow-Up

Severe Condition or Questionable Diagnosis

- Monitor urine output
- Strain all urine for stones
- Send any stones for laboratory analysis
- Client may be discharged home once pain and nausea are controlled
- Instruct client to collect and strain all urine for stones and save any stones that are passed
- Follow up 12–24 hours after discharge

Referral

Severe Condition or Questionable Diagnosis

Medevac to hospital if pain or fever persist.

URINARY INCONTINENCE

DEFINITION

Involuntary loss of urine.

CAUSES

Overflow Incontinence

Leakage of urine due to overdistension of the bladder, commonly caused by obstruction of the bladder outlet (e.g., prostatic enlargement, fecal impaction) or neurologic disease (e.g., multiple sclerosis).

Stress Incontinence

Leakage of urine due to an increase in intra-abdominal pressure (e.g., with cough, exercise). This form is more common in women. Poor pelvic support (for example, because of multiple vaginal deliveries or postmenopausal estrogen deficiency) is the primary cause.

Urge Incontinence

Leakage of urine due to inability to delay voiding when an urge is perceived. Causes include hyperactivity or instability of the bladder wall, disorders of the central nervous system (e.g., Parkinson's disease), and bladder irritability from infection, stones, diverticula or tumor.

Functional Incontinence

Leakage of urine due to inability to get to the toilet. Causes include age-related problems (e.g., decreased mobility, cognitive disability), alcohol intoxication, medications (e.g., diuretics, sedatives) and diabetes mellitus (neurogenic bladder).

HISTORY

- Loss of bladder control
- Amount of leakage varies with each person and with specific cause
- Qualify degree of difficulty in maintaining continence
- Determine when and how the urinary leakage occurs
- Assess bowel habits, number of pregnancies and vaginal deliveries, postmenopausal symptoms, neurologic deficits
- Review medications
- If infection is present, there will be related symptoms of cystitis

In women, incontinence is often associated with coughing, sneezing, laughing, climbing stairs, exercising (stress incontinence).

In men, dribbling is usually associated with other symptoms of bladder-outlet obstruction (*see "Benign Prostatic Hyperplasia," above, this chapter*)

Previously "dry" elderly clients who suddenly become incontinent may have an early urinary tract infection or an intercurrent illness or infection elsewhere.

If diabetes is suspected, ask about polyuria, polydipsia, polyphagia, weight loss, recurrent cystitis or vaginitis.

PHYSICAL FINDINGS

The findings will depend upon the specific cause. A careful examination of the urinary and genital systems, the abdomen and rectum, and the neurologic system is required.

- Distension of the bladder may be present
- Assess prostate, anal-sphincter tone, rectal wall, amount of stool present in rectum
- Note atrophic urethral and vaginal changes, relaxation of pelvic floor, pelvic masses
- Assess deep tendon reflexes and perineal sensation

DIFFERENTIAL DIAGNOSIS

See "Causes," above.

COMPLICATIONS

- Irritation
- Breakdown and ulceration of skin in the genital area
- Social embarrassment
- Social and psychological problems

DIAGNOSTIC TESTS

- Obtain urine for urinalysis (routine and microscopy, culture and sensitivity) to identify cystitis
- Perform complete blood count, and measure creatinine and electrolytes to check renal function
- Measure blood sugar to rule out diabetes

MANAGEMENT

Management is based on identifying and treating the underlying cause.

Goals of Treatment

- Achieve relief of urinary symptoms
- Increase functional capacity of the bladder

Nonpharmacologic Interventions

The following simple measures should be tried.

Stress Incontinence

- Demonstrate Kegel exercises to strengthen pelvic floor and perineal muscles; advise client to do 10–15 repetitions of each exercise, three or four times a day
- Encourage weight loss, if appropriate, to reduce symptoms
- Encourage frequent toileting, complete emptying of the bladder, voiding before strenuous activities and use of sanitary napkins to maintain dryness
- Encourage client to establish a good bowel routine to reduce straining at stool

Urinary stress incontinence of some small degree may be physiological and may not be abnormal.

Nighttime Incontinence

- Advise client to reduce fluid intake in the evening
- Advise client to take diuretic drugs earlier in the evening
- Suggest a bedside commode, if available, or a condom catheter

Chronic Day and Nighttime Incontinence

- Advise client to toilet regularly at a bedside commode
- Suggest adult diapers or a condom catheter to help maintain dryness.
- Instruct client and family members about good skin care to prevent skin breakdown and infection

Medications are sometimes used as an adjuvant therapeutic intervention to these nonpharma cologic measures. They would be used only after clear diagnosis of the type of incontinence (*see "Causes," above*) and would be prescribed only by the physician. The following are some examples:

- For instability of detrusor muscle: Ditropan, Uripas, Tofranil
- For incompetence of sphincter: Ornade, Tofranil
- For overflow incontinence due to atonic bladder: Urecholine
- For overflow incontinence due to prostatic enlargement: Minipres, Proscar

In the elderly client, assess life situation and any recent life changes, mental status (to detect recent changes or confusion), general medical status (to identify concurrent illness and whether client has physical difficulty getting to the toilet).

If client has a distended bladder, *see "Acute Urinary Retention," below, this chapter*.

Relieve fecal impaction with gentle disimpaction or water enemas (*see "Constipation," in chapter 5, "Gastrointestinal System"*).

Referral

Refer electively to a physician for evaluation if conservative measures fail to improve symptoms.

EMERGENCIES OF THE URINARY AND MALE GENITAL SYSTEMS

TESTICULAR TORSION

DEFINITION

Twisting of spermatic cord and testis, which compromises blood supply to these structures and results in ischemic pain.

CAUSES

- Torsion usually spontaneous and idiopathic
- Predisposing structural (genetic) defect
- Occasionally caused by trauma to the groin

HISTORY

- Sudden onset of severe, constant, unilateral pain in scrotum, groin or lower abdomen
- Pain made worse by elevation of scrotum
- Pain not relieved by lying down
- Nausea and vomiting may be present
- Usually occurs in adolescents and young men

PHYSICAL FINDINGS

- Temperature usually normal
- Heart rate elevated
- Blood pressure mildly elevated (because of pain)
- Client in acute distress
- Client bent over or unable to walk
- Unilateral scrotal swelling and redness
- Testis acutely tender, may be warm
- Testis swollen and found higher up (retracted) in the scrotal sac than expected

DIFFERENTIAL DIAGNOSIS

- Epididymitis
- Orchitis
- Trauma
- Incarcerated or strangulated inguinal hernia
- Torsion appendix testis
- Acute varicocele
- Testicular tumor
- Scrotal abscess

COMPLICATIONS

- Testicular atrophy
- Abnormal spermatogenesis
- Infertility

DIAGNOSTIC TESTS

None.

MANAGEMENT

Goals of Treatment

- Relieve pain
- Prevent complications

Appropriate Consultation

Consult a physician immediately. This is a surgical emergency.

Nonpharmacologic Interventions

- Nothing by mouth
- Bed rest

Ajuvant Therapy

- Start IV therapy with normal saline
- Adjust IV rate according to age and state of hydration

Pharmacologic Interventions

Analgesia:

meperidine (Demerol) (**D class drug**), 50–100 mg IM

Referral

Medevac as soon as possible. This is a surgical emergency.

ACUTE URINARY RETENTION

DEFINITION

Accumulation of urine in the bladder due to an inability to empty the bladder.

CAUSES

- Any process that causes increased bladder-outlet resistance or decreases bladder contractility
- Benign prostatic hyperplasia
- Side effects of drugs
- Fecal impaction
- Prostatic cancer
- Acute prostatitis
- Neurogenic bladder
- Urethral stricture or stone
- Impingement on sacral nerves by protruding intervertebral disk
- Spinal cord injury

HISTORY

- Strong urge to void but inability to do so
- Suprapubic fullness and pain
- Voiding habits before retention (hesitancy, dribbling, daytime frequency, nocturia)
- Bowel habits, last bowel movement and its consistency

Review medications, noting any drugs that might predispose to acute urinary retention (excessive alcohol intake, sedatives, decongestants in over-the-counter cold remedies, anticholinergics, antipsychotics and antidepressants).

With a neurogenic bladder, symptoms of pain, fullness and urgency may be absent. However, dribbling of small amounts of urine (overflow dribbling) may be present.

PHYSICAL FINDINGS

- Pulse may be elevated
- Client may appear in moderate-to-acute distress (but there may be no evidence of distress with a neurogenic bladder)
- Client may be restless and sweaty
- Bladder distension may be noted on abdominal inspection
- Tender, distended bladder may be felt above symphysis, often reaching umbilicus (neurogenic bladder is distended but nontender)
- Rectal examination: fecal impaction, enlargement of prostate, nodular or rocky hard prostate, decreased anal tone or absent perineal sensation may be present

DIFFERENTIAL DIAGNOSIS

See "Causes," above.

COMPLICATIONS

- Decreased renal function
- Post-obstructive diuresis
- Renal failure
- Infection of stagnant urine

DIAGNOSTIC TESTS

None.

MANAGEMENT

Goals of Treatment

- Identify underlying cause
- Relieve bladder distension

Appropriate Consultation

Consult a physician.

Nonpharmacologic Interventions

- Encourage client to sit in a tub full of warm water and to try voiding into the water. If the client is able to do so, reassess the bladder for residual distension.

If the bladder is still distended, catheterization is required (unless there are contraindications). Use the following technique:

- Use a Foley catheter (18 French in a male, 16 French in a female)
- If the client is known to have benign prostatic hyperplasia, a 16 French catheter may be tried if catheterization is unsuccessful with the larger size of catheter
- Insert catheter and decompress the bladder *slowly*
- Remove 200 mL of urine, then clamp the catheter for 30 minutes
- Continue to remove 50–75 mL of urine slowly every 20 minutes until the bladder is empty
- Leave catheter in place after decompression

If retention is due to acute prostatitis, do not insert catheter unless absolutely necessary, as this may cause bacteremia. Likewise, do not insert catheter if the pelvis is fractured. Do not attempt catheterization more than three consecutive times.

Monitoring and Follow-Up

Monitor hourly urine output carefully for the development of post-obstruction diuresis, a complication that occurs after the release of the obstruction, because of temporary impairment of renal function.

Diuresis is generally self-limiting and can be managed with oral fluid intake based on thirst, but client may require IV fluid therapy to prevent dehydration.

Referral

Medevac to hospital.

CHAPTER 7 – MUSCULOSKELETAL SYSTEM

Table of Contents

ASSESSMENT OF THE MUSCULOSKELETAL SYSTEM

HISTORY OF PRESENT ILLNESS AND REVIEW OF SYSTEM

GENERAL

The following characteristics of each symptom should be elicited and explored:

- Onset (sudden or gradual)
- Chronology
- Current situation (improving or deteriorating)
- Location
- Radiation
- Quality
- Timing (frequency, duration)
- Severity
- Precipitating and aggravating factors
- Relieving factors
- Associated symptoms
- Effects on daily activities
- Previous diagnosis of similar episodes
- Previous treatments
- Efficacy of previous treatments

CARDINAL SYMPTOMS

In addition to the general characteristics outlined above, additional characteristics of specific symptoms should be elicited as follows.

Bones and Joints

- Pain, swelling, redness, heat, stiffness
- Time of day when these symptoms are most bothersome
- Relation of symptoms to movement
- Limitation of movement
- Deformity
- Extra-articular findings: urethritis, pustular rash, tophi, nodules
- Trauma: obtain accurate description of exact mechanism of injury

Muscles

- Pain
- Weakness
- Wasting
- History of previous injuries and treatment received

Neurovascular Structures

- Paresthesia
- Paresis
- Paralysis

FUNCTIONAL ASSESSMENT

Any self-care deficits in bathing, dressing, toileting, grooming, mobility, use of mobility aids.

MEDICAL HISTORY (SPECIFIC TO MUSCULOSKELETAL SYSTEM)

- Previous trauma (e.g., to bones, joints, ligaments)
- Arthritis (rheumatoid or osteoarthritis)
- Diabetes mellitus (associated with greater risk of carpal tunnel syndrome)
- Hypothyroidism (associated with greater risk of carpal tunnel syndrome)
- Recent immobilization of an extremity
- Medications (e.g., steroids)
- Allergies
- Obesity
- Osteoporosis
- Cancer
- Menopause
- Immune deficiency (recent infection)

FAMILY HISTORY (SPECIFIC TO MUSCULOSKELETAL SYSTEM)

- Rheumatoid arthritis
- Diabetes mellitus
- Hyopthyroidism (associated with greater risk of carpal tunnel syndrome)
- Osteoporosis
- Cancer (bone)

PERSONAL AND SOCIAL HISTORY (SPECIFIC TO MUSCULOSKELETAL SYSTEM)

- Absenteeism from work or school (multiple days)
- Occupational hazards (activity involving repetitive joint motion, e.g., kneeling, reaching overhead)
- Sports activities (especially contact sports)
- Risk behaviors for injuries (e.g., snowmobiling, skateboarding, injection drug use, alcohol abuse [specifically drinking and driving])
- Calcium intake
- Smoking
- Exercise habits

EXAMINATION OF THE MUSCULOSKELETAL SYSTEM

The purpose of examining the musculoskeletal system is to assess function and performance of activities of daily living, as well as to check for abnormalities. A screening exam is appropriate for most people.

Although the musculoskeletal and neurological systems (*see chapter 8, "Central Nervous System"*) are discussed separately in this set of guidelines, they are usually examined together.

GENERAL

- Apparent state of health
- Appearance of comfort or distress
- Color (e.g., flushed, pale)
- Nutritional status (obese or emaciated)
- Match between appearance and stated age

MUSCULOSKELETAL SCREENING EXAM

Observe client walking into examination room; assess gait, posture and use of aids. Determine ability to perform activities of daily living (e.g., sitting, standing, walking, dressing).

Examine specific joints in the following order. Compare corresponding paired joints.

- Temporomandibular joint
- Cervical spine
- Shoulders
- Elbows
- Wrists and hands
- Hips
- Knees
- Ankles and feet
- Lumbar spine

Inspection of Joints

- Symmetry of structure and function
- Note alignment, size (muscle bulk, bone enlargement) and contour of the joint
- Inspect skin and tissues over joints for color, swelling, rash, masses or deformity

Palpation of Joints

Palpate each joint, including skin, muscles, bony articulations and area of joint capsule, for the following features:

- Heat
- Swelling
- Tenderness
- Nodules, masses
- Crepitus
- Ligament instability

Range of Motion

Ask client to demonstrate range of active motion while stabilizing the body area proximal to the joint being moved. If you see a limitation, gently attempt passive motion.

The normal ranges of active and passive motion should be the same.

Muscle Testing

- Test strength of prime muscle groups (i.e., flexors and extensors) for each joint
- Muscle strength should be equal bilaterally and should fully resist your opposing force
- There is wide variability in normal muscle strength among different people

Ligament Stability Around Joints

- Determine stability of collateral ligaments of ankle
- Determine stability of collateral and cruciate ligaments of knee

Neurovascular Status

Assess limbs for the following aspects and conditions:

- Sensation
- Pulses
- Paresis
- Paralysis

This part of the examination is particularly important if the client has experienced trauma.

Table 1 presents the symptoms associated with various types of musculoskeletal injury.

Table 1: Symptoms of Musculoskeletal Injury

Symptom	Fracture	Dislocation	Sprain	Strain
Pain	Severe	Moderate to severe	Mild to moderate	Mild to moderate
Swelling	Moderate to severe	Mild	Mild to severe	Mild to moderate
Bruising	Mild to severe	Mild to severe	Mild to severe	Mild to severe
Deformity	Variable	Marked	None	None
Function	Loss of function	Loss of function	Limited	Limited
Tenderness	Severe	Moderate to severe	Moderate	Moderate
Crepitus	Present	Absent	Absent	Absent

DIFFERENTIAL DIAGNOSIS OF MUSCULOSKELETAL CARDINAL SYMPTOMS

CAUSES OF JOINT PAIN

Inflammatory

- Tenosynovitis
- Rheumatoid arthritis
- Viral polyarthritis (e.g., hepatitis B, Epstein–Barr virus)
- Septic arthritis (e.g., *Staphylococcus aureus*, streptococcal species)
- Autoimmune disease (e.g., polymyalgia rheumatica)
- Rheumatic fever
- Immune complex arthritis (e.g., HIV)
- Polyarthritis associated with systemic diseases (e.g., systemic lupus erythematosus, Lyme disease, syphilis, bacterial endocarditis)
- Gouty arthritis

Non-inflammatory

- Osteoarthritis
- Tendinitis
- Systemic lupus erythematosus
- Metabolic arthropathy
- Tumors
- Mechanical abnormalities (e.g., erosion of cartilage and bone)
- Blood dyscrasias
- Sickle cell anemia
- Neuroarthropathy

CAUSES OF NECK PAIN

The causes of neck pain are outlined in Table 2.

CAUSES OF SHOULDER PAIN

Intrinsic Disorders

- Glenohumeral osteoarthritis
- Acromioclavicular arthritis
- Septic arthritis
- Rheumatoid arthritis
- Gout
- Rotator cuff impingement
- Rotator cuff tear
- Biceps tendinitis
- Biceps tendon rupture
- Calcific tendinitis
- Adhesive capsulitis
- Trauma to bony structures (e.g., clavicle, acromioclavicular joint, glenohumeral joint)

Extrinsic Disorders (Referred Pain)

- Cervical spine disorders
- Brachial plexus neuropathy
- Myofascial pain
- Thoracic outlet syndrome
- Diaphragmatic irritation
- Neoplastic disease
- Myocardial ischemia

Shoulder pain can arise from the bony structures of the shoulder or from the muscles, ligaments and tendons that support the shoulder. Most shoulder problems are attributable to overuse and trauma.

Table 2: Causes of Neck Pain and Cervical Spine Disorders

Biomechanical	Referred	Rheumatologic	Neoplastic
Neck strain	Thoracic outlet syndrome	Rheumatoid arthritis	Osteoblastoma
Herniated disk	Pancoast's tumor	Ankylosing spondylitis	Osteochondroma
Spondylosis	Esophagitis	Psoriatic arthritis	Giant cell tumor
Myelopathy	Angina	Reiter's syndrome	Hemangioma
	Vascular dissection	Myelopathy	Metastases
Infectious		Enteropathic arthritis	Multiple myeloma
Osteomyelitis	**Neurologic**	Polymyalgia rheumatica	Chondrosarcoma
Diskitis	Brachial plexitis	Fibromyalgia	Chordoma
Meningitis	Peripheral entrapment	Myofascial pain	Gliomas
Herpes zoster	Neuropathies	Diffuse idiopathic skeletal hypertrophy	Syringomyelia
Lyme disease	Reflex sympathetic dystrophy	Microcrystalline disease	Neurofibroma
			Miscellaneous
			Paget's disease
			Sarcoidosis

CAUSES OF LOW-BACK PAIN

Mechanical Low-Back Disorders

- Lumbar sacral strain
- Degenerative disk disease
- Facet joint syndrome
- Spondylolisthesis
- Herniated disk
- Spinal stenosis
- Osteoporosis
- Fracture
- Spondylolysis
- Severe kyphosis
- Severe scoliosis

Non-mechanical Spine Disease

- Neoplasia (e.g., multiple myeloma, lymphoma, spinal cord tumor, metastatic carcinoma)
- Infection (e.g., osteomyelitis, septic disk, epidural abscess)
- Inflammatory arthritis
- Ankylosing spondylitis
- Psoriatic spondylitis
- Paget's disease (tuberculosis of spine)

Referred Pain of Visceral Disease

- Prostatitis
- Endometriosis
- Chronic pelvic inflammatory disease
- Kidney stones
- Pyelonephritis
- Aortic aneurysm
- Pancreatitis
- Cholecystitis
- Penetrating peptic ulcer

COMMON PROBLEMS OF THE MUSCULOSKELETAL SYSTEM

NECK PAIN

DEFINITION

Neck pain, acute and chronic, is commonly seen in the primary care setting. Many disorders are implicated in neck pain, but biomechanical problems of the cervical spine are the most common cause.

Diseases affecting the cervical spine are rare but important causes of pain; certain symptoms and signs help to identify the more serious clinical conditions. Most patients improve with non-operative therapy within 3 months; only about 10% of patients require surgical intervention.

TYPES

Myofascial Pain

Myofascial pain is the most common type of acute and chronic neck pain. The upper trapezius and levator scapulae are the muscles most frequently involved in myofascial pain of the neck, head and upper back. The pain is often described as dull, aching or burning and is referred from active myofascial trigger points. A myofascial trigger point is a hyper-irritable spot within a taut band of skeletal muscle or muscle fascia that is painful to compression and gives rise to a characteristic pattern of referred pain and tenderness and autonomic phenomena such as tingling, dizziness and gooseflesh. Each muscle with active trigger points gives rise to its own characteristic, predictable and reproducible pattern of referred pain and autonomic symptoms.

Neuropathic Pain

Disease and injury of the neck commonly involve nerves or nerve roots lying along the transverse processes or the paravertebral region of the spinal cord. This produces neuropathic pain felt in the occipital region, the back, the posterior ear and ear lobe, and the anterior neck.

A history of significant trauma, cervical arthritis, prior herniated disk or herpes zoster infection, along with typical neuralgic pain and sensory disturbances, should suggest a neuropathic process.

Neuropathic pain is usually described as sharp, burning or aching and often follows the distribution of the affected nerve segment. The pain is worsened by movements that stretch the involved nerve or nerve roots. It is frequently accompanied by sensory and motor disturbances such as hyperesthesia, paresthesia, hypalgesia and a decrease in muscle strength. Disk herniation with radicular pain is one example of neuropathic disease.

CAUSES

Biomechanical Disorders

Biomechanical disorders that occur secondary to overuse, trauma or deformity constitute the most common cause of neck pain. Typically, these disorders are characterized by correlating exacerbation or alleviation of symptoms with certain physical activities.

Most biomechanical disorders of the cervical spine have a natural history of improvement. In 50% of patients, the pain will decrease in 2–4 weeks, and 80% of patients will be asymptomatic in 2–3 months.

The causes of biomechanical disorders include neck strain, herniated disk, spondylosis and myelopathy.

Biomechanical Neck Problems Without Nerve Compression

Clients with pain only in the cervical area, trapezii and shoulders may have one of many disorders, of which neck strain and cervical hyperextension (whiplash) are the most common (Table 3).

Biomechanical Neck Problems with Spinal Compression

The main type of biomechanical neck problem with spinal compression is cervical myelopathy. This condition occurs secondary to compression of the spinal cord or nerve roots in the spinal canal (Table 4). Only one-third of affected patients report neck pain. Although cervical myelopathy is rare, one form, spondylitic myelopathy, is the most common cause of spinal cord dysfunction in people over the age of 55 years.

The location, duration and size of lesions influence the severity and distribution of symptoms. Compression usually results from a combination of osteophyte growth and degenerative disk disease. Symptoms may involve all limbs and may include difficulty in walking and urinary or fecal incontinence.

The most frequent presentation is arm pain and leg dysfunction. Older clients may describe leg stiffness, foot shuffling and a fear of falling. Common findings include weakness of the limbs, spasticity, fasciculations, hyperreflexia, clonus and Babinski's reflex in the lower extremities.

Table 3: History and Physical Examination for Biomechanical Neck Problems without Nerve Compression

Condition	History	Physical Examination
Neck strain	Pain in middle or lower portion of the posterior neck Pain may be diffuse or localized to both sides of the spine	Local tenderness in paracervical muscles, decreased range of motion, loss of cervical lordosis No abnormalities found on neurologic or shoulder examination Spinal x-rays may be normal or reveal loss of lordosis
Cervical hyperextension (whiplash)	Acceleration–deceleration injury to soft-tissue structures Common causes: rear-impact motor vehicle crashes, falls, diving accidents, other sports injuries Paracervical muscles stretched or torn, and sympathetic ganglia may be damaged, resulting in Horner's syndrome, nausea, hoarseness or dizziness Intervertebral disk injuries occur with severe trauma First symptoms occur 12–24 hours after trauma Clients experience stiffness and pain with motion; may also have difficulty swallowing or chewing	Soreness, paracervical muscle contraction and decreased range of motion Neurologic examination often unremarkable, but x-rays may reveal loss of cervical lordosis In severely injured clients, structural damage identified on x-rays mandates immediate stabilization

Table 4: Characteristics of Radicular Pain Caused by Compression of Cervical Nerve Root

Nerve Root	Area of Pain	Location of Sensory Loss	Motor Loss	Reflex Loss
C5	Neck to outer shoulder, arm	Shoulder	Deltoid	Biceps, supinator
C6	Outer arm to thumb, index finger	Index finger and thumb	Biceps	Biceps, supinator
C7	Outer arm to middle finger	Index and middle fingers	Triceps	Triceps
C8	Inner arm to ring and little fingers	Ring and little fingers	Hand muscles	None

DIFFERENTIAL DIAGNOSIS OF NECK PAIN

See Table 2 in "Differential Diagnosis of Muskuloskeletal Cardinal Symptoms," above, this chapter.

COMPLICATIONS

- Permanent nerve damage with compression of nerve root
- Chronic neck pain
- Absenteeism from work
- Disability (long term)

DIAGNOSTIC TES TS

Discuss with a physician before ordering any tests.

MANAGEMENT

Goals of Treatment

- Relieve symptoms
- Regain or maintain full range of motion
- Prevent complications

Appropriate Consultation

Consult immediately if there is concern of serious injury (e.g., trauma of significant force) or if there is associated neuropathic pain and neurological changes. Treat all other injuries conservatively and follow up closely.

Nonpharmacologic Interventions

- Clients without systemic disorders should be treated with non-operative therapy for 3–6 weeks
- Ice massage for 12–14 minutes qid provides additional analgesia in some cases
- Heat may decrease muscle tightness and improve range of motion in others
- Cervical collar and limiting motion are suggested; short-term immobilization is useful, particularly at night, when movement during sleep can cause pain
- A soft collar that supports but does not extend the neck is an appropriate treatment; however, its use should be decreased as neck pain diminishes

The use of a collar in clients with cervical hyperextension should be severely limited except in cases of disk herniation, which requires full-time collar immobilization to limit radicular pain for longer periods.

Pharmacologic Interventions

Anti-inflammatory analgesics such as nonsteroidal anti-inflammatory drugs (NSAIDs) can decrease the pain and inflammation associated with localized disease

ibuprofen (Motrin) (**A class drug**), 200 mg, 1–2 tabs PO tid–qid

or

naproxen (Naprosyn) (**C class drug**), 250 mg PO bid–tid for 2 weeks or longer prn

Do not use if there are contraindications to the use of NSAIDs (such as a history of peptic ulcer disease). Instead, use:

acetaminophen (Tylenol) (**A class drug**), 500 mg, 1–2 tabs PO tid–qid prn

Monitoring and Follow-Up

- Arrange follow-up at 1–2 days, at 7 days and then every 2 weeks to assess response to treatment
- Start range-of-motion exercises within pain-free range in 2–3 days (in cases of minor injury)
- Advise client to begin stretching and strengthening program when range of motion is regained

Referral

Most clients, including those with cervical radiculopathy, improve and return to normal activity within 2 months. Clients who are still symptomatic after 6 weeks of non-operative treatment should be referred to a physician for further evaluation.

A physiotherapy phone consultation or referral would be useful if one is readily available.

ADHESIVE CAPSULITIS (FROZEN SHOULDER), TENDINITIS AND BURSITIS

DEFINITION

Adhesive capsulitis: Chronically stiff and painful shoulder, which begins without any significant injury.

Tendinitis and bursitis: Inflammation of a tendon or a bursa within the shoulder. The supraspinatus and long end of the biceps are especially susceptible.

CAUSES

Adhesive capsulitis: Prolonged immobilization from either protracted use of a sling or disuse because of pain in the arm.

Tendinitis and bursitis: Overuse, repetitive strain from repeated motion.

HISTORY AND PHYSICAL FINDINGS

Adhesive capsulitis: Shoulder pain and limitation of movement in one or more directions, with pain occurring at the limits of motion. Other findings relatively unremarkable.

Tendinitis and bursitis: Non-specific pain and aching of the shoulder. With supraspinatus tendinitis, the pain is aggravated when the shoulder is abducted and externally rotated against resistance. With bicipital tendinitis, the pain is aggravated when the patient flexes forward against resistance.

MANAGEMENT

Goals of Treatment

- Relieve pain and inflammation
- Maintain function of shoulder
- Prevent complications

Most of the soft-tissue conditions about the shoulder can be relieved by application of ice and rest for 5–7 days (with short-term use of sling for 2–3 days).

Physical therapy and rehabilitation are extremely important in regaining and maintaining range of motion, flexibility and strength for optimal shoulder functioning.

Nonpharmacologic Interventions

Rest Injured Limb

- Avoid aggravating positions and activities
- Type and period of rest varies according to severity of symptoms and type of injury or disorder
- For upper limb: use sling in acute stage for brief period (2–3 days), then discontinue

Ice or Cold Pack Locally to Reduce Pain and Swelling

- Apply to area for 12–14 minutes qid
- If soft-tissue injury is severe, apply q2h
- Use ice as long as swelling and pain are present
- Heat is contraindicated in acute soft-tissue injury
- Never use heat in acute or subacute phases of recovery
- Heat may be used for chronic stiffness and swelling

Pharmacologic Interventions

Anti-inflammatory analgesics to reduce pain and swelling:

ibuprofen (Motrin) (**A class drug**), 200 mg, 1–2 tabs PO tid–qid

or

naproxen (Naprosyn) (**C class drug**), 250 mg PO bid–tid for 2 weeks or longer prn

Do not use if there are contraindications to the use of NSAIDs (such as a history of peptic ulcer disease). Instead, use:

acetaminophen (Tylenol) (**A class drug**), 500 mg, 1–2 tabs PO tid–qid prn

Monitoring and Follow-Up

- Arrange follow-up at 1–2 days and at 14 days
- Start range-of-motion exercises within pain-free range in 2–3 days (in cases of minor injury)
- Advise client to begin stretching and strengthening program when range of motion is regained
- Exercise progression: passive range of motion, active assisted range of motion, isometrics, active stretching, and late stretching and strengthening exercises
- Exercises are best done in multiple short sessions, not long ones
- Exercise should be preceded by application of moist heat for 10–15 minutes and should be followed by icing for 12–14 minutes
- Any exercise that causes pain should be temporarily omitted
- As range of motion, flexibility and strength improve, so will shoulder function

Referral

Refer to a physician if there is no improvement with conservative therapy in 4–6 weeks.

A physiotherapy consultation (if available) is especially important for adhesive capsulitis because optimal treatment of this condition involves extended, aggressive physical therapy.

ROTATOR CUFF SYNDROME

DEFINITION

Pain and diminished function of the shoulder secondary to inflammation and weakness of the muscles of the rotator cuff. There are three stages, as outlined below.

The rotator cuff muscles are the supraspinatus, infraspinatus, teres minor and subscapularis, all of which envelop the scapula.

CAUSES

Stages 1 and 2: A rotator cuff tendinitis caused by forceful or repetitive motion

Stage 3: A complete traumatic tear of the supraspinatus tendon

HISTORY AND PHYSICAL FINDINGS

Stage 1: Occurs in people ≤ 25 years of age; pain is noted over the anterior aspect of the shoulder and is maximal when the arm is raised from 60° to 120° elevation.

Stage 2: Usually occurs in people 25–40 years of age who have had multiple previous episodes; in addition to pain from tendinitis inflammation of the rotator cuff, some permanent fibrosis, thickening or scarring is present; x-rays may reveal calcific deposits within the rotator cuff .

Stage 3: Client usually > 40 years of age; may feel a sudden pop in the shoulder and then suffer severe pain; client notes increasing weakness when trying to abduct and externally rotate the affected arm.

MANAGEMENT

Goals of Treatment

- Relieve pain and inflammation
- Maintain function of shoulder
- Prevent complications

Appropriate Consultation

Consult a physician immediately about all stage 3 injuries. Consult a physician if a stage 1 or 2 injury remains symptomatic for > 4–6 weeks.

Nonpharmacologic Interventions

Rest Injured Limb

Type and period of rest varies according to type and severity of injury.

- *Stages 1 and 2:* Aggravating positions and activities should be avoided; a sling should be used in acute injury stage for a brief period (2–3 days)
- *Stage 3:* Place injured limb in sling for comfort

Ice or Cold Pack Locally to Reduce Pain and Swelling

Apply ice or cold pack as follows:

- Apply to area for 12–14 minutes qid
- If soft-tissue injury is severe, apply q2h
- Use ice as long as swelling and pain are present
- Heat is contraindicated in acute soft-tissue injury
- Never use heat in acute or subacute phases of recovery
- Heat may be used for chronic swelling

Pharmacologic Interventions

Stages 1 and 2: Anti-inflammatory analgesics to reduce pain and swelling:

ibuprofen (Motrin) (**A class drug**), 200 mg, 1–2 tabs PO tid–qid

or

naproxen (Naprosyn) (**A class drug**), 125 mg, 1–2 tabs PO q6h prn

Do not use if there are contraindications to the use of NSAIDs (such as a history of peptic ulcer disease). Instead, use:

acetaminophen (Tylenol) (**A class drug**), 500 mg, 1–2 tabs PO tid–qid prn

or

acetaminophen with codeine (Tylenol #2) (**C class drug**), 1–2 tabs q4h prn (maximum 15 tabs)

Stage 2: In addition to the drugs given above, corticosteroids (**B class drugs**) may be injected into the subacromial bursa.

Stage 3: Analgesics for pain:

ibuprofen (Motrin) (**A class drug**), 200 mg, 1–2 tabs PO tid–qid

or

naproxen (Naprosyn) (**A class drug**), 125 mg, 1–2 tabs PO q6h prn

or

acetaminophen with codeine (Tylenol #2) (**C class drug**), 1–2 tabs q4h prn (maximum 15 tabs)

Monitoring and Follow-Up

Stages 1 and 2: Clients with this type of injury should be monitored as follows:

- Arrange follow-up at 1–2 days and at 10 days
- Start range-of-motion exercises within pain-free range in 2–3 days (in cases of minor injury)
- Advise client to begin stretching and strengthening program when range of motion is regained
- Exercise progression: passive range of motion, active assisted range of motion, isometrics, active stretching exercises, and late stretching and strengthening exercises
- Exercises are best done in multiple short sessions, not long ones
- Exercise should be preceded by application of moist heat for 10–15 minutes and should be followed by icing for 12–14 minutes
- Any exercise that causes pain should be temporarily omitted
- As range of motion, flexibility and strength improve, so will shoulder function

Referral

Physiotherapy consultation or referral should be considered if readily available.

Stage 2: If symptoms persist after 4–6 weeks of conservative therapy, consider referral to an orthopedist for surgery consult.

Stage 3: Medevac urgently. Treatment is usually surgical repair, depending on whether there is significant loss of function. Repair is more likely in young clients than in elderly clients. Many elderly clients have progressive loss of the rotator cuff as a result of aging.

ACROMIOCLAVICULAR INJURIES

DEFINITION

Grade 1 (sprain): Partial tear of the joint capsule. Mild pain without joint deformity and minimal ligamentous disruption and instability.

Grade 2 (subluxation): Complete tear of the acromioclavicular ligaments. The acromioclavicular joint is locally tender and painful with motion. The distal end of the clavicle may protrude slightly upward.

Grade 3 (dislocation): Complete tear of the acromioclavicular and coracoclavicular ligaments. Significant pain, especially on any attempt at abduction; there is an obvious "step-off" deformity on physical examination.

CAUSES

Usually results from a direct blow to or fall on the tip of the shoulder.

HISTORY

- The history often involves a fall onto the apex of the shoulder, usually with the arm in adduction. Severe forces resulting from significant falls are often associated with grade 3 injuries.
- Pain over injured area
- Inability to use shoulder

PHYSICAL FINDINGS

- Pain at rest or elicited with movement
- Pain increases with severity of injury
- Tenderness on palpation of the acromioclavicular joint
- There may be a "step-off" deformity of the acromioclavicular joint
- Note the position of the clavicle

Perform a careful neurovascular assessment of brachial-plexus motor and sensory function, because associated injuries, though rare, can occur.

COMPLICATIONS

- Instability of the shoulder
- Loss of mobility

DIAGNOSTIC TESTS

- X-ray may be advisable to determine extent of injury, especially in younger people with significant symptoms
- *Grade 1:* Acromioclavicular joint films (with and without weights) yield normal findings
- *Grade 2:* Stress x-ray of the acromioclavicular joint with the client holding a 4.5-kg (10-lb) weight in both hands reveals widening of the joint
- *Grade 3:* X-rays obtained with the client holding weights show superior displacement of the clavicle and complete dislocation of the joint

MANAGEMENT

Appropriate Consultation

Consult a physician for all grade 2 and 3 injuries as soon as possible.

Nonpharmacologic Interventions

Rest Injured Limb

Type and period of rest varies according to severity of injury.

- Avoid aggravating positions and activities
- *Grade 1:* Sling in acute injury stage for very brief period (5–7 days), then discontinue
- *Grade 2:* Subluxation requires a longer period of immobilization (7–14 days)

Ice or Cold Pack Locally to Reduce Pain and Swelling

For all grades of acromioclavicular injuries, ice or cold packs may be used:

- Apply to area for 12–14 minutes qid
- If soft-tissue injury is severe, apply q2h
- Use ice as long as swelling and pain are present
- Heat is contraindicated in acute soft-tissue injury
- Never use heat in acute or subacute phases of recovery
- Heat may be used for chronic stiffness and swelling

Pharmacologic Interventions

Anti-inflammatory analgesics to reduce pain and swelling:

ibuprofen (Motrin) (**A class drug**), 200 mg, 1–2 tabs PO tid–qid

or

naproxen (Naprosyn) (**A class drug**), 125 mg, 1–2 tabs PO q6h prn

Do not use if there are contraindications to the use of NSAIDs (such as a history of peptic ulcer disease). Instead, use:

acetaminophen (Tylenol) (**A class drug**), 500 mg, 1–2 tabs PO tid–qid prn

or

acetaminophen with codeine (Tylenol #2) (**C class drug**), 1–2 tabs q4h prn (maximum 15 tabs)

Monitoring and Follow-Up

- Arrange follow-up at 1–2 days and at 14 days
- Start range-of-motion exercises within pain-free range in 2–3 days (in cases of minor injury)
- Advise client to begin stretching and strengthening program when range of motion is regained
- Exercise progression: passive range of motion, active assisted range of motion, isometrics, active stretching exercises, and late stretching and strengthening exercises
- Exercises are best done in multiple short sessions, not long ones
- Exercise should be preceded by application of moist heat for 10–15 minutes and should be followed by icing for 12–14 minutes
- Any exercise that causes pain should be temporarily omitted
- As range of motion, flexibility and strength improve, so will shoulder function

Referral

Medevac urgently all clients with grade 3 injuries, as orthopedic consultation is required.

GLENOHUMERAL DISLOCATIONS

DEFINITION

Dislocation of the humeral head from the glenohumeral joint socket.

CAUSES

Trauma; usual mechanism is forced abduction and external rotation (95% are anterior dislocations).

HISTORY

- Severe pain
- Client usually holds the arm tightly against the body

PHYSICAL FINDINGS

- Shoulder appears flattened laterally and prominent anteriorly
- The acromion process is prominent
- Shoulder appears to be “squared off”

Check for associated injuries:

- Proximal humeral fracture
- Avulsion of the rotator cuff
- Injuries to the adjacent neurovascular structures; axillary nerve injury is most common and is associated with decreased active contraction of the deltoid muscle

DIFFERENTIAL DIAGNOSIS

– Soft-tissue injury
– Clavicle fracture
– Acromioclavicular joint separation

COMPLICATIONS

– Neurovascular compromise

DIAGNOSTIC TESTS

X-ray (if available) is necessary before reduction; obtain images in two planes (anteroposterior [A P] and lateral scapula) to confirm the dislocation and to rule out fracture if mechanism is suggestive.

MANAGEMENT

Goals of Treatment

– Relieve pain
– Reduce dislocation
– Prevent complications

Appropriate Consultation

Consult a physician. The dislocation should be reduced as soon as possible.

Nonpharmacologic Interventions

Immobilize the client's arm in a sling-and-swathe dressing.

Pharmacologic Interventions

Analgesia is needed:

meperidine (Demerol) (**D class drug**), 75–100 mg IM

Monitoring and Follow-Up

Monitor pain and neurovascular status frequently until transfer.

Referral

Medevac to hospital if unable to perform reduction on site. Recurrent dislocation or subluxation is common and may require surgical repair. Referral to an orthopedist is necessary.

LATERAL EPICONDYLITIS (TENNIS ELBOW)

DEFINITION

An inflammatory process occurring at the extensor origin of the lateral epicondyle.

CAUSES

– Usually secondary to overuse or repetitive use
– Populations at risk: athletes and manual laborers

HISTORY

– Pain at the lateral epicondyle
– Referred pain to the extensor surface of the forearm
– Pain exacerbated by resisted extension of the wrist or fingers

PHYSICAL FINDINGS

– Swelling (mild)
– Warmth
– Redness (mild)
– Tenderness over lateral elbow

DIFFERENTIAL DIAGNOSIS

– Avulsion injury of the tendon
– Bursitis
– Septic tenosynovitis
– Arthritis

COMPLICATIONS

– Recurrent episodes
– Tendon rupture

DIAGNOSTIC TESTS

None.

MANAGEMENT

Goals of Treatment

– Relieve pain
– Reduce inflammation
– Prevent complications

Nonpharmacologic Interventions

Rest the Limb

– Client should avoid exacerbating activities
– A constrictive band should be placed on the elbow (commercial "tennis elbow" bands are available)
– The joint should be rested (using a sling) for 2–3 days

Ice or Cold Pack Locally to Reduce Pain and Swelling

- Apply to elbow for 12–14 minutes qid
- Use ice as long as swelling and pain present
- Heat is contraindicated in acute soft-tissue injury
- Never use heat in acute or subacute phases of recovery
- Heat may be used for chronic stiffness and swelling

Pharmacologic Interventions

Anti-inflammatory analgesics to reduce pain and swelling:

ibuprofen (Motrin) (**A class drug**), 200 mg, 1–2 tabs PO tid–qid

or

naproxen (Naprosyn) (**A class drug**), 125 mg, 1–2 tabs PO q6h prn

Do not use if there are contraindications to the use of NSAIDs (such as a history of peptic ulcer disease). Instead, use:

acetaminophen (Tylenol) (**A class drug**), 500 mg, 1–2 tabs PO tid–qid prn

or

acetaminophen with codeine (Tylenol #2) (**C class drug**), 1–2 tabs q4h prn (maximum 15 tabs)

Monitoring and Follow-Up

- Arrange follow-up at 1–2 days and at 14 days
- Start gentle range-of-motion exercises within pain-free range in 2–3 days
- Advise client to begin stretching and strengthening program when range of motion is regained
- Exercise progression: passive range of motion, active assisted range of motion, isometrics, active stretching exercises, and late stretching and strengthening exercises
- Exercises are best done in multiple short sessions, not long ones
- Exercise should be preceded by application of moist heat for 10–15 minutes and should be followed by icing for 12–14 minutes

Referral

In most clients, the problem subsides with conservative treatment. Refer to a physician if there is failure to respond to treatment.

CARPAL TUNNEL SYNDROME

DEFINITION

The symptoms are a result of median nerve dysfunction because of compression within the carpal tunnel. Tends to affect the dominant hand but may be bilateral.

CAUSES

- Overuse
- Ganglion cyst
- Trauma: Colles' fracture
- Predisposing factors: pregnancy, diabetes mellitus, rheumatoid arthritis, hypothyroidism, systemic lupus erythematosus, hypoparathyroidism, hypocalcemia
- Risk factors: jobs that involve repetitive flexion and extension of the wrist

HISTORY

Symptoms usually affect the thumb, index and middle finger.

- Tingling or pricking sensation in the fingers
- Burning pain in the fingers, especially at night
- Relief of symptoms afforded by shaking or rubbing the hand
- Arm pain

PHYSICAL FINDINGS

- Sensory loss in the thumb, index and middle fingers
- Tinel's sign: painful sensation of the fingers induced by percussion of the median nerve at the level of the palmar wrist
- Phalen's sign: keeping both wrists in a palmar-flexed position may reproduce symptoms
- Weakness of the hand while performing tasks (e.g., opening jars)
- Muscle wasting of the thenar eminence (late sign)

DIFFERENTIAL DIAGNOSIS

- Cervical spine spondylosis
- Peripheral neuropathy
- Brachial plexus lesion

COMPLICATIONS

Without treatment, permanent injury to the nerve

MANAGEMENT

Goals of Treatment

- Relieve symptoms
- Prevent complications

Appropriate Consultation

Consult a physician if there is evidence of muscle weakness and wasting of the thenar eminence on the initial visit. Otherwise, treat conservatively and follow closely.

Nonpharmacologic Interventions

- Avoid aggravating activities, especially repetitive motion activity
- Splint with the wrist in neutral position of extension

Pharmacologic Interventions

Anti-inflammatory analgesics:

ibuprofen (Motrin) (**A class drug**), 200 mg, 1–2 tabs PO tid

or

naproxen (Naprosyn) (**A class drug**), 125 mg, 2 tabs PO bid–tid

Monitoring and Follow-Up

- Follow up in 2 weeks to see if there is response to treatment
- If improving, continue to see every 2 weeks until resolved or until 6 weeks has passed

Referral

Refer to a physician if the carpal tunnel symptoms do not improve in 6 weeks. If there is evidence of thenar muscle weakness or atrophy, surgical intervention is indicated.

KNEE INJURY

Most knee injuries in adults involve the ligaments.

LIGAMENT INJURIES

Collateral Ligament Injury

Grade 1 sprain: Microtear of the ligament; increase in joint opening < 5 mm (0.2 inch); no instability.

Grade 2 sprain: Partial macrotear of the ligament accompanied by significant increase in joint opening (with an end point) and instability.

Grade 3 sprain: Complete tear of the ligament, with no end point distinguishable on examination.

Collateral ligament injuries are usually caused by direct trauma to the contralateral side of the knee or excessive indirect force to the knee in a varus or valgus manner. Pain and a sensation of tearing may have been noted by the client at the time of injury. In case of medial collateral ligament injury, there may be tenderness along the distal femur extending to the joint line.

Medial collateral ligament injuries may be associated with meniscal tears.

Valgus and varus tests allow assessment of the collateral ligaments. With the knee in 30° of flexion, the collateral ligaments can be isolated. Increased laxity may be seen (in grade 2 or 3 sprain).

Anterior Cruciate Ligament Injury

- History of a twisting injury accompanied by a pop or a tearing feeling and subsequent effusion
- Hemarthrosis found in 75% of cases
- Frequently associated with injury to a medial collateral ligament

Posterior Cruciate Ligament Injury

- Most injuries result from direct trauma to proximal tibia when the flexed knee is decelerated rapidly, as in a dashboard injury
- Posterior drawer test is used: knee is flexed 90°, and posterior displacement of the tibia on the femur is attempted

Meniscal Tears

- Medial meniscal injury is one of the most common causes of knee-joint pain; medial meniscus is much more susceptible to tears than lateral meniscus
- More than one-third of meniscal injuries are associated with anterior cruciate ligament tear and possibly medial collateral ligament injuries
- Client reports pain at time of injury; pain persists and interferes with weight-bearing activity
- Client often reports that the knee “locks,” which may be attributable to pain or a physical inability to extend the knee because the torn meniscus prevents extension
- Most consistent physical finding is tenderness to palpation along the joint line
- Clinical tests help identify meniscal injury (e.g., McMurray’s test and Apley’s test)

MANAGEMENT

Goals of Treatment

– Relieve symptoms
– Restore or maintain knee function
– Prevent complications

Most knee injuries will respond well to conservative management.

Appropriate Consultation

If there are any diagnostic doubts, consult a physician as soon as possible.

Nonpharmacologic Interventions

Conservative treatment of isolated grade 1 and 2 collateral ligament and minor meniscal injuries involves nonpharmacologic interventions.

– Client should rest with an immobilizer splint or bandage for 7–14 days
– Client should start using crutches with weight-bearing as tolerated as soon as ambulation causes only minor pain
– Ice should be applied for 12–14 minutes qid
– Client should elevate knee for first 24–72 hours
– Initiation of gentle range-of-motion exercises within the pain-free zone should begin as soon as pain and swelling subside enough to allow. Start with quadriceps extension.

Pharmacologic Interventions

Anti-inflammatory analgesics:

ibuprofen (Motrin) (**A class drug**), 200 mg, 1–2 tabs PO tid

or

naproxen (Naprosyn) (**A class drug**), 125 mg, 2 tabs PO bid–tid

Do not use if there are contraindications to the use of NSAIDs (such as a history of peptic ulcer disease). Instead, use:

acetaminophen (Tylenol) (**A class drug**), 500 mg, 1–2 tabs PO q4h prn

If pain moderate to severe initially, use:

acetaminophen with codeine (Tylenol #2 or #3) (**C class drug**), 1–2 tabs PO q4h prn to maximum of 15 tabs, then switch to plain acetaminophen

Monitoring and Follow-Up

Follow up in 1–2 days to reassess injury. If swelling and pain are reduced, you may be able to examine knee more thoroughly.

Referral

Collateral Ligament Injury

Grade 3 collateral ligament injuries can be treated non-operatively, but an orthopedic referral is recommended to assess the need for surgical intervention.

Anterior Cruciate Ligament Injury

Treatment should be supervised by an orthopedist. Treatment of acute injuries depends on the severity. Clients without associated meniscal, collateral ligament or posterior cruciate ligament injury should be treated by immobilizing the knee for comfort; crutches should be used.

Clients with associated ligament injury or meniscal injury should be referred immediately to an orthopedist, because surgery may be necessary.

Posterior Cruciate Ligament Injury

Isolated tears should be managed conservatively, but some posterior cruciate ligament injuries may require surgical fixation.

Meniscal Tears

If the knee remains locked or if symptoms of pain, giving way (a sense that the knee is going to collapse) and swelling persist, client should be referred to an orthopedist for surgical intervention.

ANKLE SPRAIN

DEFINITION

Inversion or eversion injury causing a tear of ligaments supporting the ankle, usually involving lateral ligaments.

– *First-degree sprain:* Ligament is stretched and joint is stable.
– *Second-degree sprain:* More severe; significant partial tearing of the ligament, joint is stable.
– *Third-degree sprain: C*omplete tear of ligament(s), joint is unstable.

CAUSES

– Trauma
– Predisposing laxity of ligaments

HISTORY

- Sudden twisting motion of foot and lateral ankle
- Most commonly results in forced inversion of foot and ankle with injury to the lateral collateral ligament
- Eversion-type injury to the deltoid ligament is second most common type of sprain
- Depending upon extent of injury and degree of ligament injury, symptoms vary in severity
- Acute pain
- Swelling
- Bruising
- Inability to walk (depending on degree of sprain)

PHYSICAL FINDINGS

- Affected limb may be unable to bear weight
- Swelling evident (extent depends on severity of sprain)
- Bruising present in moderate and severe sprains
- Anterolateral aspect of ankle joint tender
- Posterolateral aspect of ankle joint may be tender
- In severe sprains, anterior aspect of ankle also tender
- Lateral ligament may show laxity
- Tenderness over either malleolus
- Range of motion (dorsiflexion, plantar flexion, inversion) may be limited because of pain

DIFFERENTIAL DIAGNOSIS

- Fracture
- Avulsion fracture
- Tendon rupture (e.g., Achilles', peroneal, posterior tibial)

COMPLICATIONS

- Chronic laxity of ligaments and recurrent injury to ankle
- Neurovascular compromise

DIAGNOSTIC TESTS

X-ray of ankle (according to Ottawa Ankle Rules, below) to rule out a fracture if indicated.

Ottawa Ankle Rules

Perform radiography if there is pain near the malleoli and inability to bear weight immediately at the time of injury and at the time of your examination of the client or if there is point tenderness over the bone at the posterior tip of either malleoli.

Perform radiography if there is pain at the mid-foot and inability to bear weight both immediately and at the time of your examination or there is bone tenderness at the navicular or at the base of the fifth metatarsal.

MANAGEMENT

Goals of Treatment

- Reduce pain and swelling
- Rehabilitate ankle strength
- Prevent further injury

Appropriate Consultation

Consult a physician if joint instability is present at initial examination. Also, consult a physician if there is no improvement after 2 weeks of conservative therapy.

Nonpharmacologic Interventions

Rest the Joint

Type and period of rest varies according to severity of injury.

- No weight-bearing or partial weight-bearing with crutches, limited weight-bearing activities
- For first- and second-degree sprains, a gradual increase in weight-bearing is recommended, beginning as soon as pain and stability allow; this promotes healing and proprioception

Ice or Cold Pack to Reduce Swelling and Pain

- Apply to lateral aspect of ankle for 12–14 minutes qid for 48 hours (longer if swelling continues)
- If sprain is severe, apply ice q2h
- Use ice as long as swelling and pain are present
- Heat is contraindicated for the acutely injured ankle
- Never use heat in acute or subacute phases of recovery
- Heat may be used for chronic swelling

Compression and Elevation to Reduce Swelling and Pain

- Tensor bandage should be worn during daytime and removed at bedtime
- Ankle should not be wrapped too tightly
- When possible, ankle should be elevated above level of hip

Exercises

– Start gentle range-of-motion exercises for dorsiflexion within 24 hours
– Encourage calf stretching as tolerated
– Instruct client to draw letters of alphabet with ankle

Plantar flexion, inversion and eversion should be avoided in the very early stages of rehabilitation.

Muscle-strengthening exercises should be started when range of motion is regained. Instruct client about the following exercises:

– Toe and heel raises on inclined surface, holding end position for 4–6 seconds (10–20 repetitions)
– Toe raises on flat surface, holding end position for 4–6 seconds (10–20 repetitions)
– Heel and toe walking
– Balancing on one foot

Client Education

– Counsel client about the importance of rest, ice and elevation
– Teach client to use crutches to prevent weight-bearing
– Teach client the proper application of tensor bandage
– Counsel client about appropriate use of medications (dose, frequency, side effects)
– Counsel client about strategies to prevent further injuries to ankle (e.g., doing warm-up exercises before physical activities such as sports; wearing high-top, lace-up shoes for walking and running)

Pharmacologic Interventions

Anti-inflammatory analgesics to reduce pain and swelling:

ibuprofen (Motrin) (**A class drug**), 200 mg, 1–2 tabs PO tid–qid prn

If there are contraindications to acetylsalicylic acid (ASA) or NSAIDs, use:

acetaminophen (Tylenol) (**A class drug**), 500 mg, 1–2 tabs PO q4h prn

For moderate to severe pain, stronger analgesics may be needed in addition to anti-inflammatory drugs in the first 24–48 hours; use:

acetaminophen with codeine (Tylenol #2 or #3) (**C class drug**), 1–2 tabs PO q4-6h prn (maximum 15 tabs)

Monitoring and Follow-Up

Follow up in clinic at 48 hours and again in 2 weeks, or sooner if pain and swelling persist

Referral

Arrange physiotherapy (if readily available) if symptoms persist for more than 2–3 weeks.

Refer all grade 3 sprains to a physician. Consider consult with orthopedist for eversion-type injuries.

LOW-BACK PAIN

Acute low-back pain is one of the most common health problems. Almost everyone experiences it in his or her lifetime to some degree. It is the fourth most common reason for visits to a healthcare professional.

Back structures that can be a source of pain are ligaments, vertebral bones, facet joints, intervertebral disks, nerve roots and muscles. Pain usually results from strain or degeneration of these structures, but serious inflammatory, infectious and neoplastic disorders also occur.

Back pain can also result from disorders of the visceral structures immediately anterior to the spine: aorta, kidneys, intestines, pancreas, stomach, gallbladder, prostate, uterus and ovaries.

RED FLAG INDICATORS FOR POTENTIALLY SERIOUS CONDITIONS

Possible Fracture

– Major trauma
– Minor trauma in older clients or clients who may have osteoporosis

Possible Cauda Equina Syndrome (Surgical Emergency)

– Saddle-block anesthesia
– Bladder dysfunction
– Severe or progressive neurologic dysfunction in the legs
– Laxity of anal sphincter
– Major motor weakness in quadriceps (knee extensors), ankle plantar flexors, evertors and dorsiflexors (foot drop)

Possible Tumor or Infection

– Client age < 20 or > 50 years
– History of cancer
– Constitutional symptoms such as fever, chills and weight loss
– Risk factors for spinal infection, recent bacterial infection, injection drug use or immunosuppression
– Pain that is worse in the supine position or severe nighttime pain

LUMBOSACRAL STRAIN AND SCIATICA

DEFINITION

Stretching or tearing of muscles, tendons, ligaments or fascia of the lower back secondary to trauma or chronic mechanical stress. May be accompanied by sciatica (pain in buttocks or legs, or both, along path of sciatic nerve, due to nerve root irritation).

CAUSES

- Contusions
- Ligamentous strain
- Muscular strain
- Muscular tension related to mechanical stress
- Osteoarthritis of spine
- Protruding intervertebral disk

Risk Factors

- Aging
- Prolonged periods of standing or sitting
- Poor posture
- Pregnancy
- Obesity
- Improper lifting techniques
- Family history
- Osteoporosis
- Past trauma

HISTORY

Obtain a detailed history, with a precise description of the pain and events surrounding its onset (e.g., activity at the time).

- Pain localized in low lumbar area
- Pain may radiate into buttock or leg (e.g., sciatica)
- Aching pain may be accompanied by intense, sharp muscle spasm
- Sitting increases pain
- Supine posture decreases pain
- Rest decreases pain
- Motion increases pain
- Interference with daily activities
- Interference with performance of job-related activities
- Occupation involving bending or heavy lifting
- History of recent or previous trauma
- Other underlying spinal disk, bone or joint disease (e.g., spinal stenosis, osteoarthritis)

PHYSICAL FINDINGS

- Client appears in mild-to-severe distress
- Abnormal posture (tilting to one side)
- Difficulty with walking (atactic gait)
- May be unable to stand or sit up straight
- Spinal deformities may be present
- Bruising or soft-tissue swelling may be present
- Spasm of paraspinal muscles may be present
- Intervertebral disk space may be tender in lumbar area and along paravertebral muscles
- Range-of-motion maneuver may be limited (especially forward flexion)
- Straight leg-raising may be limited because of muscle tightness, muscle spasm or nerve root irritation (sciatica)
- Reflexes normal in cases of soft-tissue injury, but may be abnormal in cases of impingement on nerve root
- Weakness with heel or toe walking may be present (in cases of impingement on nerve root)
- Sensory deficits may be present (in cases of impingement on nerve root)
- Bowstring test may be positive (in cases of impingement on nerve root)
- Evaluate for "red flag" indicators for potentially serious conditions (*see "Red Flag Indicators for Potentially Serious Conditions," in "Low-Back Pain," above, this chapter*)

DIFFERENTIAL DIAGNOSIS

See "Causes of Low-Back Pain," in "Differential Diagnosis of Musculoskeletal Cardinal Symptoms," above, this chapter.

COMPLICATIONS

- Chronic or recurrent back pain
- Absenteeism from work
- Dependency on or abuse of analgesics
- Occupational disability

DIAGNOSTIC TESTS

In the absence of any red flag indicators, no investigations are needed within the first 4 weeks of acute mechanical low-back pain from lumbar strain.

MANAGEMENT

When treating a client with uncomplicated acute low-back pain, look for red flag indicators while taking the history and performing the physical examination. If there are no red flag indicators (even if sciatica is present), treat conservatively and follow closely.

Goals of Treatment

– Relieve pain
– Prevent further injury
– Educate and reassure the client

Appropriate Consultation

Consult physician for moderate-to-severe back pain, especially if the client is > 50 years of age or has neurologic abnormalities, or if you suspect an underlying organic cause for the back pain.

Nonpharmacologic Interventions

– If the initial assessment indicates no serious condition, assure the client that there is no evidence of a dangerous problem and that full, quick recovery can be expected
– Clients with sciatica may have a longer expected recovery time than clients with non-specific back symptoms and thus may need more education and reassurance
– Bed rest is useful if pain and spasm preclude motion, but should not exceed 3 days; any longer may actually increase pain and disability
– Heavy physical activity should be reduced for 1–2 weeks; otherwise activity as tolerated
– No heavy lifting (> 11 kg [25 lb])
– Client should sleep on a firm mattress support with pillow under knees when lying on back or between knees when lying on side
– Ice packs can be used to reduce muscle spasm (12–14 minutes q2–4h for 24–48 hours)
– Use a heating pad or hot water bottle to reduce muscle stiffness (if pain and spasm absent) after the first 48 hours (20 minutes qid prn)
– Provide advice about nutrition and weight loss if client is overweight
– Client may require note for time off work; time off should be brief; goal is to keep client active

To Be Avoided

– Prolonged standing
– Prolonged sitting
– Lifting > 11 kg (25 lb)
– Lifting and twisting motion
– Slumping posture

To Be Encouraged

– Lumbar support
– Frequent positional changes
– Maintenance of normal spine alignment when sitting or standing
– Proper lifting techniques

Client Education

The need for education will vary among clients and at different stages of care; an obviously apprehensive client may need a more detailed explanation.

Any client who does not recover within a few weeks may need more extensive education about back problems and the reassurance that special tests may be considered if recovery is slow.

– Counsel client about appropriate use of medications (dose, frequency, abuse, overuse)
– Teach the client back-strengthening and conditioning exercises that can be done at home
– Advise client not to start exercises until acute symptoms have subsided

Pharmacologic Interventions

Anti-inflammatory analgesics to reduce pain:

ibuprofen (Motrin) (**A class drug**), 200 mg, 1–2 tabs PO tid–qid prn

or

naproxen (Naprosyn) (**C class drug**), 250 mg, 1–2 tabs PO bid

or

acetaminophen (Tylenol) (**A class drug**), 500 mg, 1–2 tabs PO tid–qid prn

If pain is moderate to severe, or first-line agents fail to control discomfort:

acetaminophen with codeine (Tylenol #2 or #3) (**C class drug**), 1–2 tabs PO q4h prn (maximum 15 tabs) —*may be used in addition to the anti-inflammatory drugs*

Monitoring and Follow-Up

Arrange follow-up at 1–2 days, and then every 2 weeks until client has recovered.

Referral

– Refer to a physician if symptoms persist after 4 weeks, or sooner if symptoms are worsening despite conservative treatment
– Arrange referral to a physiotherapist (if readily available)

GOUT

DEFINITION

Inflammatory disease of peripheral joints related to high concentrations of uric acid in the joints and bones. Most commonly affects men 30–60 years old.

CAUSES

- *Primary gout*: High levels of uric acid from either increased production or decreased excretion of uric acid
- *Secondary gout*: Hyperuricemia from primary acquired diseases such as hypertension, renal failure, hemolytic anemia, glycogen storage disease, psoriasis, renal insufficiency, sarcoidosis, enzyme deficiencies

Risk Factors

- Obesity
- Lead intoxication
- Medications such as salicylates, thiazide diuretics, corticosteroiods, cytotoxic drugs, diazepam, ethambutol, nicotinic acid
- Alcohol abuse (especially binge drinking)
- Other risk factors: family history, diabetes mellitus, hypertension, renal failure, hypothyroidism, hyper- or hypo-parathyroidism, pernicious anemia

HISTORY

- Sudden onset of pain in a joint
- Great toe most commonly affected initially
- Instep, ankle, knee, wrist and elbow may be affected
- Almost all attacks are monoarticular (involving only one joint)
- Widespread joint involvement occurs rarely, accompanied by fever, chills and general malaise
- Pain usually occurs spontaneously, is severe, throbbing and continuous
- First attack begins during the night or early morning
- May be precipitated by trauma, alcohol binging, recent infection, emotional stress or administration of medications (diuretics, penicillin, insulin)
- Attacks are recurrent
- Familial tendency
- Male or postmenopausal female

PHYSICAL FINDINGS

Acute Attack

- Temperature usually normal
- Temperature may be mildly elevated if more than one joint is involved
- Heart rate may be elevated
- Client appears in acute distress
- Difficulty walking or unable to bear weight on affected limb
- Metatarsophalangeal or interphalangeal joint of great toe shows the following characteristics: redness and swelling; overlying skin tense and shiny; range of motion reduced and accompanied by pain; joint acutely tender and feels warm or hot

Chronic Disease

- Joint deformity may be present
- Tophi (chalky deposits) may be present in pinnae of ear, olecranon bursa, dorsum of hands, ulnar surface of forearms, Achilles' tendon and joints of hands and feet

DIFFERENTIAL DIAGNOSIS

- Septic arthritis
- Pseudogout
- Bursitis
- Cellulitis
- Osteomyelitis
- Degenerative arthritis with acute inflammation
- Rheumatoid arthritis
- Bunion

COMPLICATIONS

- Recurrent attacks
- Joint deformity and reduced mobility
- Chronic pain
- Renal calculi
- Nephropathy (may take 10 years to develop)
- Tophi (deposition of uric acid crystals in soft tissues)

DIAGNOSTIC TESTS

- Measure serum uric acid (elevated if > 0.45 mmol/L [7.5 mg/dL])
- Obtain sample for white blood cell (WBC) count (elevated in acute phase)
- Determine erythrocyte sedimentation rate (ESR) (elevated in acute phase)
- Determine 24-hour urinary uric acid excretion (> 900 mg suggests overproduction)

MANAGEMENT

Goals of Treatment

– Relieve symptoms
– Prevent recurrence
– Prevent complications

Appropriate Consultation

Consult a physician if the client is acutely ill or febrile on initial presentation. Consult a physician if no response to therapy in 24–48 hours.

Nonpharmacologic Interventions

– Bed rest during acute phase; no weight-bearing
– Immobilize the joint until hyperacute symptoms are controlled
– Client should increase fluid intake during attack (8 glasses daily)
– Client should discontinue alcohol consumption
– Low-fat diet (to reduce dietary purine, if excessive)
– Weight reduction will help an obese client in the long term

Client Education

– Explain chronic nature and course of the disease
– Counsel client about appropriate use of medications (dose, frequency, side effects, adherence to regimen between attacks to prevent future attacks)
– Advise client to avoid known precipitating factors
– Explain how to prevent irritation (e.g., proper-fitting footwear, not going barefoot in the house)
– Advise client to return to clinic at first sign of recurrence
– Advise client to begin anti-inflammatory medications at the first sign of an acute attack

Pharmacologic Interventions

For acute gout, relieve pain and inflammation with NSAIDs:

ibuprofen (Motrin) (**A class drug**), 200 mg, 2–3 tabs PO tid–qid until acute symptoms subside, then taper drug to discontinue in another 72 hours

or

naproxen (Naprosyn) (**C class drug**), 250 mg PO bid for 7 days

ASA (Aspirin) is contraindicated for gout.

If pain is severe, additional analgesia may be required until anti-inflammatory drugs start to work:

acetaminophen with codeine (Tylenol #2 or #3) (**C class drug**), 1–2 tabs PO q4h prn (maximum 15 tabs)

Monitoring and Follow-Up

– Follow up in 24 hours to ensure response to therapy
– Follow up in 1 month to evaluate status
– For client with chronic gout, measure uric acid levels annually and assess adherence to prophylaxis

Referral

Refer to a physician regarding prophylactic therapy for clients with recurrent episodes.

Gout Prophylaxis

Allopurinol (Zyloprim) (**B class drug**) is the drug of choice (100 mg PO od).

Indications for Prophylaxis

– Presence of tophi
– 24-hour urinary uric acid secretion > 1000 mg
– History of renal calculi of any type
– Renal insufficiency
– Uric acid nephropathy
– Allergy to uricosurics

OSTEOARTHRITIS (DEGENERATIVE JOINT DISEASE)

DEFINITION

Degenerative disease of the articular cartilage of movable joints. Variable amounts of synovial inflammation result, new bone forms at joint surfaces (osteophytes).

CAUSES

– Unknown.
– Factors associated with osteoarthritis: aging, previous joint trauma, chronic overuse of joint, altered biomechanics, obesity, metabolic disorders (e.g., Wilson's disease), previous infection in a joint, endocrine disorders (e.g., diabetes mellitus), crystalline deposit disease

HISTORY

- Family history
- Client usually > 50 years of age
- Joint pain (joints most affected are DIP [distal interphalangeal], PIP [proximal interphalangeal], MCP [metacarpophalangeal], knees, hips, cervical spine, lumbar spine)
- Pain is aching in character
- Pain often worsens with changes in weather
- Pain increases with activity
- Pain relieved by rest
- Localized joint stiffness may be present in the morning or after periods of inactivity
- Stiffness quickly relieved with movement (in less than 30 minutes)
- Generalized joint stiffness absent
- Crepitus (a noisy joint) may be present
- Joint enlargement with limited range of motion may be present
- Flare-ups of pain may occur after unaccustomed exercise

PHYSICAL FINDINGS

Extent and pattern of physical findings are variable.

- Difficulty with mobility may be present if spine, hips or knees are affected
- Joints may appear enlarged and deformed
- Range of motion limited according to extent of joint involvement
- Muscle strength and joint stability (ligament) may be affected
- Osteophyte formation (bony enlargement)
- DIP joints may have osteophyte formation dorsally and marginally (Heberden's nodes)
- Redness or swelling not evident unless there has been an episode of secondary reactive synovitis
- Tenderness may be present in late disease
- Crepitations may be felt or heard with movement of joint

DIFFERENTIAL DIAGNOSIS

- Other forms of arthritis and articular disease
- Trochanteric bursitis (in clients with hip problems)
- Ligamentous or meniscal problems, local bursitis, loose bodies (in clients with knee problems)

COMPLICATIONS

- Chronic pain
- Progressive joint destruction with increasing loss of function and pain
- Impingement of spinal nerves

DIAGNOSTIC TESTS

None.

MANAGEMENT

Goals of Treatment

- Relieve or modify symptoms
- Preserve joint function
- Prevent complications

Management depends upon severity of osteoarthritis and presence of associated reactive inflammation (synovitis) and should be individualized for each person.

Appropriate Consultation

Consult a physician if client is < 50 years of age, joint involvement is atypical, or nerve dysfunction is suspected.

Nonpharmacologic Interventions

- Weight-reduction strategies to reduce stress on joints if client is obese
- Daily exercise program (walking is best) to maintain joint function and limit disability
- Range-of-motion exercises and muscle-strengthening exercises
- Alternating application of heat and cold to reduce joint pain
- Discourage bed rest or inactivity, as this will cause further loss of function and increase immobility

Client Education

- Explain prognosis, process and expected course of the disease
- Counsel client about appropriate use of medications (dose, frequency, side effects)

Pharmacologic Interventions

acetaminophen (Tylenol) (**A class drug**), 500 mg, 1–2 tabs PO q4h prn

If there is insufficient pain control, add low-dose NSAID, if not contraindicated (e.g., heart failure, hypertension, renal failure, peptic ulcer):

ibuprofen (Motrin) (**A class drug**), 200 mg, 1–2 tabs PO qid prn

or

naproxen (Naprosyn) (**A class drug**), 125 mg bid prn

Monitoring and Follow-Up

Follow up every 6–12 months. Clients receiving daily doses of acetaminophen, ASA or other NSAIDs should undergo regular monitoring as follows: complete blood count, creatinine level, electrolyte level, liver function tests (LFTs) and stool examination (for occult blood).

Referral

Refer to a physician if symptoms are not controlled with conservative treatment. Arrange for physiotherapy (if readily available).

RHEUMATOID ARTHRITIS

DEFINITION

A chronic systemic inflammatory disease that affects primarily the peripheral joints. Certain extra-articular manifestations are common, including rheumatoid nodules, arteritis, peripheral neuropathy, keratoconjunctivitis, pericarditis and splenomegaly.

CAUSES

- Largely unknown
- Autoimmune disorder
- Viral infection

Risk Factors

- Usually occurs in women 30–60 years of age
- Family history
- Native ancestry

HISTORY

- Recent systemic illness or trauma may have occurred
- Onset of symptoms generally insidious
- Hands, wrists, elbows, shoulders, ankles and feet are the joints most commonly affected; joints exhibit pain, swelling, stiffness, warmth, redness
- Pain and stiffness exacerbated by prolonged rest or strenuous activity
- Joint stiffness for at least 1 hour upon rising in morning, over a period of more than 6 weeks
- Fatigue, general malaise, anorexia and weight loss present during acute exacerbations

As disease progresses:

- Morning and resting stiffness lasts for longer periods of time (this increase over time is a good indicator of disease progression)
- Disease progresses to involve multiple other joints
- Progressive joint destruction, deformity

PHYSICAL FINDINGS

Acute Exacerbation

- Client in moderate distress
- Temperature may be elevated
- Heart rate may be elevated
- Affected joints swollen (bilateral symmetric joint involvement common)
- Affected joints may be reddened
- Affected joints are warm and tender
- Range of motion reduced

Chronic Progressive Disease

- Affected joints are enlarged
- Joints become deformed: PIP joints take on fusiform shape; flexion contractures may occur (e.g., Swan neck deformity); ulnar deviation of MCP joints; deviation of wrists
- Subcutaneous rheumatoid nodules may be present
- Progressive weight loss may occur

DIFFERENTIAL DIAGNOSIS

- Degenerative osteoarthritis with inflammation
- Septic arthritis
- Polymyalgia rheumatica
- Systemic lupus erythematosus
- Gout
- Psoriatic arthritis
- Gonococcal arthritis
- Reiter's syndrome (in men)
- Lyme disease
- Polymyositis
- Inflammatory bowel disease (e.g., Crohn's disease, ulcerative colitis)

COMPLICATIONS

- Chronic pain
- Progressive joint destruction
- Loss of mobility
- Anemia of chronic disease
- Pulmonary and renal involvement
- Dermatitis
- Pericarditis

DIAGNOSTIC TESTS

Before medications are started, previously undiagnosed clients should undergo some basic laboratory tests: complete blood count, ESR, rheumatoid factor, anti-nuclear antibody (ANA), creatinine and electrolyte levels, LFTs. Urinalysis should also be performed before drug treatment starts.

MANAGEMENT

Goals of Treatment

– Control pain
– Reduce inflammation
– Preserve joint function
– Prevent long-term disability

Appropriate Consultation

Consult physician for:

– Previously undiagnosed clients
– Clients whose disease is not controlled by current therapy
– Clients whose disease is progressive
– Clients in whom a complication is developing

Nonpharmacologic Interventions

Acute Episode

– Adequate rest and nutrition
– Rest for affected joints
– Splint affected joint during acute phase prn
– Ice packs prn to reduce pain and swelling of affected joints

Long Term

– Adequate, balanced, nutritious diet
– Exercise program to maintain joint mobility and muscle strength
– Maintenance of ideal body weight

Client Education

– Explain process, course and prognosis of the disease
– Counsel client about appropriate use of medications (dose, frequency, side effects, compliance)
– Instruct client to take medications with meals to reduce gastrointestinal upset
– Stress importance of daily exercise in maintaining function and mobility of joints
– Assess family support systems and encourage family members to become active in client's treatment program
– Advise client to return to clinic if acute episode occurs

Pharmacologic Interventions

Anti-inflammatory analgesics:

enteric-coated ASA (**A class drug**), 975–1950 mg PO qid (titrate up, starting with a low dose)

or

ibuprofen (Motrin) (**A class drug**), 200 mg, 2–3 tabs PO tid–qid

or

naproxen (Naprosyn) (**C class drug**), 250 mg, 1–2 tabs PO bid

Monitoring and Follow-Up

Acute Episode

– Follow up in 48–72 hours to assess response to therapy

Long-Term Surveillance

– Follow up regularly (frequency depends on stage of disease)
– Assess weight, appetite, energy level, sense of well-being
– Monitor symptoms for progression of disease
– Determine efficacy of therapy
– Encourage joint mobility through exercise program
– Identify acute exacerbations

Referral

Refer clients with persistent joint inflammation (> 3 months) and any who present with severe disease as soon as possible. Arrange physiotherapy consult (if readily available).

EMERGENCIES OF THE MUSCULOSKELETAL SYSTEM

SEPTIC ARTHRITIS

DEFINITION

Bacterial infection of a joint.

CAUSES

Common pathogens include *Neisseria gonorrheae*, *Staphylococcus aureus*, *Streptococcus pneumoniae*, *Mycobacterium tuberculosis*, gram-negative bacilli and occasionally *Haemophilus*; infection with viral and fungal agents is rare but may occur in immunocompromised clients.

Risk Factors

- Trauma
- Recent joint surgery
- Prosthetic joint
- Contiguous spread from osteomyelitis
- Extension of cellulitis
- Hematogenous spread of bacteria (in 80% to 90% of cases)
- Pre-existing joint disease (e.g., rheumatoid arthritis)
- Injection drug use
- Prior use of antibiotics, corticosteroids or immunosuppressants
- Serious chronic illness (e.g., diabetes mellitus, liver disease, malignant disease)
- Primary immunodeficiency (e.g., HIV)

HISTORY

- Presence of one of the above risk factors
- Fever and chills
- Sudden onset of acute monoarticular joint pain
- Heat
- Redness
- Swelling
- Large joint usually involved
- Client unable to bear weight on affected limb, unable to move joint
- Recent history of urethritis, salpingitis or hemorrhagic skin lesions (indicating gonococcal infection) may be present

PHYSICAL FINDINGS

The classic signs of acute inflammation may be absent in elderly clients, chronically debilitated people or clients receiving steroid therapy.

- Temperature elevated
- Heart rate elevated
- Client appears ill and in acute distress
- Joint red (in only 50% of cases)
- Joint swelling (because of effusion)
- Range of motion severely limited
- Client actively resists any movement of joint
- Hemorrhagic skin lesions may be present
- Joint warm (in only 50% of cases)
- Joint tender
- Regional lymphatic nodes enlarged and tender

DIFFERENTIAL DIAGNOSIS

- Localized synovitis due to trauma
- Bursitis
- Cellulitis
- Rheumatic fever arthritis
- Active rheumatoid arthritis
- Active gout or pseudogout
- Reiter's syndrome
- Psoriatic arthritis
- Lyme disease arthritis

COMPLICATIONS

- Sepsis
- Septic shock
- Osteomyelitis
- Joint destruction
- Loss of limb

DIAGNOSTIC TESTS

None.

MANAGEMENT

Goals of Treatment

- Relieve pain and inflammation
- Prevent complications

Appropriate Consultation

Consult a physician immediately.

Nonpharmacologic Interventions

– Bed rest
– Splint limb, using pillows or a back slab, to protect involved area from injury

Adjuvant Therapy

Start IV therapy with normal saline to keep vein open.

Pharmacologic Interventions

Analgesic or antipyretics for pain and fever:

acetaminophen (Tylenol) (**A class drug**), 500 mg, 1–2 tabs PO q4h prn

Consider starting IV antibiotics in consultation with physician if transfer to hospital will be delayed more than an hour or two. If unable to consult a physician, give:

penicillin G sodium (Crystapen) (**A class drug**), 2 million units IV q4h

Monitoring and Follow-Up

Monitor vital signs frequently.

Referral

Medevac as soon as possible.

OSTEOMYELITIS

DEFINITION

Infection of the bone.

CAUSES

Bacterial infection (common pathogens are *Staphylococcus aureus*, *Streptococcus*).

Risk Factors

– Extension of existing soft-tissue infection
– Trauma
– Direct introduction of organism into the bone
– Hematogenous spread of pre-existing infection

People with diabetes, peripheral vascular disease with chronic skin breakdown, and chronic skin infection are particularly prone to osteomyelitis.

HISTORY

– Presence of one of the above risk factors
– Mild-to-moderate fever may be present
– Infection of overlying skin and subcutaneous tissues may be present
– Localized pain, increased by weight-bearing or movement
– Heat, redness and swelling of affected area
– Sinus may be draining

Blood-Borne Osteomyelitis

– Original site of infection frequently not apparent
– Most commonly occurs in vertebrae
– Presents as persistent back pain with minimal or absent fever
– May present as acute back pain with high fever, paravertebral muscle spasm and guarding of movements (mimicking pyelonephritis)

PHYSICAL FINDINGS

– Temperature may be elevated
– Heart rate moderately elevated
– Client in moderate distress
– Distress with weight-bearing
– Involved area swollen, overlying skin red
– Range of motion reduced if adjacent joint is involved
– Purulent drainage from sinus may be present
– Area warm and tender to touch

DIFFERENTIAL DIAGNOSIS

– Infectious arthritis
– Active rheumatoid arthritis
– Cellulitis

COMPLICATIONS

– Chronic osteomyelitis
– Chronic bone pain
– Loss of limb
– Subcutaneous abscess

DIAGNOSTIC TESTS

None.

MANAGEMENT

Goals of Treatment

– Relieve infection
– Prevent complications

Appropriate Consultation

Consult a physician immediately.

Nonpharmacologic Interventions

– Bed rest
– Elevate and splint affected area

Adjuvant Therapy

Start IV therapy with normal saline to keep vein open.

Pharmacologic Interventions

Antipyretic or analgesic for pain and fever:

acetaminophen (Tylenol) (**A class drug**), 500 mg, 1–2 tabs PO q4h prn

Consider starting IV antibiotics if there will be any delay in transfer to hospital (antibiotics as directed by a physician) or if unable to consult with a physician in a timely manner:

penicillin G sodium (Crystapen) (**A class drug**), 2 million units IV q4h

and

cloxacillin (Orbenin) (**A class drug**), 500–1000 mg q6h

Referral

Medevac as soon as possible. A prolonged course of antibiotics is necessary for this condition.

LIMB FRACTURES

DEFINITION

A break in the continuity of the bone.

CAUSES

– Trauma
– Pathological fracture secondary to underlying disease (e.g., osteoporosis)

Types of Fractures

– *Closed (simple) fracture*: fracture that does not communicate with the external environment
– *Open (compound) fracture*: fracture that communicates with the external environment (through laceration of skin)
– *Comminuted fracture*: fracture involving three or more fragments
– *Avulsion fracture*: fracture in which fragment of bone is pulled from its normal position by muscular contraction or resistance of a ligament
– *Greenstick fracture*: incomplete angulated fracture of a long bone, seen most often in children
– *Undisplaced fracture*: fractured bone stays in alignment
– *Displaced fracture*: fractured bone goes out of alignment

HISTORY

– Determine exact mechanism of injury
– Pain
– Swelling
– Loss of function
– Numbness distal to fracture site (possible)

COMMONLY SEEN FRACTURES

– *Fracture of the clavicle: See "Clavicle Fracture," below, this chapter.*
– *Fracture of radial head (elbow)*: Usually caused by a fall onto an outstretched hand. Client is reluctant to pronate the hand or flex the elbow beyond 90°.
– *Radial fracture (wrist)*: In adults, the most common radial fracture is the Colles' fracture, which is extra-articular and occurs 2.5–3 cm (1–1.2 inch) proximal to the articular surface of the distal radius. This fracture occurs with the hand in dorsiflexion; the distal fracture segment is angulated dorsally and causes a "dinner fork" deformity.
– *Metacarpal fracture*: Also known as "boxer's fracture," this is a fracture of the distal neck of the fifth metacarpal and is generally the result of punching something with a closed fist (generally a wall or refrigerator). Tenderness is localized to the injured metacarpal bone.
– *Finger fracture:* There are three types of finger fractures. (1) Distal tip fractures are usually crush injuries to the tip of the finger. (2) Middle and proximal phalangeal fractures should be examined for evidence of angulation (by x-ray) or rotation (by clinical examination), each of which requires reduction. (3) Small (< 25%) avulsion fractures of the middle phalangeal base occur with a hyperextension injury.
– *Pelvic fracture:* Often associated with major trauma and can lead to signficant blood loss. *See "Pelvic Fracture," in chapter 14, "General Emergencies and Major Trauma."*
– *Hip fracture:* Common in elderly clients. May not be very painful.
– *Femur fracture:* Often associated with major trauma and can lead to significant blood loss.
– *Tibia and fibia fracture*
– *Ankle fracture*

PHYSICAL FINDINGS

- Skin lacerations with protruding bones may be present if fracture is compound
- Bruising and swelling
- Range of motion decreased
- Affected part may be pale if blood flow to the area is compromised
- Limb cool, pulses absent and sensation decreased if blood supply has been compromised
- Check temperature of area and presence of pulses distal to site of injury
- Test sensory function (to sharp and dull stimuli) distal to site of injury
- Affected area extremely tender
- If bones are displaced, crepitations may be felt

DIFFERENTIAL DIAGNOSIS

- Severe sprain
- Severe contusion
- Dislocation

COMPLICATIONS

Immediate (within First Few Hours)

- Hemorrhage
- Damage to arteries, neurovascular bundle and surrounding soft tissues

Early (within First Few Weeks)

- Wound infection
- Fat embolism
- Adult respiratory distress syndrome
- Chest infection
- Disseminated intravascular coagulopathy
- Exacerbation of general illness
- Compartment syndrome may result from casting

Late (Months or Years Later)

- Deformity
- Osteoarthritis of adjacent or distant joints
- Aseptic necrosis
- Traumatic chondromalacia
- Reflex sympathetic dystrophy

DIAGNOSTIC TESTS

X-ray, if available and only if result will affect decision to transfer care to hospital.

MANAGEMENT

Most bones join in 6–8 weeks; lower-limb bones may take longer and fractures in children may take less time.

Goals of Treatment

- Stabilize fracture
- Relieve pain
- Prevent or manage complications

Appropriate Consultation

Consult physician for all suspected or confirmed fractures.

Nonpharmacologic Interventions

Do not cast a fracture.

Do not attempt to reduce a displaced fracture.

- Immobilize and support involved area using splints, a back slab cast or sling (for upper extremities) as appropriate
- For client with displaced fracture, give nothing by mouth because surgery may be needed

Client Education

- Counsel client about appropriate use of medications (dose and frequency)
- Advise client to keep limb elevated as much as possible during the first several days to reduce swelling
- Instruct the client about cast care: keep cast dry, avoid poking objects down the cast, as this may result in damage to the skin
- Advise client to return to the clinic if pain increases, if numbness or tingling develops, if the limb becomes cool or if color changes are noted in the distal limb
- Teach client how to care for limb after removal of cast: skin should be kept clean and well hydrated with oil or petroleum jelly to prevent drying, cracking and infection; range-of-motion exercises should be done to regain joint mobility (tell the client that these exercises may be painful and that it may take some time to regain full mobility)

Adjuvant Therapy

If hypotension is present in a client with a major fracture (e.g., femur, pelvis, hip), treat for shock:

- Oxygen 6–10 L/min; keep oxygen saturation > 97% to 98%
- Start two large-bore IVs with normal saline or Ringer's lactate

For management of hypvolemic shock, *see "Shock," in chapter 14, "General Emergencies and Major Trauma"*

Pharmacologic Interventions

Analgesia for pain:

meperidine (Demerol) (**D class drug**), 50–100 mg IM q3–4h prn

or

acetaminophen with 30 mg codeine (Tylenol #3) (**D class drug**), 1–2 tabs PO q4h prn

Monitoring and Follow-Up

- Monitor vital signs, and watch for tachycardia and hypotension; shock may occur with major fractures of the pelvis and femur
- Monitor neurovascular status of area distal to the fracture site

Referral

Medevac to hospital.

MANAGEMENT OF SPECIFIC FRACTURES OF THE UPPER EXTREMITY

Fracture of Radial Head

Management of undisplaced fracture includes a sling and posterior elbow splint for 1–2 weeks with range-of-motion exercises initiated after 1 week. Continue in sling for another week and do follow-up x-ray to document that no displacement has occurred with mobilization.

Displaced fractures of the radial head should be referred to an orthopedist for operative repair.

Radial Fracture

Reduction by traction and manipulation is performed. After the fracture is reduced, a plaster short-arm cast is applied for 5–8 weeks. If the fracture is undisplaced, casting for 6 weeks without reduction is indicated.

Metacarpal Fracture

Undisplaced fractures of the base of the metacarpals are treated by immobilization in a short-arm cast. Displaced fractures are reduced by traction, with local pressure over the prominent proximal end of the distal metacarpal fracture. Follow-up x-ray within 7 days is necessary. If any instability is noted after reduction or the fracture is comminuted, the client should be referred to an orthopedist for open reduction and internal fixation.

Distal Tip Fracture

Protective splinting of the tip for several weeks is usually satisfactory.

Middle and Proximal Phalangeal Fracture

Nondisplaced extra-articular fractures can be managed by 1–2 weeks of immobilization followed by dynamic splinting with "buddy taping" to the adjacent finger.

Large intra-articular or displaced fractures are usually unstable and require orthopedic referral.

Small (< 25%) Avulsion Fracture of Middle Phalangeal Base

These injuries are managed by 2–3 weeks of immobilization with up to 15° of flexion at the PIP joint, followed by "buddy taping" for 3–6 weeks.

CLAVICULAR FRACTURE

DEFINITION

Clavicular fractures are common injuries, accounting for approximately 5% of all fractures seen in the primary care setting. The force required to fracture the clavicle is greater in adults than in children. In addition, healing occurs at a slower rate in adults, and there is a greater risk of complications.

The clavicle is the sole articulation of the shoulder girdle to the trunk. It protects major underlying vessels, the lung and the brachial plexus. These structures are in close proximity to the clavicle and may be injured by the sharp edges of the broken bone.

Eighty percent of clavicle fractures occur in the middle third of the bone (class A), 15% involve the distal or lateral third (class B), and 5% involve the proximal or medial third (class C).

Class B fractures are further classified as:

- *Type 1 (non-displaced):* the supporting ligaments remain intact and there is no significant displacement of the fracture fragments
- *Type 2 (displaced):* the coracoclavicular ligament ruptures, with resultant upward displacement of the proximal segment because of the sternocleidomastoid muscle
- *Type 3 (articular surface):* fracture involves the acromioclavicular joint

CAUSES

- Fall onto shoulder or outstretched upper extremity
- Direct trauma to clavicle area

HISTORY

- Fall onto outstretched upper extremity, fall onto the shoulder or direct clavicular trauma
- Pain (moderate to severe), especially with movement of the upper extremity

PHYSICAL FINDINGS

- Tenderness
- Swelling over fracture site
- Deformity
- Ecchymosis, especially when severe displacement causes tenting of skin
- Bleeding due to open fracture (rare)
- Non-use of arm on affected side

Distal neurovascular examination and lung auscultation (to clinically exclude pneumothorax) must be performed.

DIFFERENTIAL DIAGNOSIS

- Dislocation
- Shoulder fracture
- Rib pneumothorax (tension and traumatic)
- Rotator cuff injury
- Sternoclavicular joint injury

COMPLICATIONS

- Brachial plexus compression may result from hypertrophic callus formation and may cause peripheral neuropathy
- Delayed union or non-union (especially with distal-third fractures)
- Poor cosmetic appearance
- Post-traumatic arthritis
- Intrathoracic injury (as with fracture of the first rib, great force is necessary to cause proximal-third clavicle fractures, and it is imperative to rule out underlying injuries)
- Pneumothorax
- Subclavian artery and vein injury
- Internal jugular vein injury
- Axillary artery injury

DIAGNOSTIC TESTS

- Routine clavicle x-ray (the fracture is usually seen with an AP view)
- Chest x-ray, if pneumothorax suspected

MANAGEMENT

Goals of Treatment

- Identify and treat associated life-threatening injuries
- Stabilize fracture site
- Relieve pain
- Identify and manage complications

Uncomplicated clavicle fractures may be managed by a primary care provider

Nonpharmacologic Interventions

- Employ the ABC approach (airway, breathing and circulation) to evaluation and stabilization
- Perform a careful secondary survey
- Apply a cold pack to site of injury
- Immobilize the upper extremity with a sling

Class A (Middle-Third Fractures)

- Treat with sling immobilization (some prefer a figure-of-eight clavicular splint, especially for displaced fractures)

Class B (Distal-Third Fractures)

- Type 1 (non-displaced) and type 3 (articular surface) fractures of the distal clavicle are treated with sling immobilization
- Type 2 (displaced) fractures should be immobilized in a sling and swath and may require orthopedic surgical fixation

Class C (Proximal-Third Fractures)

- Treat non-displaced fractures with sling immobilization
- Displaced fractures may require orthopedic referral for surgical reduction

If the fracture is open, the client should be treated with prophylactic antibiotics, tetanus vaccination (if needed), irrigation and placement of a sterile dressing while awaiting urgent orthopedic consultation.

Client Education

- Client should use a sling or shoulder immobilizer
- Alternatively, client may use a figure-of-eight bandage (clavicle strap); educate clients as to proper placement and adjustment techniques; paresthesias or edema in the hands or fingers indicate that the strap is too tight and should be removed; purpose of this bandage is to reduce pain by decreasing movement of the fracture fragments, not necessarily to maintain perfect alignment; may be combined with a sling for added comfort
- Counsel client about injury prevention: adequate protective gear for participation in certain sports, use of seatbelts, drug and alcohol counseling (as needed), early physical therapy (e.g., range-of-motion exercises) if indicated

Pharmacologic Interventions

Control discomfort with NSAIDs. If pain continues, add a narcotic analgesic:

ibuprofen (Motrin) (**A class drug**), 200 mg, 1–2 tabs PO qid prn for 1–2 weeks

If pain is not controlled, add:

acetaminophen with codeine (Tylenol #2 or #3) (**C class drug**), 1–2 tabs PO q4h prn (maximum 15 tabs)

Monitoring and Follow-Up

- Reassess injuries in 48 hours, then follow up weekly until full shoulder mobility has returned
- Arrange orthopedic follow-up if necessary (this will depend on type of initial injury and presence of complications)

Referral

- Medevac clients with open fractures, as immediate orthopedic consultation will be needed
- Refer clients with displaced fractures urgently, as orthopedic consultation is required, and surgical repair may be needed

CHAPTER 8 – CENTRAL NERVOUS SYSTEM

Table of Contents

ASSESSMENT OF THE CENTRAL NERVOUS SYSTEM

HISTORY OF PRESENT ILLNESS AND REVIEW OF SYSTEM

GENERAL

The following characteristics of each symptom should be elicited and explored:

- Onset (sudden or gradual)
- Chronology
- Current situation (improving or deteriorating)
- Location
- Radiation
- Quality
- Timing (frequency, duration)
- Severity
- Precipitating and aggravating factors
- Relieving factors
- Associated symptoms
- Effects on daily activities
- Previous diagnosis of similar episodes
- Previous treatments
- Efficacy of previous treatments

CARDINAL SYMPTOMS

In addition to the general characteristics outlined above, additional characteristics of specific symptoms should be elicited, as follows.

General Cerebral Function

- Changes in memory
- Changes in concentration
- Changes in mood

Cranial Nerve Function

- Changes in vision, drooping eyelids
- Facial weakness
- Disturbance of speech production
- Hearing loss, unusual noise in ears, difficulties with balance
- Impairment of sense of smell or taste

Headaches

- Onset, age at onset
- Pattern, any changes in pattern
- Location, description, whether pulsating
- Time of day, duration
- Precipitating factors
- Associated symptoms: nausea, vomiting, visual or sensory disturbances

Changes in Level of Consciousness

- Dizziness
- Fainting
- Convulsions
- History of head injury that produced any periods of loss of consciousness

Motor Function

- Muscle weakness, paralysis, stiffness
- Clumsiness, ataxia
- Staggering gait with wide-base stance
- Tremor

Sensory Function

- Loss of or decrease in sensation
- Sensation of “pins and needles,” tingling
- Burning sensation

Other Associated Symptoms

- Bowel or bladder dysfunction
- Impotence
- Pain

MEDICAL HISTORY (SPECIFIC TO CENTRAL NERVOUS SYSTEM)

- Seizures
- Head trauma
- Metabolic disease (e.g., diabetes mellitus, thyroid problems)
- Cardiac disease (e.g., hypertension, heart block)
- Transient ischemic attack
- Demyelinating diseases (e.g., multiple sclerosis, Parkinson’s disease)
- Alcoholism
- Migraine headaches
- Psychiatric illness (e.g., depression, bipolar disorder)
- Bell’s palsy

FAMILY HISTORY (SPECIFIC TO CENTRAL NERVOUS SYSTEM)

- Seizures
- Metabolic disease (e.g., diabetes mellitus)
- Cardiac disease (e.g., hypertension, myocardial infarction, stroke)
- Demyelinating diseases (e.g., multiple sclerosis, Parkinson's disease)
- Migraine headaches
- Psychiatric illness

PERSONAL AND SOCIAL HISTORY (SPECIFIC TO CENTRAL NERVOUS SYSTEM)

- Alcoholism
- Drug abuse
- Occupational exposure to neurotoxins

EXAMINATION OF THE CENTRAL NERVOUS SYSTEM

GENERAL APPEARANCE

- Apparent state of health
- Appearance of comfort or distress
- Color (e.g., flushed, pale, cyanotic)
- Nutritional status (emaciated or obese)
- Match between appearance and stated age

SCREENING EXAMINATION

The following screening examination will reveal areas of difficulties. If deficits are discovered, a more in-depth examination is required.

To Be Assessed During History-Taking

- Level of consciousness
- Mental status
- Speech (clarity, content, volume, rate)

Cranial Nerves

See Table 1.

Motor Function, Sensory Function and Reflexes

Assess motor function, sensory function and reflexes together, as follows.

Arms and Hands

- Grip strength
- Raise both arms and hold (assess for palmar drift)
- Finger–nose test (assess for eye–hand coordination)
- Blunt and sharp pin prick
- Reflexes (biceps, triceps, brachioradialis [supinator])

Legs

- Straight-leg raising
- Bowstring test
- Quadriceps test
- Heel-to-toe walk
- Heel–shin test
- Romberg test
- Blunt and sharp pin prick
- Reflexes (Achilles' tendon, patellar, plantar)

Meningeal Irritation

Test for meningeal irritation if indicated:

- Neck stiffness
- Brudzinski's sign
- Kernig's sign

Table 1: Screening Tests for Cranial Nerves

Cranial Nerve	Test
I—Olfactory	Smell (test only if there is a specific complaint)
II—Optic	Visual acuity
	Visual fields
	Funduscopic examination
III—Oculomotor IV—Trochlear VI—Abducent	Pupillary response (direct or consensual) Extraocular eye movements
V—Trigeminal	Motor function: clench teeth, open jaw
	Sensory function: pain (sharp stimulus); light touch (cotton wisp); sensation on forehead, cheek, chin
	Corneal reflex (omit if client is conscious)
VII—Facial	Facial symmetry: raise eyebrows, frown, close eyes tightly against resistance, show teeth, puff cheeks, smile
VIII—Acoustic (Vestibulocochlear)	Hearing (watch ticking, whisper)
	Rinne and Weber tests
IX—Glossopharyngeal X—Vagus	Movement of palate, uvula, pharyngeal wall
	Gag reflex and swallowing
	Hoarseness
XI—Spinal accessory	Shoulder shrug against resistance
	Head turn against resistance
XII—Hypoglossal	Stick out tongue, push tongue against each cheek

COMMON PROBLEMS OF THE CENTRAL NERVOUS SYSTEM

BELL'S PALSY

DEFINITION

Sudden, painless, unilateral paralysis of facial muscles due to inflammation and swelling of the seventh cranial nerve (the facial nerve). The condition usually resolves spontaneously.

CAUSES

- Largely unknown
- Possibly viral infection of facial nerve
- May be related to Lyme disease and HIV infection
- Hereditary and vascular factors may be contributory

Risk Factors

- Pregnancy (third trimester)
- Positive family history
- Hypertension
- Diabetes mellitus

HISTORY

- Sudden onset of unilateral facial weakness
- Progression to complete paralysis within a few hours
- Inability to close eye on affected side
- Excessive tearing of affected eye may be present
- Taste sensation may be altered
- Hypersensitivity to sound
- Pain in or behind ear may occur on affected side just before onset of facial weakness

PHYSICAL FINDINGS

- Client appears anxious
- Flat nasolabial fold
- Client unable to close eye, raise eyebrow or smile on affected side
- Widened palpebral fissure
- Eyeball rolls upward when client attempts to close eyelid
- Drooling may be present
- Sensation to light touch and pin prick may be reduced

DIFFERENTIAL DIAGNOSIS

- Stroke (brain stem)
- Cerebral tumor
- Parotid gland tumor
- Middle ear or mastoid infection
- Meningitis
- Head or facial trauma with fracture
- Lyme disease
- Herpes zoster oticus
- Guillain–Barré syndrome
- Multiple sclerosis

COMPLICATIONS

- Corneal abrasion
- Corneal ulceration
- Keratitis
- Chronic facial weakness
- Facial muscle contracture

DIAGNOSTIC TESTS

None.

MANAGEMENT

Goals of Treatment

- Protect the eye from injury
- Prevent complications

Management is directed toward the symptoms and depends on the time and severity of presentation.

Appropriate Consultation

Consult a physician immediately. If within 72 hours of onset and the client is at high risk for denervation (e.g., full unilateral facial paralysis, > 50 years of age, diabetic), drug therapy may be indicated (*see "Pharmacologic Interventions," below*)

Nonpharmacologic Interventions

Reassure client that full recovery can be expected in 6–8 weeks.

Client Education

- Counsel client about appropriate use of medications (dose, frequency, side effects)
- Recommend adequate nutritional intake and suggest that client direct food and liquids to unaffected side of mouth to prevent drooling and to promote proper mastication
- Recommend adequate oral hygiene after meals to prevent collection of food and liquids within affected cheek
- Suggest protection of affected eye to prevent corneal abrasions (e.g., wearing sunglasses during the day to prevent dust particles from entering eye, taping the eye closed at night)
- Recommend eye lubricants to prevent drying of eye: eye drops (Isopto Tears, Lacril) q1–2h during the day; eye ointment (Lacri-Lube, Duratears) and eye patch hs
- Recommend facial exercises and massage, to be performed 2 or 3 times daily to prevent muscle atrophy (wrinkle forehead, blow out cheeks, purse lips, close eyes)

Pharmacologic Interventions

Antiviral or anti-inflammatory drugs (or both) may be prescribed by the physician:

acyclovir (Zovirax) (**B class drug**), 400 mg PO 5 times daily for 10 days (optional)

and

prednisone (**B class drug**), 30 mg PO bid for 5 days, then taper by 5 mg daily

Monitoring and Follow-Up

- Arrange daily follow-up for several days
- Assess progression of palsy
- Monitor for symptoms of corneal abrasion: stain corneal surface with fluorescein prn and examine to identify development of corneal abrasion; if corneal abrasion suspected or detected, *see "Corneal Abrasion" in chapter 1, "The Eyes"*

Referral

Refer to a physician if complications are suspected or detected or if condition does not resolve within 4 weeks.

HEADACHES: GENERAL PRINCIPLES

Most headaches (90%) are benign.

There is a wide variety of causes of headaches, ranging from abnormalities of the head and neck to systemic illness. Other causes include use or abuse of drugs, alcohol or chemicals.

When a client first presents to the clinic with headache, the following points in the history must be obtained to assist in differentiating the type of headache.

An accurate, precise description of the pain:

- Age at onset of headaches, if recurrent
- Location
- Quality
- Duration
- Time of occurrence (first time, recurrence, onset in morning, evening or during the day)
- Frequency (daily, monthly, occasionally)
- How headache begins
- How headache progresses
- Interference with daily activities

Associated symptoms either before pain begins or as pain progresses (e.g., loss of consciousness, aura, nausea, vomiting, photophobia, sensory changes, fever)

Aggravating and relieving factors (medications used and their effectiveness, position of head, noise, light)

Lifestyle factors that precipitate headache (at home, at work, anytime)

Occupation

Family history of headaches (including type)

Pre-existing medical conditions (e.g., glaucoma, hypertension, infection, anxiety, depression, seizures)

DIFFERENTIAL DIAGNOSIS OF HEADACHE

Primary

- Migraine
- Tension (muscle contracture)
- Cluster
- Other
  - Cold stimulus (e.g., ice cream)
  - Benign cough-related
  - Benign exertional
  - Post-traumatic

Secondary

Disorders of the Cerebral Parenchyma

- Brain tumor
- Brain abscess
- Intracranial hemorrhage
- Cerebral trauma
- Hydrocephalus
- Benign intracranial hypertension

Disorders Involving the Meninges

- Meningitis
- Subarachnoid bleeding

Disorders Involving the Extracranial Structures

- Dental abscess
- Paranasal sinusitis
- Temporomandibular joint syndrome
- Closed-angle glaucoma
- Trigeminal neuralgia
- Herpes zoster infection
- Retro-orbital disease process

Metabolic Causes

- Food additives or toxins (e.g., nitrites, monosodium glutamate, alcohol)
- Side effect of medication (e.g., nitrates, oral contraceptives, calcium-channel blockers)
- Related to fever
- Related to hypercapnia (increased carbon dioxide levels)

Vascular Causes

- Hypertension
- Vasculitis
- Embolic or thrombotic events

FEATURES SUGGESTIVE OF A SERIOUS CAUSE OF HEADACHE

- Advanced age
- Worst headache ever experienced
- Onset with exertion
- Decreased alertness or cognition
- Radiation of pain between the shoulder blades (which suggests spinal arachnoid irritation)
- Association with nuchal rigidity
- Any history or physical finding suggestive of infection (e.g., fever)
- Headache worsening under observation

MUSCLE TENSION HEADACHE

DEFINITION

Diffuse pain in the head.

- *Episodic:* usually associated with some stressful event, of moderate intensity, self-limited and responds to nonprescription preparations
- *Chronic:* often occurs daily (must be present for at least 15 days per month for 6 months to be considered chronic); pain often bilateral, usually occipito-frontal and associated with contraction of muscles of the neck and scalp

CAUSES

- Stress or anxiety
- Poor posture
- Cervical osteoarthritis
- Intramuscular vasoconstriction of scalp muscles
- Depression (found in 70% of those with daily headache)
- Life-time prevalence: 88% in females, 69% in males, common in children 8–12 years of age

Risk Factors

- Excess caffeine intake
- Medications (e.g., long-term use of acetaminophen)
- Obstructive sleep apnea
- Family history

HISTORY

- History extremely vague
- No obvious relieving or precipitating factors identified
- Document medication use: type, frequency, amount, effect
- Often associated with abuse or overuse of medications
- 40% of patients have positive family history
- 60% of patients > 20 years of age at onset
- Pain becomes more constant and severe over time
- Stressful events aggravate symptoms

FEATURES OF HEADACHES

- Generalized
- Constant
- Dull, tight sensation
- Occasionally throbbing
- Present on rising in the morning
- Wax and wane during the day
- Prevent client from falling asleep, but never awaken client from sleep
- Medication affords only minimal or no relief

ASSOCIATED SYMPTOMS

- Nausea
- Anorexia
- Weight loss
- Dyspepsia
- Diarrhea
- Fatigue
- Early-morning awakening
- Concentration impaired
- Libido reduced (as in depression)

PHYSICAL FINDINGS

- Client in no distress, although may complain of headache at time of presentation
- Results of neurologic examination completely normal
- Muscular tightness in the neck, upper trapezius, occipital and frontal scalp muscles

DIFFERENTIAL DIAGNOSIS

Although most chronic headaches are benign, it is important to rule out other more serious problems:

- Caffeine dependency
- Nonprescription drug dependency (e.g., acetaminophen with or without codeine)
- Dental disease
- Post-traumatic headache
- Temporomandibular joint dysfunction
- Depression
- Cervical spondylosis
- Chronic sinusitis
- Temporal arteritis
- Migraine headache
- Eye problem
- Middle ear disease
- Severe anemia
- Hypoxia
- Hypertension
- Intracranial infection (meningitis)
- Intracranial tumor

COMPLICATIONS

- Interference with daily activities
- Dependence on analgesic medication
- Absenteeism from work or school
- Depression

DIAGNOSTIC TESTS

None.

MANAGEMENT

Goals of Treatment

- Identify symptoms suggestive of serious pathology
- Relieve symptoms

Appropriate Consultation

Consult physician if symptoms suggest serious pathology (e.g., neurologic deficit). Otherwise, treat conservatively and follow.

Nonpharmacologic Interventions

- Provide supportive environment
- It is important for success of therapy that caregiver be nonjudgmental
- Explore current life situation: encourage client to talk about worries, concerns, fears
- Discover areas of difficulty that could contribute to headaches
- Evaluate stress level
- Ice packs may help
- Massage therapy may help
- Rest in dark, quiet room may help
- Recommend decrease in use of caffeinated products

Client Education

- Counsel client about appropriate use of medications (dose, frequency, avoidance of overuse)
- Suggest stress-management strategies (e.g., relaxation techniques)

Pharmacologic Interventions

Analgesics:

acetaminophen (Tylenol) (**A class drug**), 500 mg, 1–2 tabs PO q4h prn

or

ibuprofen (Motrin) (**A class drug**), 200 mg, 1–2 tabs PO q4h prn

Monitoring and Follow-Up

Follow up in 1–2 weeks to assess response to interventions.

Referral

Refer to a physician if there is failure to respond to therapy or if there is concern about an underlying disorder.

CLUSTER HEADACHE

DEFINITION

Recurrent attacks of severe unilateral headaches around the eye and temple. Attacks last approximately 30–120 minutes and occur one to three times per day, at the same time of day, for up to 12 weeks; this pattern is typically followed by 1–24 months without an attack.

CAUSES

Unknown.

Risk factors

- Male > 30 years of age
- Possible relationship to previous head injury
- May be triggered by alcohol, nitroglycerine, disturbance in sleep cycle, emotion (anger), excessive physical activity

HISTORY

- Client usually male, older than mid-20s
- Cyclic or seasonal pattern to attacks
- Sudden onset of unilateral pain
- Headache usually begins without warning, often during sleep
- Begins as dull ache, which quickly increases to severe pain
- Peaks in 15 minutes
- Pain steady, boring, piercing and centered about one eye (retro-orbital)
- No aggravating or relieving factors
- Pain extends into adjacent cheek, temple, forehead
- Usually resolves within 30–120 minutes, leaving client fatigued
- Pain recurs later the same day or at same time next day
- Cycle repeats itself until "cluster" ends

Associated Symptoms during Attack

- Agitation: client may pace about
- Affected eye becomes red and tears
- Eyelid tends to droop
- Nose on unaffected side runs profusely
- Nausea in 40% of cases, but vomiting rare
- Perspiration

PHYSICAL FINDINGS

- Heart rate elevated during attack
- Bradycardia may be present in 43% of cases

During Attacks

- Acute distress
- Pale
- Diaphoretic
- Restless
- Ipsilateral nasal rhinorrhea
- Ptosis of affected eyelid
- Conjunctival redness and excessive tearing of affected eye

Between Attacks

- Client feels well (i.e., completely asymptomatic)
- Results of neurologic examination normal

DIFFERENTIAL DIAGNOSIS

- Temporal arteritis
- Subarachnoid hemorrhage (initial presentation)
- Episodic, long-lasting tension headaches
- Trigeminal neuralgia
- Acute glaucoma
- Sinusitis
- Pheochromocytoma

COMPLICATIONS

- Interference with daily activities
- Absenteeism from work or school
- Weight loss during "cluster"
- Depression
- Potential for drug abuse (e.g., analgesics)

DIAGNOSTIC TESTS

None.

MANAGEMENT

Goals of Treatment

- Relieve pain
- Prevent recurrence

Appropriate Consultation

Consult a physician for acute attack.

If symptoms are significant during an initial attack, serious pathology must be ruled out.

Nonpharmacologic Interventions

Client Education

- Explain expected course of disease and prognosis and how to avoid precipitants
- Counsel client about appropriate use of medications (dose, frequency, compliance, avoidance of overuse or abuse of analgesics)
- Counsel client about appropriate use of prophylactic medication
- Recommend avoidance of alcohol, bright light, anger, stressful activity or undue excitement during a cluster
- Recommend that client decrease smoking during a cluster, as smoking reduces response to drug treatment
- Counsel client about smoking cessation

Pharmacologic Interventions

Do not give analgesics in a previously undiagnosed client until you have consulted a physician, as these drugs may mask the progression of neurologic symptoms.

A trial of ergotamine tartrate–caffeine (Cafergot) (**B class drug**) or sumatriptan (Imitrex) (**B class drug**) is the usual first-line drug therapy.

Monitoring and Follow-Up

- Monitor medication compliance
- Assess effectiveness of prophylaxis
- Assess for depression
- Assess for analgesic abuse or dependence

Referral

- Refer all previously undiagnosed clients as soon as possible to a physician during an acute attack
- Clients with chronic recurrence of cluster headaches should be evaluated by a physician if symptoms are not controlled by prophylaxis

MIGRAINE HEADACHES

DEFINITION

Recurrent headaches due to vascular disturbances.

CAUSES

- Unknown
- Individual attacks may be triggered by specific foods (e.g., chocolate, cheese, smoked meats, alcohol), missing meals, menstrual cycle, oral contraceptives, fatigue, excessive sleep, stress or relief of stress, excessive or flickering light

Risk Factors

- Female
- Young age (10–30 years)
- Family history of migraine

HISTORY

- Regular or near regular perimenstrual or periovulatory timing
- Abatement of headache with sleep
- Prodrome may be present: irritability, mood swings, changes in energy level, food cravings, fluid retention
- Aura (including visual defects and sensory losses) may be present: precedes headache, lasts approximately 5–30 minutes, recedes with onset of headache (although sometimes aura and headache may overlap)

Pain of Headache

- Unilateral or diffuse
- Moderate to severe intensity
- Peaks within 1 hour
- Pulsating in nature (at onset or any time during attack)
- Rest in dark, quiet room helps
- Bending forward or moving head increases pain

Associated Symptoms

- Photophobia (aversion to light)
- Phonophobia (aversion to noise)
- Osmophobia (aversion to odors)
- Nausea and vomiting
- Diarrhea, constipation
- Chills, tremor, sweating

PHYSICAL FINDINGS

During Attack

- Moderate distress
- Pale
- Diaphoretic
- Scalp arteries may be distended
- Photophobia
- Scalp tenderness
- Results of neurologic exam usually normal during and between attacks

Criteria for Diagnosing Migraine without Aura

1. At least 5 attacks fulfilling criteria 2, 3, 4 and 5
2. Each attack, untreated or treated unsuccessfully, lasts 72 hours
3. Each attack has at least 2 of the following characteristics:
   - Unilateral most often, but 30% to 40% have bilateral pain
   - Pulsating quality (occurring at any time during the attack); 50% of those with migraines report non-throbbing pain; headache quality may vary over the course of the attack
   - Moderate or severe intensity, enough to interfere with daily activities
   - Pain aggravated by physical activity such as walking up or down stairs
4. During an attack at least one of the following symptoms is present:
   - Nausea and vomiting
   - Photophobia, phonophobia and osmophobia
5. There is no evidence from the client's history or physical examination of any other disease that might cause headaches

Criteria for Diagnosing Migraine with Aura

The criteria are the same as for migraine without aura, but also include symptoms of neurologic dysfunction (including visual disturbances) before or during attack.

DIFFERENTIAL DIAGNOSIS

- Disorders or infections of head and neck
- Systemic illness
- Toxic effects of drugs, alcohol, chemicals
- Intracranial lesion
- Stroke
- Drug-seeking behavior

COMPLICATIONS

- Family and marital dysfunction if headaches frequent
- Absenteeism from work or school
- Depression
- Drug addiction (e.g., to prescription analgesics)

DIAGNOSTIC TESTS

None.

MANAGEMENT

Goals of Treatment

- Identify and modify trigger factors
- Relieve symptoms
- Prevent recurrences

Appropriate Consultation

Consult physician if an acute attack is moderate to severe and is unresponsive to first-line drug therapy, or if attacks recur and are not controlled with current prophylactic regimen.

Severe Attack

Consult physician for medication orders.

Nonpharmacologic Interventions

Mild or Moderate Attack

- Rest in dark, quiet room
- Ice packs
- Pressure massage of the scalp
- Relaxation therapy
- Cognitive–behavioral therapy (e.g., stress management training)

Severe Attack

- Bed rest in dark, quiet room
- Nothing by mouth temporarily if vomiting is significant

Client Education

- Explain expected disease course and prognosis
- Counsel client about appropriate use of medications (dose, frequency, avoidance of overuse or abuse)
- Recommend regular rest and activities, appropriate diet
- Help client to identify trigger factors and then to attempt to reduce or eliminate them
- Help client to identify and avoid other causative factors (e.g., coffee, chocolate, alcohol, certain foods, oral contraceptives, nuts, cheese)

Adjuvant Therapy

Severe Attack

For severe attack only, start IV therapy with normal saline; adjust rate according to state of hydration.

Pharmacologic Interventions

Symptomatic Therapy, Mild or Moderate Attack

Analgesia for mild pain:

enteric-coated acetylsalicylic acid (ASA) (**A class drug**), 325 mg, 1–2 tabs PO q4h prn

or

ibuprofen (Motrin) (**A class drug**), 200 mg, 1–2 tabs PO q4h prn

Analgesia for moderate pain:

naproxen (Naprosyn) (**C class drug**), 250 mg, 1–2 tabs PO q6h prn

or

mefenamic acid (Ponstan) (**C class drug**), 250–500 mg q6h

or

*ASA with codeine (282, 292) (**C class drug**), 1–2 tabs PO q4h prn

or

*acetaminophen with codeine (Tylenol #2 or #3) (**C class drug**), 1–2 tabs PO q4h prn

*These combination medications can be used if clients do not respond to initial therapy with non-steroidal anti-inflammatory drugs (NSAIDs). They are to be used for short periods only. Overuse of such combination medications is one of the most prominent causes of rebound headache (a leading form of chronic daily headaches).

Other drug choice for moderate attacks:

sumatriptan (Imitrex) (**B class drug**) PO

Antiemetics for vomiting if necessary:

dimenhydrinate (Gravol) (**A class drug**), 50 mg PO q4–6h prn

Symptomatic Therapy, Severe Attack

Drug choices for pain control:

sumatriptan (Imitrex) (**B class drug**)

or

metoclopramide (Maxeran) (**B class drug**)

or

chlorpromazine (Largactil) (**B class drug**)

Avoid use of meperidine (Demerol), if at all possible. This drug should be used as a last resort only.

Prophylactic Therapy

Source: Guidelines for the diagnosis and management of migraine in clinical practice (Pryse-Phillips et al. 1997)

The principle underlying prophylaxis is to use the least amount of medication with the fewest side effects to control attacks until the preventive therapy can be stopped permanently.

Prophylaxis is indicated when:

- the migraine attacks are severe enough to affect the person's quality of life
- the person is experiencing three or more migraines per month that fail to respond adequately to abortive or symptomatic therapy

Recommended medications:

- β-blockers, e.g., propranolol (Inderal), atenolol (Tenormin)
- calcium-channel blockers, e.g., verapamil (Isoptin)
- serotonin receptor antagonists, e.g., pizotyline (Pizotifen)
- tricyclic analgesics, e.g., amitriptyline (Elavil)

Have client keep a log of headaches: characteristics, medications used and response to therapy.

Except in the more resistant cases, only one preventive drug should be used at a time.

The medication must be continued for an adequate period, usually several months, and withdrawn slowly to prevent rebound headaches. Some medications, especially calcium-channel blockers, may take up to 12 months to be effective.

If initial drug treatment is not effective, several medications should be tried in sequence.

Sometimes a combination of agents from different prophylactic groups is tried. If this approach fails, neurologic consultation should be considered.

Prophylactic medications are ineffective if the person is concurrently taking analgesics on a regular basis. Instruct client not to take headache medications other than those prescribed.

The client should be prepared to experience some side effects, to take the medication daily and to recognize that the drug therapy will need to be adjusted or changed until efficacious drug(s) and doses are identified.

The client should also expect to have some migraine attacks, although these will probably be less severe or less frequent than before.

Explain that prophylaxis is designed to be used for a number of months and then weaned. Some clients may need long-term therapy.

Instruct any female client to report if she becomes pregnant or is contemplating pregnancy, as some prophylactic drug therapies will have to be stopped.

Monitoring and Follow-Up

Mild or Moderate Attack

Encourage regular follow-up until headaches are effectively controlled; frequency of follow-up should be individualized to each person's unique circumstances.

Severe Attack

Monitor response to therapy and vital signs.

Referral

Mild or Moderate Attack

- Arrange follow-up with physician to discuss prophylactic therapy if headaches are frequent or severe enough to interfere with daily activities
- Referral for a neurologic examination may be needed if optimum first-line therapy and prophylaxis fail to control attacks

Severe Attack

Medevac may be required if attack is prolonged and unresponsive to therapy (a condition known as status migrainous).

TEMPORAL ARTERITIS (GIANT CELL)

DEFINITION

Inflammation of temporal arteries.

CAUSES

- Largely unknown
- Possibly autoimmune reaction

HISTORY

- Age > 50 years
- Client may initially complain of flu-like symptoms
- Headache unilateral or bilateral
- Headache located in temporal or periorbital area
- Onset gradual or sudden
- Pain slight and transient initially
- Pain becomes more severe (throbbing or boring) and constant over several days
- Not relieved by over-the-counter medications

Associated Symptoms

- Malaise
- Night sweats
- Fever
- Shoulder and back pain
- Reduced vision of eye on affected side

PHYSICAL FINDINGS

- Temperature may be mildly elevated
- Client appears mildly-to-moderately ill
- Visual acuity may be reduced on affected side
- Problem with visual acuity may progress to other eye
- Range of motion of shoulder(s) may be reduced; shoulder movement may be painful
- Shoulder joint may be tender
- Temporal artery may be firm, nodular, non-compressible, tender
- Temporal artery may be pulseless

DIFFERENTIAL DIAGNOSIS

- Other disorders of head and neck
- Systemic illness

COMPLICATIONS

- Blindness on affected side
- Progression to blindness of other eye
- Stroke
- Coronary occlusion
- Arterial insufficiency of upper extremities

DIAGNOSTIC TESTS

- Determine erythrocyte sedimentation rate (if test available) (will be elevated)

MANAGEMENT

Goals of Treatment

- Diagnose the problem
- Prevent complications

Appropriate Consultation

Consult a physician immediately if this diagnosis is suspected.

Pharmacologic Interventions

Oral prednisone may be initiated by the physician if transfer to hospital will be delayed.

Referral

Arrange transfer to hospital for further investigation and treatment as soon as possible (biopsy of temporal artery is needed to confirm diagnosis).

TRANSIENT ISCHEMIC ATTACK (TIA)

DEFINITION

Acute episode of temporary, focal loss of cerebral function that is vascular in origin. Onset is rapid, and symptoms are of variable duration, typically lasting 2–15 minutes but rarely as long as 24 hours. Most TIAs last less than 1 hour.

TIA is an important omen of impending stroke; one-third of all patients with TIA have a stroke within 5 years of the first event.

CAUSES

- Temporary reduction or cessation of cerebral blood flow
- Underlying problem: atherosclerosis of carotid or vertebrobasilar arteries

Risk Factors

- Advancing age
- Hypertension
- Diabetes mellitus
- Heart disease
- Cardiac arrhythmias (atrial fibrillation)
- Smoking
- Family history

HISTORY

- Usually one of above risk factors is present
- Attacks may occur several times a day or once or twice a year
- Symptoms generally similar for repeat attacks
- Identify previous symptoms of peripheral vascular disease, coronary artery disease
- Symptoms acute at onset
- Symptoms resolve completely in 24 hours
- Client remains conscious throughout attack
- Symptoms depend on affected blood vessel
- *Carotid artery:* unilateral symptoms, ipsilateral blindness, contralateral weakness or paresthesia, aphasia, headache (may follow attack)
- *Vertebrobasilar arteries:* confusion, vertigo, binocular blindness or diplopia, weakness or paresthesia of extremities, drop attacks in which client remains conscious but suddenly collapses
- Slurred speech may be present

PHYSICAL FINDINGS

Because TIA may be brief, the results of a physical examination may be entirely normal. Careful examination of the neurologic and cardiovascular systems is required. Look for evidence of atherosclerosis (e.g., peripheral vascular disease, heart disease).

- Blood pressure and heart rate often normal
- Pulse may be irregular (because of underlying atrial fibrillation)
- Hypertension may be present
- Client usually looks well
- Muscular weakness of affected side may be obvious or subtle
- Visual acuity may be reduced
- Balance may be slightly affected
- Confusion may be evident
- Look for old surgical scars from previous heart surgery
- Carotid artery thrill may be present
- Focal sensory deficits
- Focal motor deficits
- Deep tendon reflexes may be increased or decreased for first 24 hours after attack
- Carotid bruit(s) may be present
- Other peripheral arterial bruits may be present (e.g., aortic, iliac)
- Heart murmur may be present

DIFFERENTIAL DIAGNOSIS

Differential diagnosis includes anything that can cause decreased cerebral blood flow with cerebral ischemia or transient impairment of cerebral function.

- Hypotensive episode
- Bell's palsy
- Dissecting aortic aneurysm
- Heart disease
- Focal seizure
- Cerebrovascular accident
- Hypoglycemia
- Anemia

COMPLICATIONS

Future cerebrovascular accident or myocardial infarction.

DIAGNOSTIC TESTS

- Electrocardiography may be helpful
- Look for evidence of atrial fibrillation

MANAGEMENT

Goals of Treatment

- Modify risk factors
- Prevent future TIA or stroke

Appropriate Consultation

Consult a physician as soon as possible.

Nonpharmacologic Interventions

Client Education

- Explain disease course and expected outcome
- Counsel client about appropriate use of medications (dose, frequency, total amount, long-term use, side effects, precautions if also receiving anticoagulant therapy)
- Recommend that clients receiving anticoagulant therapy avoid foods high in vitamin K (e.g., yellow and green vegetables)
- For clients receiving anticoagulant therapy, stress importance of avoiding injury to extremities
- Offer lifestyle counseling on ways to reduce risk factors such as control of hypertension, smoking cessation, weight reduction, reduction of dietary fat, regular exercise

Pharmacologic Interventions

Start ASA therapy (for antiplatelet effects) unless otherwise contraindicated:

ASA (Aspirin) (**A class drug**), 325 mg PO od

Monitoring and Follow-Up

Follow up regularly to monitor symptoms and track progress in reducing risk factors; frequency of follow-up will depend on severity of symptoms and number of risk factors.

Referral

- If neurologic deficits are identified at the time of presentation, *manage as a stroke in progress* (*see "Cerebrovascular Accident (Stroke)," in next section, "Emergency Problems of the Central Nervous System*"); medevac to hospital as soon as possible
- Elective referral to a physician for investigation of underlying pathology can take place if the client is completely asymptomatic at presentation and the event is historical only

EMERGENCY PROBLEMS OF THE CENTRAL NERVOUS SYSTEM

DIFFERENTIAL DIAGNOSIS OF ACUTE UNCONSCIOUSNESS

Metabolic disturbances (mnemonic "AEIOU and sometimes S")

- A for anoxia
- E for ethanol intoxication
- I for insulin excess (hypoglycemia)
- O for overdoses (drugs)
- U for uremia
- S for seizure

Hypoperfusion of the brain

- Stroke
- Hypotension
- Hypovolemia
- Arrhythmias
- Head trauma

For detailed information on coma, *see "Coma (Not Yet Diagnosed)," in chapter 14, "General Emergencies and Major Trauma"*

MENINGITIS

DEFINITION

Infection of meninges.

CAUSES

- Viral or bacterial infection
- Most common bacterial causes in adults: *Hemophilus influenzae*, *Neisseria meningitides*, *Streptococcus pneumoniae*

Risk factors

- Alcoholism
- Chronic otitis media
- Sinusitis
- Mastoiditis
- Closed head injury
- Pneumococcal pneumonia
- Recurrent meningitis
- Immunocompromise

HISTORY

- Usually preceded by infection of upper respiratory tract
- High fever
- Headache, which becomes increasingly severe
- Headache made worse with movement, especially bending forward
- Sudden vomiting, often without preceding nausea
- Photophobia
- Changes in level of consciousness that progress from irritability, through confusion, drowsiness and stupor to coma
- Seizures may develop

PHYSICAL FINDINGS

Perform a full head and neck examination to identify a possible source of infection.

- Temperature elevated
- Heart rate elevated or bradycardia with raised intracranial and intraocular pressure
- Blood pressure normal (low if client is in septic shock)
- Client in moderate-to-acute distress
- Client flushed
- Altered level of consciousness
- Focal neurologic signs
- Photophobia
- Petechiae may be present
- Cervical nodes may be enlarged
- Brudzinski's sign
- Kernig's sign

DIFFERENTIAL DIAGNOSIS

- Bacteremia
- Sepsis
- Brain abscess
- Seizure

COMPLICATIONS

- Seizure
- Coma
- Blindness
- Deafness
- Palsies of cranial nerves III, VI, VII, VIII
- Death

DIAGNOSTIC TESTS

- Draw blood sample for complete blood count
- Draw three blood samples (15 minutes apart) for culture

It is important to do multiple cultures before initiating antibiotic therapy in meningitis. This increases the chance of isolating the organism.

- Obtain urine for urinalysis (routine and microscopy, culture and sensitivity)
- Obtain a throat swab for culture and sensitivity

MANAGEMENT

Goals of Treatment

- Control infection
- Prevent complications

Appropriate Consultation

Consult a physician immediately. If unable to contact physician, follow the guidelines below for IV antibiotics. Do not delay start of antibiotics if this diagnosis is suspected.

Nonpharmacologic Interventions

- Bed rest
- Nothing by mouth
- Insert indwelling urinary catheter (optional if client is conscious)

Adjuvant Therapy

Start IV therapy with normal saline; adjust rate according to state of hydration.

Do not overload with fluids, as this could cause brain edema.

Pharmacologic Interventions

Antipyretics to control fever:

acetaminophen (Tylenol) (**A class drug**), 325 or 500 mg, 1–2 tabs PO q4h prn

For adults, antibiotics (if no physician available):

ceftriaxone (Rocephin) (**D class drug**), 2 g IV stat

For immunocompromised clients (cancer, HIV, elderly or alcoholic):

ceftriaxone (Rocephin) (**D class drug**), 2g IV stat

and

ampicillin (Ampicin) (**D class drug**), 2 g IV (unless penicillin allergy is present)

Monitoring and Follow-Up

- Monitor ABC (airway, breathing, circulation) and vital signs q30–60min or more frequently as required
- Monitor carefully for development of neurologic symptoms
- Monitor intake and hourly urine output

Referral

Medevac as soon as possible.

SEIZURE DISORDER (CHRONIC)

DEFINITION

Sudden, temporary brain dysfunction due to abnormal electrical activity in the brain.

Types

- Generalized tonic, clonic (grand mal)
- Focal
- Absence (petit mal)
- Complex partial
- Partial
- Myoclonic
- Infantile spasm
- Unclassified (characterized by eye movements or chewing)
- Status epilepticus

CAUSES

- Epilepsy
- Drug-related causes (non-compliance with prescibed regimen, withdrawal syndromes, overdose, multiple drug abuse)
- Hypoxia
- Brain tumor
- Cerebral infection (e.g., meningitis)
- Metabolic disturbance (e.g., hypoglycemia, uremia, liver failure, electrolyte disturbance)
- Alcohol withdrawal
- Head injury
- Stroke

HISTORY

- One of causes listed above usually present
- Family history of seizure disorder
- Age at onset, frequency of seizure activity
- Sudden loss of consciousness or loss of motor control (or both)
- Description of seizure activity variable (depends on type)
- Loss of bowel and bladder control during active seizure (e.g., grand mal)
- History of aura before onset of seizure may be present
- Precipitating factors: alcohol use, street drug use, illness such as infection, poor compliance with seizure medications
- History of stroke, head trauma, hypoxia, neurologic infection, exposure to toxins, developmental problems

PHYSICAL FINDINGS

After Acute Seizure

- Temperature normal unless infection is present
- Heart rate elevated
- Blood pressure variable
- Postictal state if seizure has occurred recently (e.g., drowsiness, confusion, behavioral changes)
- Evidence of trauma
- Results of neurologic examination and examination of other systems depend on specific cause of seizure

When Not in Active Seizure State

The results of neurologic examination are usually normal.

DIFFERENTIAL DIAGNOSIS

- Epilepsy
- Drug-related problem (non-compliance with prescribed regimen, withdrawal syndromes, overdose, multiple drug abuse)
- Hypoxia
- Brain tumor
- Cerebral infection
- Metabolic disturbance (e.g., hypoglycemia, uremia, liver failure, electrolyte disturbance)
- Alcohol withdrawal
- Head injury
- Stroke

COMPLICATIONS

- Injuries during seizure or from a fall
- Hypoxia during seizure
- Status epilepticus
- Interference with normal lifestyle (e.g., work, driving, social interactions)

DIAGNOSTIC TESTS

Obtain electroencephalogram.

MANAGEMENT

Management depends on underlying cause and severity of symptoms.

Goals of Treatment

- Control seizures
- Prevent recurrence
- Allow person to return to normal lifestyle
- Achieve good adherence to treatment regimen over the long term
- Discontinue medications eventually with continued control of seizures

Appropriate Consultation

- If client is not in active seizure on arrival: consult physician immediately for any case of previously undiagnosed seizure and for anyone with history of breakthrough seizures
- If client is in active seizure on arrival, *see "Status Epilepticus (Acute Grand Mal Seizure)," this chapter*

Nonpharmacologic Interventions

- Assist client to identify and reduce or avoid trigger factors (e.g., alcohol use)
- Recommend regular meals and balanced nutrition
- Encourage stress reduction
- Recommend avoidance of fatigue
- Suggest relaxation therapy

Pharmacologic Interventions

Anticonvulsants are tailored to the specific type of seizure. Monotherapy is ideal, but 10% to 15% of patients need two or more medications. Poor compliance is the major cause of seizure recurrence.

Commonly Used Anticonvulsants (B class drugs)

- carbamazepine (Tegretol)
- clonazepam (Rivotril)
- gabapentin (Neurontin)
- lamotrigine (Lamictal)
- phenobarbital (Phenobarb)
- phenytoin (Dilantin)
- primidone (Mysoline)
- valproic acid (Depakene)
- vigabatrin (Sabril)

Monitoring and Follow-Up

- Follow up every 6 months if seizures are well controlled, more frequently if client is having breakthrough seizures
- Assess adherence to medication regimen
- Monitor serum drug levels every 6 months if stable, more frequently if necessary

Referral

- Refer electively for review by a physician at least annually if seizures are well controlled
- Refer urgently if client is having breakthrough seizures
- Consider neurologic follow-up if symptoms are not controlled on current medications

STATUS EPILEPTICUS (ACUTE GRAND MAL SEIZURE)

DEFINITION

State of epileptic seizure lasting more than 15 minutes or occurrence of repeated seizures without the patient regaining consciousness. If the seizure lasts more than 60 minutes and is untreated, status epilepticus is associated with significant morbidity and mortality.

CAUSE

- Unknown
- Inadequate absorption of anticonvulsants
- Noncompliance with medications
- Dosage of anticonvulsants reduced too rapidly

HISTORY

- Attack begins as seizure
- Episodes of tonic and clonic movements occur repeatedly without client regaining consciousness
- May go on for hours or days
- Can be fatal

PHYSICAL FINDINGS

- Temperature normal unless underlying infection is present
- Heart rate elevated, pulse may be irregular
- Respirations irregular (absent during seizure, present between seizures)
- Blood pressure elevated or low
- Oxygen saturation may be decreased
- Client unconscious
- Client pale or cyanotic
- Evidence of loss of bowel and bladder control
- Repeated episodes of tonic and clonic movements
- Foaming at mouth may be present
- Blood around or in mouth if client has bitten tongue
- Evidence of trauma

COMPLICATIONS

- Hypoxia
- Cardiac arrhythmia
- Brain damage
- Death

DIAGNOSTIC TESTS

- Monitor electrocardiogram (ECG) (if available) if client > 50 years of age
- Obtain blood sample for random blood glucose determination
- Obtain urine for urinalysis (routine and microscopy, culture and sensitivity)

MANAGEMENT

Goals of Treatment

- Protect airway
- Stabilize cardiorespiratory function
- Stop seizures

Nonpharmacologic Interventions

- Ensure airway is clear and patent
- Suction as necessary
- Insert oral pharyngeal airway
- Assist ventilation as needed with Ambu bag

Adjuvant Therapy

- Give oxygen 6–10 L/min; keep oxygen saturation > 97% to 98%
- Start IV therapy with normal saline; adjust rate according to state of hydration

Pharmacologic Interventions

Anticonvulsive therapy:

lorazepam (Ativan) (**D class drug**), 2 mg IV, administered over 1 min; repeat dose at 4-min intervals if seizure activity persists (maximum dose 8 mg)

If lorazepam is not available:

diazepam (Valium) (**D class drug**), 5 mg IV; repeat dose at 4-min intervals if seizure activity persists (maximum dose 20 mg)

Lorazepam is the better choice, as it has longer duration of action and is less likely to cause respiratory depression.

Administer diazepam with caution to clients who have received barbiturates, as the side effects of respiratory depression are additive.

Monitor closely for respiratory depression.

Appropriate Consultation

Consult a physician as soon as possible after emergency treatment, because long-acting anticonvulsants (e.g., phenytoin [Dilantin]) are also needed to stop seizure and prevent recurrence if recommended anticonvulsive therapy does not work.

Commonly used long-acting anticonvulsants:

phenobarbital (Phenobarb) (**B class drug**), 15 mg/kg IV at 25–50 mg/min; may be given IM

Respiratory depression caused by phenobarbital is additive to that of benzodiazepines, so intubation may be needed if phenobarbital is used.

phenytoin (Dilantin) (**B class drug**), 15 mg/kg IV at 1 mg/kg per minute (not to exceed 50 mg/min); dose should not exceed 1 g in adults; mix with normal saline (50 mL/500 mg for adults)

Monitoring and Follow-Up

- Identify focal neurologic deficits
- Observe for return to normal level of consciousness
- Monitor vital signs
- Monitor for continued seizure activity

Referral

Medevac as soon as possible.

CEREBROVASCULAR ACCIDENT (STROKE)

DEFINITION

Sudden onset of a focal neurologic deficit resulting from either infarction or hemorrhage within brain tissue. Eighty percent of strokes are ischemic, and about 25% are caused by cerebral emboli.

CAUSES

Infarction from Thrombus or Emboli

- *Progressing stroke:* unstable, progressing neurologic deficits
- *Completed stroke*: stable, non-progressing neurologic deficit

Risk Factors

- Atrial fibrillation
- Valvular heart disease (especially mitral stenosis and mitral prolapse)
- Coronary artery disease
- Recent myocardial infarction
- Ventricular aneurysm
- Carotid stenosis
- Peripheral vascular disease
- Smoking
- Hyperlipidemia
- Diabetes mellitus
- History of injection drug abuse (e.g., cocaine, amphetamines)

Intracranial Hemorrhage

- *Intracerebral hemorrhage:* hemorrhage in or around brain
- *Subarachnoid hemorrhage:* accounts for 5% to 10% of strokes

Risk Factors

- Hypertension
- Arteriovenous malformations

HISTORY

- Presence of one of the causes listed above
- Abrupt onset is suggestive of infarction, but must rule out brain abscess, tumor and subdural hematoma

Progressing Stroke

- Neurologic dysfunction evolving painlessly over several hours or days
- Headache absent
- Involves progressively more of the body
- Progression stepwise, with periods of stability; may be continuous

Consciousness may be reduced or altered

Completed Stroke

- Abrupt onset
- Symptoms maximal in a few minutes
- One-sided neurologic deficits

Consciousness may be reduced or altered

Intracranial Hemorrhage

- Suggested by coma, vomiting, severe headache, history of warfarin therapy, history of vascular anomaly (e.g., aneurysm, angioma), systolic blood pressure > 220 mm Hg, blood glucose ≥ 170 mg/dL (9.43 mmol/L) in nondiabetic client
- Subarachnoid hemorrhage suggested by new-onset, severe headache that may be followed by nausea and vomiting and loss of consciousness (transient or coma); however, client may have only headache and normal results on physical exam

PHYSICAL FINDINGS

- Heart rate may be elevated, pulse irregular
- Blood pressure may be normal, elevated or low
- Client in moderate-to-acute distress
- Client may be unconscious
- Mental confusion may be present
- One-sided weakness
- Aphasia may be present
- Bladder and bowel incontinence may be present
- Sensation may be reduced on affected side
- Muscle weakness on affected side
- Reflexes on affected side may be reduced or hyperactive
- Clonus may be present
- Carotid bruits may be present
- Heart murmur may be present

DIFFERENTIAL DIAGNOSIS

- Seizure disorder
- Subdural hematoma
- Head injury
- Tumor

COMPLICATIONS

- Inadequate ventilation
- Aspiration
- Seizures
- Disturbances in communication
- Acute urinary retention or urinary incontinence
- Bowel incontinence
- Deep vein thrombosis
- Skin breakdown (decubitus skin ulcers)
- Death

DIAGNOSTIC TESTS

- ECG may be helpful
- Look for atrial fibrillation

MANAGEMENT

Goals of Treatment

- Protect airway
- Ensure adequate ventilation

Nonpharmacologic Interventions

- Insert oral pharyngeal airway (if unconscious)
- Suction secretions prn
- Ventilate with Ambu bag at 12 bpm prn
- Nothing by mouth if stroke affects level of consciousness or impairs swallowing mechanism
- Insert urinary catheter if level of consciousness impaired

Adjuvant Therapy

- Give oxygen 6–10 L/min or more prn; keep oxygen saturation > 97% to 98%
- Start IV therapy with normal saline; adjust rate according to age, pre-existing medical problems, state of hydration and client's ability to take fluids

Do not overload with volume, especially if cerebral hemorrhage is suspected.

Appropriate Consultation

Consult a physician as soon as the client is stable.

Pharmacologic Interventions

- None specifically in the acute phase
- Do not attempt to reduce blood pressure, as elevated blood pressure is often compensatory, and a sudden drop in blood pressure could increase severity of stroke

Monitoring and Follow-Up

- Monitor vital signs, fluid intake and hourly urine output
- Monitor level of consciousness, changes in neurologic status
- Monitor for complications
- Monitor for decompensation of pre-existing medical problems

Referral

Medevac as soon as possible.

CHAPTER 9 – THE SKIN

Table of Contents

ASSESSMENT OF THE INTEGUMENTARY SYSTEM

HISTORY OF PRESENT ILLNESS AND REVIEW OF SYSTEM

GENERAL

The following characteristics of each symptom should be elicited and explored:

- Onset (sudden or gradual)
- Chronology
- Current situation (improving or deteriorating)
- Location
- Quality
- Timing (frequency, duration)
- Severity
- Precipitating and aggravating factors
- Relieving factors
- Associated symptoms
- Effects on daily activities
- Previous diagnosis of similar episodes
- Previous treatments
- Efficacy of previous treatments

CARDINAL SYMPTOMS

In addition to the general characteristics outlined above, additional characteristics of specific symptoms should be elicited, as follows.

Skin

- Changes in texture or color
- Unusual dryness or moisture
- Itching
- Rash
- Bruises, petechiae
- Changes in pigmentation
- Lesions
- Changes in moles or birthmarks

Hair

- Changes in amount, texture, distribution

Nails

- Changes in texture, structure

Other Associated Symptoms

- Site of onset
- Date(s) and site(s) of recurrence(s)
- Intermittent or continuous
- Influence of environmental or occupational factors

MEDICAL HISTORY (SPECIFIC TO INTEGUMENTARY SYSTEM)

- Allergic manifestation (e.g., asthma, hay fever, urticaria)
- Recent or current viral illness
- Recent or current bacterial illness
- Fever
- Allergies to drugs, foods, other chemical substances
- Medications (e.g., steroids, OCPs [oral contraceptive pills], antibiotics, OTCs [over-the-counter drugs])
- Immunosuppression (e.g., HIV/AIDS)
- Seborrheic dermatitis
- Psoriasis
- Diabetes mellitus

FAMILY HISTORY (SPECIFIC TO INTEGUMENTARY SYSTEM)

- Allergies (e.g., seasonal, to food)
- Seborrheic dermatitis
- Others at home with similar symptoms (e.g., rash)
- Psoriasis

PERSONAL AND SOCIAL HISTORY (SPECIFIC TO INTEGUMENTARY SYSTEM)

- Obesity
- Poor hygiene
- Hot or humid environment, poor environmental sanitation
- Stress (may precipitate flares of chronic skin problem such as psoriasis)
- Exposure to new chemicals (e.g., soaps), foods, pets, plants
- Emotional disturbance
- History of sensitive skin
- Others at home, work or school with similar symptoms
- Recent travel

PHYSICAL EXAMINATION

GENERAL APPEARANCE

- Apparent state of health
- Appearance of comfort or distress
- Color (e.g., flushed, pale)
- Nutritional status (obese or emaciated)
- State of hydration
- Match between appearance and stated age
- Vital signs (temperature may be elevated)

INSPECTION AND PALPATION OF THE SKIN

- Color
- Temperature, texture, turgor
- Dryness or moisture
- Scaling
- Pigmentation
- Vascularity (erythema, abnormal veins)
- Bruises, petechiae
- Edema (dependent, facial)
- Induration
- Individual lesions (color, type, texture, general pattern of distribution, character of edge, whether raised or flat)
- Hair (amount, texture, distribution)
- Nails (shape, texture, discoloration, grooving)
- Mucous membranes
- Flexural folds

OTHER ASPECTS

- Examine lymph nodes
- Examine area distal to enlarged lymph nodes

MAJOR TYPES

The major types and characteristics of skin lesions are given in Table 1.

Jaundice, spider angiomata, palmar erythema or a necklace of telangiectasia may indicate alcoholic liver disease. Petechiae or purpura suggest a coagulation problem.

Table 1: Major Types of Skin Lesions

Type of Lesion	Characteristicsa
Atrophy	Skin thin and wrinkled
Crust (scab)	Dried serum, blood or pus
Erosion	Loss of part or all of the epidermis
Excoriation	Linear or hollowed-out crusted area, caused by scratching, rubbing or picking
Lichenification	Skin thickened, skin markings accentuated (e.g., atopic dermatitis)
Macule	Flat, circumscribed, discolored spot; size and shape variable (e.g., freckle, mole, port-wine stain)
Nodule	Palpable, solid lesion that may or may not be elevated (keratinous cyst, small lipoma, fibroma)
Papule	Solid elevated lesion (e.g., wart, psoriasis, syphilitic lesion, pigmented mole)
Pustule	Superficial elevated lesion containing pus (impetigo, acne, furuncle, carbuncle)
Scales	Heaping-up of the horny epithelium (e.g., psoriasis, seborrheic dermatitis, fungal infection, chronic dermatitis)
Telangiectasia	Fine, often irregular red line produced by dilatation of a normally invisible capillary
Vesicle	Circumscribed, elevated lesion < 5 mm in diameter containing clear fluid; larger vesicles are classified as bullae or blisters (e.g., insect bite, allergic contact dermatitis, sunburn)
Ulcer	Loss of epidermis and at least part of the dermis
Wheal	Transient, irregularly shaped, elevated, indurated, changeable lesion caused by local edema (e.g., allergic reaction to a drug, a bite, sunlight)

COMMON PROBLEMS OF THE SKIN

ABSCESS (SUBCUTANEOUS)

DEFINITION

A collection of pus in subcutaneous tissues.

CAUSES

– Infection with *Staphylococcus aureus*, anaerobes, other microorganisms
– Predisposing factors: folliculitis, cellulitis, trauma, incision

HISTORY

– Pain, swelling, redness at infected site
– Fever may be present
– Injury or trauma

PHYSICAL FINDINGS

– Temperature may be elevated
– Heart rate may be elevated
– Client may look ill
– Localized redness, swelling
– Lesion may be draining
– Localized induration
– Tenderness
– Fluctuance (may be difficult to palpate if abscess is deep)
– Regional lymph nodes may be enlarged and tender
– Size of abscess often difficult to estimate; abscess usually larger than suspected

DIFFERENTIAL DIAGNOSIS

Cellulitis.

COMPLICATIONS

Sepsis.

DIAGNOSTIC TESTS

Swab discharge for culture and sensitivity.

MANAGEMENT

For a **small, simple, uncomplicated abscess** that is not ready for incision and drainage, appropriate treatment includes cleaning and protecting the abscess and oral administration of a course of antibiotics. For **complicated, extensive abscesses, abscesses in critical body areas and those in an immunocompromised person**, IV antibiotic treatment is needed, as well as prompt referral.

Goals of Treatment

– Control infection
– Prevent complications

Appropriate Consultation

Consult a physician if client is febrile or appears acutely ill; if extensive cellulitis, lymphangitis or adenopathy is present; or if an abscess is suspected or detected in a critical region (e.g., head or neck, hands, feet, perirectal area) or in an immunocompromised client (e.g., diabetic person).

Nonpharmacologic Interventions

Small, Uncomplicated Abscess

– Soak abscess with warm saline compresses four times a day
– Cover any open areas with a sterile, non-adherent dressing (e.g., Telfa)
– Rest, elevate and gently splint infected limb

Severe Abscess

– Bed rest
– Cover any open areas with a sterile, non-adherent dressing (e.g., Telfa)
– Rest, elevate and gently splint infected limb

Adjuvant Therapy

Severe Abscess

Start IV therapy with normal saline; adjust rate according to state of hydration and age

Pharmacologic Interventions

Small, Uncomplicated Abscess

Antibiotics:

cloxacillin (Orbenin) (**A class drug**), 250–500 mg PO qid for 10 days

or

cephalexin (Keflex) (**C class drug**), 250 mg PO qid for 10 days

For clients with allergy to penicillin:

erythromycin (E-Mycin) (**A class drug**), 250–500 mg PO qid

Antipyretics and analgesia:

acetaminophen (Tylenol) (**A class drug**), 325 or 500 mg, 1–2 tabs PO q4–6h prn

Severe Abscess

IV antibiotics such as the following may be started before transfer *if ordered by a physician*:

cefazolin (Ancef) (**B class drug**), 0.5–1.0 g IV q6–8h

If abscess is in the perirectal area:

cefoxitin (Mefoxin) (**B class drug**), 1 g IV q8h

and

metronidazole (Flagyl) (**B class drug**), 7.5 mg/kg IV q6h

For clients with allergy to penicillin:

erythromycin (Erythrocin) (**A class drug**), 500 mg IV q8–12h (maximum dose 20 mg/kg daily)

Monitoring and Follow-Up

Small, Uncomplicated Abscess

Follow up daily until infection resolves.

Severe Abscess

Monitor vital signs frequently, and watch for sepsis.

Referral

Small, Uncomplicated Abscess

Referral usually not required.

Severe Abscess

Medevac as soon as possible, for IV drug therapy and possible surgical drainage.

CELLULITIS

DEFINITION

Acute, diffuse, spreading infection of the skin, involving the deeper layers of the skin and the subcutaneous tissue.

CAUSES

- Bacteria: most commonly *Staphylococcus* or *Streptococcus*
- Predisposing factors: local trauma, furuncle, underlying skin ulcer

If a bite was the original trauma, different organisms are involved. *See "Skin Wounds," in "Dermatological Emergencies," below, this chapter.*

HISTORY

- Localized pain
- Redness
- Swelling
- Area increasingly red, warm to touch, painful
- Area around skin lesion also tender
- Mild fever and headache may be present

PHYSICAL FINDINGS

- Temperature may be elevated
- Heart rate may be elevated
- Redness, swelling
- Advancing edge of lesion diffuse, not sharply demarcated
- Small amount of purulent discharge may be present
- Skin surrounding lesion red and swollen, may be tense
- Edema
- Tenderness
- Induration (firm to touch)
- Regional lymph nodes may be enlarged, tender

DIFFERENTIAL DIAGNOSIS

- Folliculitis
- Foreign body
- Abscess

COMPLICATIONS

- Extension of infection
- Abscess
- Sepsis

DIAGNOSTIC TESTS

Swab any wound discharge for culture and sensitivity.

MANAGEMENT

If the condition is **mild**, physician consultation and referral are not usually required, and the client can be treated on an outpatient basis. If the condition is **moderate to severe**, IV therapy and referral are necessary.

Goals of Treatment

- Control infection
- Identify formation of abscess

Appropriate Consultation

Mild Cellulitis

Consultation not usually required.

Moderate-to-Severe Cellulitis

Consult physician if any of the following conditions pertain:

- cellulitis is moderate to severe (e.g., large area is involved)
- cellulitis is progressing rapidly, which may indicate an invasive streptococcal infection
- cellulitis involves hands, feet, face or a joint
- client is immunocompromised (e.g., has diabetes mellitus)
- client is febrile, appears acutely ill or shows signs of sepsis

Nonpharmacologic Interventions

Mild Cellulitis

- Apply warm saline compresses to affected areas qid
- Elevate, rest and gently splint the affected limb

Client Education

- Counsel client about appropriate use of medications (dose, frequency, compliance)
- Encourage proper hygiene of all skin wounds to prevent future infection
- Stress importance of close follow-up

Adjuvant Therapy

Mild Cellulitis

If original lesion caused by trauma, check for tetanus vaccination; if not up to date, administer tetanus vaccine.

Moderate-to-Severe Cellulitis

- Start IV therapy with normal saline to keep vein open; adjust rate according to state of hydration and age
- If original lesion caused by trauma, check tetanus vaccination record; if not up to date, administer tetanus vaccine

Pharmacologic Interventions

Mild Cellulitis

Oral antibiotics:

cloxacillin (Orbenin) (**A class drug**), 250 mg PO qid for 10 days

or

erythromycin (E-Mycin) (**A class drug**), 250 mg PO qid for 10 days

or

cephalexin (Keflex) (**C class drug**), 250–500 mg PO qid for 10 days

Distinctive signs of streptococcal infection are rare, making diagnosis difficult. Therefore, penicillin should be *added* to this regimen:

penicillin (Pen Vee K) (**A class drug**) 300 mg qid for 10 days

For clients with allergy to penicillin:

erythromycin (E-Mycin) (**A class drug**), 250–500 mg PO qid for 10 days

Antipyretics and analgesia:

acetaminophen (Tylenol) (**A class drug**), 500 mg, 1–2 tabs PO q4–6h prn

Moderate-to-Severe Cellulitis

Administer IV antibiotics only as directed by a physician.

Antipyretics and analgesia:

acetaminophen (Tylenol) (**A class drug**), 500 mg, 1–2 tabs PO q4–6h prn

Monitoring and Follow-Up

Mild Cellulitis

- Follow up daily to ensure that infection is controlled
- Instruct client to return for reassessment immediately if lesion becomes fluctuant, if pain increases or if fever develops

Moderate-to-Severe Cellulitis

Monitor vital signs and affected area frequently for progression.

Referral

Moderate-to-Severe Cellulitis

Medevac as soon as possible.

FURUNCLE AND CARBUNCLE

DEFINITION

- *Furuncle or boil*: an acute, tender perifollicular inflammatory nodule
- *Carbuncle*: a cluster of furuncles, generally larger and deeper

CAUSES

- Staphylococcal infection of several hair follicles
- Predisposing factors: obesity, diabetes mellitus, poor hygiene, excessive friction or perspiration, seborrhea, local trauma (e.g., from plucking hairs), use of systemic steroids

HISTORY

- Usually found on the neck, axilla, breasts, face and buttocks
- Local redness, swelling, pain, tenderness
- Begins as a small nodule, quickly becomes a large pustule
- If poked, purulent, sanguineous material drains
- May occur singly or in groups
- May be recurrent
- Fever absent

PHYSICAL FINDINGS

- Nodule or pustule 5–30 mm in diameter
- Deep red in color
- Central area may spontaneously drain pus
- Carbuncle may present as red mass with multiple draining sinuses in area of thick, inelastic tissue (e.g., posterior neck, back, thigh)
- Lesion(s) warm, tender to touch
- May be fluctuant
- Regional lymph nodes usually not enlarged or tender

DIFFERENTIAL DIAGNOSIS

- Cellulitis
- Abscess

COMPLICATIONS

- Scarring
- Spread of infection (e.g., lymphangitis, lymphadenitis)
- Abscess
- Recurrence

DIAGNOSTIC TESTS

- Swab discharge for culture and sensitivity
- Determine blood glucose level if infection is recurrent or if symptoms suggestive of diabetes mellitus are present

MANAGEMENT

Goals of Treatment

- Control infection
- Prevent recurrence
- Identify predisposing underlying conditions (e.g., diabetes mellitus)

Appropriate Consultation

Consult physician if a large furuncle or carbuncle is present, as surgical drainage may be needed.

Nonpharmacologic Interventions

- Apply warm saline compresses to area at least qid (this may lead to resolution or spontaneous drainage if the lesion or lesions are mild)
- Cover area with a sterile, non-adherent dressing
- If area is fluctuant and pointing, incise lesion with a single stab wound and allow pus to drain; some of the pain and tenderness will resolve spontaneously with drainage of pus

Client Education

- Counsel client about appropriate use of medications (dose, frequency)
- Encourage proper hygiene of the area
- Stress importance of regular skin cleansing to prevent future infection
- Recommend that client avoid picking or squeezing the lesions
- Instruct clients with recurrent disease to bathe area bid with a mild antiseptic soap to help prevent recurrences

Pharmacologic Interventions

Antibiotics if infection is moderate or severe:

cloxacillin (Orbenin) (**A class drug**), 250 mg PO qid for 7–10 days

For clients with allergy to penicillin:

erythromycin (E-Mycin) (**A class drug**), 250 mg PO qid for 7–10 days

Monitoring and Follow-Up

- Follow up in 2 days and at 7–10 days
- Instruct client to return immediately for reassessment if lesion becomes fluctuant, if pain increases or if fever develops

Referral

Arrange elective follow-up with physician if infections recur.

IMPETIGO

DEFINITION

Highly contagious superficial bacterial infection of skin.

CAUSES

- *Streptococcus*, *Staphylococcus* or a mixture of both
- Predisposing factors: local trauma, insect bites, skin lesions from other disorders (e.g., eczema, scabies, pediculosis)

HISTORY

- More common on face, scalp and hands, but may occur anywhere
- Involved area is usually exposed
- Usually occurs during summer
- New lesions usually due to auto-inoculation
- Rash begins as red spots, which may be itchy
- Lesions become small blisters and pustules, which rupture and drain
- Discharge dries to form characteristic golden yellow crusts
- Lesions painless
- Fever and systemic symptoms rare
- Mild fever may be present in more generalized infections

PHYSICAL FINDINGS

- Thick, golden yellow, crusted lesion on a red base
- Numerous skin lesions at various stages present (vesicles, pustules, crusts, serous or pustular drainage, healing lesions)
- Bullae may be present
- Lesions and surrounding skin may feel warm to touch
- Regional lymph nodes may be enlarged, tender

DIFFERENTIAL DIAGNOSIS

- Infected eczema, contact dermatitis, scabies
- Herpes simplex infection with blisters or crusts
- Chickenpox infection with blisters or crusts
- Shingles (herpes zoster) with blisters or crusts
- Bullous insect bites

COMPLICATIONS

- Localized or widespread cellulitis
- Post-streptococcal glomerulonephritis (uncommon in adults)

DIAGNOSTIC TESTS

None.

MANAGEMENT

Goals of Treatment

- Control infection
- Prevent auto-inoculation
- Prevent spread to other household members

Appropriate Consultation

Consult a physician if there is failure to respond to therapy.

Nonpharmacologic Interventions

- Apply warm saline compresses to soften and soak away crusts qid and prn
- Cleanse with antiseptic antimicrobial agent to decrease bacterial growth

Client Education

- Counsel client about appropriate use of medications (dose, frequency, compliance)
- Recommend proper hygiene (i.e., daily washing with prescribed soap)
- Counsel client about prevention of future episodes
- Suggest strategies to prevent spread to other household members (e.g., proper hand-washing, use of separate towels)

Pharmacologic Interventions

Apply topical antibiotic preparation after each soaking:

bacitracin ointment (Baciguent) (**A class drug**), qid

or

mupirocin ointment (Bactroban) (**A class drug**), qid

or

fusidic acid ointment or cream (Fucidin) (**A class drug**), qid

Oral antibiotics may be necessary if there are multiple lesions that appear infected:

cloxacillin (Orbenin) (**A class drug**), 250 mg PO qid for 10 days

or

erythromycin (E-Mycin) (**A class drug**), 250 mg PO qid for 10 days

For clients with allergy to penicillin:

erythromycin (E-Mycin) (**A class drug**), 250 mg PO qid for 10 days

Monitoring and Follow-Up

– Follow up in 2–3 days to assess response to treatment
– Instruct client to return for reassessment if fever develops or infection spreads despite therapy

Referral

Not usually necessary unless complications develop.

ECZEMA (ATOPIC DERMATITIS)

DEFINITION

Chronic, itchy, inflammatory condition of the skin

CAUSES

– Largely unknown
– Inherited skin sensitivity
– Allergy

HISTORY

– Begins in infancy
– May last throughout entire life
– Pattern in adulthood differs from that in infancy and childhood
– Periods of remission and exacerbation
– Family history of eczema, allergies and asthma common
– Characterized chiefly by itching and scaling
– Eruptions of small groups of vesicles may occur
– Scratching leads to rupture of vesicles
– Clear serous fluid oozes from vesicles, leading to development of rash
– Vicious cycle of itch, scratch, rash, itch
– Usually affects face, neck, upper arms and back, flexural folds, feet
– May be more generalized
– Secondary bacterial infection common
– Specific irritating agents can be identified
– Wool, solvents, perfumed creams, lotions, soaps bothersome
– Allergies, asthma, contact dermatitis often present

PHYSICAL FINDINGS

– Skin scaly, dry, thickened (lichenified)
– Fissures may be present
– Excoriations
– Mild redness and edema often present
– Vesicles may be present in some areas
– Lesions may be weeping
– Pustular or crusted lesions may be present
– Some areas of skin usually show chronic changes (thin skin, scarring, lichenification)

DIFFERENTIAL DIAGNOSIS

– Seborrheic dermatitis
– Dry skin (winter itch)
– Allergic contact dermatitis
– Psoriasis
– Scabies

COMPLICATIONS

– Secondary bacterial infection
– Chronic irritation of skin
– Side effects of medication (e.g., steroid preparations)

DIAGNOSTIC TESTS

None.

MANAGEMENT

Goals of Treatment

– Relieve symptoms
– Prevent secondary infection

Appropriate Consultation

Consult a physician if no response to therapy after 1 week.

Nonpharmacologic Interventions

- Offer support to client, as it can be difficult to live with this irritating and cosmetically unattractive condition
- Advise client to stop using steroid preparations once acute lesions have healed, since steroids do not have any preventive benefit and may further irritate and damage skin
- Assist client to identify precipitating and aggravating factors, and encourage avoidance
- If lesions are wet, promote drying and cooling with compresses qid prn (aluminum acetate [Burrow's solution] or normal saline)
- If lesions are dry, promote lubrication with Glaxal base, Nivea cream or petroleum jelly (Vaseline) bid, after bathing and prn

Client Education

- Counsel client about appropriate use of medications (dose, frequency, application)
- Encourage proper hygiene to prevent secondary bacterial infection
- Recommend loose-fitting cotton clothing
- Recommend avoidance of coarse materials and wool
- Recommend avoidance of overheating
- Recommend avoidance of irritants at work and at home
- Recommend use of a soap substitute (e.g., Aveeno) and avoidance of soaps
- Suggest that cotton gloves be worn inside rubber gloves when client works with liquids
- Suggest that greasy lubricants be applied within minutes of leaving shower or bath to "lock in" moisture

Pharmacologic Interventions

Reduce inflammation if itch moderate or severe:

hydrocortisone 0.5% cream or ointment (Unicort) (**A class drug**), tid for 1–2 weeks

Gels and creams are used for acute, weeping eruptions. Ointments are used for dry or lichenified lesions. Lotions are used for hairy areas.

Relieve itch with oral antihistamines:

hydroxyzine (Atarax) (**A class drug**), 10–25 mg PO hs and bid prn

Start with 10 mg if client is small, elderly or taking anxiolytics. Sedative effect of hydroxyzine is useful to break the itch–scratch cycle.

Monitoring and Follow-up

Follow up in 1–2 weeks to assess response. Advise client to return sooner if there are signs of infection developing.

Referral

Arrange elective follow-up with a physician if there is no response to treatment.

PEDICULOSIS (LICE INFESTATION)

DEFINITION

Infestation with lice.

CAUSES

There are 3 types: head lice, body lice and pubic lice.

Risk Factors

- Crowded housing (e.g., shared beds), crowded schools
- High pediatric population
- Failure to recognize an infestation
- Faulty application of treatments
- Failure to treat close contacts simultaneously
- Failure to eradicate lice from linens and clothing at time of treatment
- Lack of running water, which can predispose to poor hygiene and secondary skin infection

HISTORY

- *Head lice*: involve scalp
- *Body lice*: involve body
- *Pubic lice*: involve pubic area and may be found in hairs of abdomen, thighs, axilla, eyebrows, eyelashes
- Severe itching of involved area
- Excoriation of skin
- Secondary bacterial infection may occur
- Client may find lice or nits on bedclothes, in seams of clothing

PHYSICAL FINDINGS

- Small gray–white nits cemented to base of hair shafts
- Lice may be visualized
- Excoriation of skin

DIFFERENTIAL DIAGNOSIS

- Dandruff

COMPLICATIONS

- Recurrent infestation
- Skin infection

DIAGNOSTIC TESTS

None.

MANAGEMENT

Goals of Treatment

- Eradicate infestation
- Prevent recurrences
- Prevent spread to close contacts

Nonpharmacologic Interventions

- Remove dead lice and nits with tweezers or nit comb
- Avoid irritation of eyes and mucous membranes
- Remove nits on eyelashes with petroleum jelly (nits become coated, and ova die from suffocation)
- Instruct client to place small amount of petroleum jelly on tips of fingers, then close eyes and rub petroleum jelly into lids and brows; repeat bid or tid for 4 or 5 days
- Examine all family members and close personal contacts, including schoolmates and daycare contacts, and treat if infested
- Also treat anyone who shares a bed with the person who has head lice

Client Education

- Counsel client about proper use of medication and side effects
- Recommend that combs, brushes, hats, coats, bedding and clothing of all household members be washed in warm soapy water
- Recommend avoidance of sharing of combs, brushes, hats, etc.
- Suggest that mattresses (which can harbor lice) be taken outside, sprayed with Raid insecticide and then left outside for the day

Pharmacologic Interventions

Antiparasitic shampoo agent for head lice (apply topically and massage in thoroughly for 10 minutes, then rinse):

permethrin (Nix) cream rinse (**A class drug**)

or

pyrethrin shampoo (R&C shampoo) (**A class drug**)

Monitoring and Follow-Up

Follow up in 7 days. Shampoo treatment may be repeated 7–10 days after original application.

Referral

Usually not necessary.

SCABIES

DEFINITION

Infestation of the skin with a mite parasite.

CAUSE

Sarcoptes scabiei.

Risk Factors

- Failure to recognize an infestation
- Faulty application of treatment regimens
- Failure to treat close contacts
- Failure to eradicate mites from clothing and bed linen

The Aboriginal population is particularly at risk because of a number of additional factors:

- Crowded housing, shared beds, crowded schools and daycare centers
- High pediatric population
- Reduced access to medical or nursing care
- Lack of running water, which may predispose to poor hygiene and secondary skin infection

HISTORY

- Severe itching
- Itching generally worse at night
- Rash of hands, feet, flexural folds
- Transmitted by intimate or sexual contact with infected person
- Transmitted by clothes
- Symptoms may take 2–3 weeks to develop after contact with mite
- Symptoms are due to hypersensitivity to mite and its products

PHYSICAL FINDINGS

- Usually affects interdigital web spaces, flexures of wrists and arms, axilla, belt line, lower folds of buttocks, genitalia, areolae of nipple
- Diffuse red rash
- Primary lesions: papules, vesicles, pustules, burrows
- Secondary lesions: scabs, excoriations, crusts, nodules, secondary infection
- Lesions in various stages present at the same time
- Secondary lesions may predominate
- Burrows (gray or flesh-colored ridges 5–15 mm long) may be few or many
- Burrows commonly seen on anterior wrist or hand and in interdigital web spaces

DIFFERENTIAL DIAGNOSIS

- Pediculosis
- Impetigo
- Eczema
- Contact and irritant dermatitis

COMPLICATIONS

- Secondary bacterial infection

DIAGNOSTIC TESTS

None.

MANAGEMENT

Goals of Treatment

- Eradicate infestation
- Control secondary infection
- Relieve symptoms

Appropriate Consultation

Consult physician if unsure of diagnosis.

Nonpharmacologic Interventions

Client Education

Counsel client about proper use and side effects of medication.

Control Measures

- Prophylactic therapy essential for all household members, since signs of scabies may not appear for 1–2 months after the infection is acquired
- Treat all household members at the same time to prevent re-infection
- All bed linen (sheets, pillow slips) and clothing worn next to the skin (underwear, T-shirts, socks, jeans) should be laundered in a hot soapy wash and dried with a hot drying cycle, as available
- If hot water is not available, place all bed linen and clothing into plastic bags and store away from family for 5–7 days, as the parasite cannot survive beyond 4 days without skin contact
- Placing bedding outside in the cold or in ultraviolet light will also help
- Children may return to daycare or school the day after treatment is completed
- Healthcare workers who have had close contact with clients with scabies may themselves require prophylactic treatment
- Community education, aimed at early recognition and awareness of scabies, is important
- In widespread scabies epidemics, prophylactic treatment of a whole community may be optimal management

Pharmacologic Interventions

Scabicide cream or lotion, to be applied to entire body, from chin to toes (emphasize that scabicide must be applied in skin creases, between fingers and toes, between buttocks, under breasts and to external genitalia):

Permethrin 5% dermal cream (Nix) (**A class drug**), (drug of choice)

Leave on skin for 8–14 hours. A single application is usually curative but medication may be reapplied after 1 week if symptoms persist.

The safety of permethrin in pregnant and lactating women has not been established.

Lindane cream or lotion is an alternative when permethrin 5% is unavailable:

lindane lotion (Kwellada) (**A class drug**)

Leave lotion on overnight. Wash lotion off after 12 hours and repeat application in 24 hours. Put on clean clothes.

Lindane should be used with caution in pregnant and lactating women. Topical antiparasitic agents can cause dermatitis if used incorrectly (i.e., if overused).

Pruritus may be a problem particularly at night. Instruct client that itch will persist for up to 2 weeks. To manage itching:

hydroxyzine (Atarax) (**A class drug**), 10–25 mg PO bid and hs prn

Monitoring and Follow-Up

- Follow up in 1 week to assess response to treatment
- Advise client to return immediately if signs of secondary infection develop

Referral

Rarely necessary if original diagnosis is correct and adequate eradication treatment is followed by the client and his or her contacts.

RINGWORM (TINEA)

DEFINITION

Superficial infection of skin.

– *On feet:* tinea pedis (athlete's foot)
– *In groin:* tinea cruris (jock itch)
– *On body:* tinea corporis

CAUSES

Fungi that invade dead tissues such as the stratum corneum, nails and hair (dermatophytes)

HISTORY AND PHYSICAL FINDINGS

The history and physical findings for various forms of tinea are given in Table 2.

DIFFERENTIAL DIAGNOSIS

– Soft corn
– Wart
– Seborrheic dermatitis
– Candidal infection of foot or groin
– Local chafing or irritation of groin
– Contact or allergic dermatitis
– Psoriasis

COMPLICATIONS

Secondary bacterial infection (particularly with tinea pedis).

DIAGNOSTIC TESTS

Take skin scrapings for mycologic investigation (fungal culture).

MANAGEMENT

Goals of Treatment

– Relieve symptoms
– Eradicate infection

Appropriate Consultation

Consult a physician if there is failure to respond to an adequate trial of antifungal therapy.

Nonpharmacologic Interventions

Apply compress (Burrow's solution) bid or tid to dry and relieve itch (for tinea pedis and tinea cruris only).

Table 2: History and Physical Findings for Various Forms of Tinea

Type	History	Physical Findings
Tinea pedis	Affects feet	Scaling of lateral interdigital areas
	Itch severe	Moist, whitened, macerated, cracked skin may be present
	Scaling and redness, mainly between toes	Skin peels off easily with red, raw, tender area underneath
	Foul odor may be present	One or several small blisters may be present
	Area may be moist, whitened, macerated, cracked	Sole of foot may be involved, with marked scaling
	Skin peels off easily, with red, tender area underneath	Fissures may become secondarily infected (cellulitis)
	One or several small vesicles may be present	
	Vesicles rupture leaving a "collarette" of scales	
	May involve sole of foot with marked scaling (itch minimal)	
Tinea cruris	Affects groin	Involves crural areas and upper inner thigh
	Common in men	Scaly reddish brown lesion
	Itch mild to severe	Sharply defined margin
	Begins as erythema of crural fold	Central clearing absent
	Spreads outward	Groin, thigh, buttock may be involved
	May spread onto thighs or buttocks	May be bilateral or unilateral
	Scrotum and penis usually not affected	Scrotum and penis usually not affected
	Often spread by infected towel	
	Often associated with tinea pedis	
	Predisposing factors: excessive sweating, diabetes mellitus, friction	
Tinea corporis	Affects any smooth, nonhairy part of body	Lesions variable in size
	Scaly, circular or oval skin lesions	Typically a well-circumscribed circular or oval patch
	Frequently itchy	Reddish pink and scaly
	May be asymptomatic	Central clearing
		Accentuation of redness at outer border
		Margins scaly, vesicular or pustular

Client Education

- Recommend elimination of moisture and heat
- Suggest that client modify socks and footwear
- Recommend avoidance of restrictive clothing, nylon underwear, prolonged wearing of wet bathing suit or work clothes
- Counsel client about appropriate use of medications (dose, frequency, compliance)
- Recommend proper hygiene (client should change socks frequently and avoid wearing rubber shoes)

Pharmacologic Interventions

For tinea pedis and tinea cruris, topical antifungal agent for at least 2 weeks; continue until 1 week after resolution of lesions:

miconazole skin cream (Monistat) (**A class drug**), bid or tid

or

clotrimazole skin cream (Canesten) (**A class drug**), bid or tid

or

tolnaftate cream or powder (Tinactin) (**A class drug**), bid or tid

Tolnaftate powder has additional drying benefits.

For tinea corporis, apply one of these topical antifungal agents for 2–4 weeks.

Monitoring and Follow-Up

Follow up in 2 weeks to ensure resolution.

Referral

Refer to physician if fungal infections are recurrent, if they develop in an immunosuppressed or diabetic client, if there is no response to therapy, or if the nails become involved.

STASIS DERMATITIS

DEFINITION

Inflammation of skin caused by pooling of venous blood in lower limb.

CAUSES

- Improper venous drainage
- Predisposing factors: varicose veins, previous deep vein thrombosis

HISTORY

- Itchiness
- Itch worsens with use of soaps, drying, bathing
- Swelling of ankles
- Initially, swelling is relieved by elevation
- Later, swelling may become constant

PHYSICAL FINDINGS

- Begins on medial ankle, may spread to lower third of leg
- Localized swelling
- Tiny petechiae
- Excoriations, redness, scales
- Diffuse red–brown pigmentation develops
- Entire circumference of lower leg may become involved

DIFFERENTIAL DIAGNOSIS

- Contact dermatitis
- Cellulitis

COMPLICATIONS

- Skin breakdown, ulceration
- Infection
- Deep venous thrombosis

DIAGNOSTIC TESTS

None.

MANAGEMENT

Goals of Treatment

- Control edema
- Prevent formation of ulcers
- Prevent infection

Appropriate Consultation

Consult physician if condition progresses despite treatment or there is skin breakdown.

Nonpharmacologic Interventions

- Encourage client to elevate legs as much as possible
- Application of compression with support hose or tensor bandages when ambulatory
- Application of cool normal-saline soaks or wet normal-saline dressings in acute phase
- Lubrication of area twice daily with emollient cream
- Avoidance of irritants (soap, hot water, rough clothes, rubbing)

Pharmacologic Interventions

None.

Monitoring and Follow-Up

- Follow up in 1 week to determine if there is a response to conservative therapy
- Monitor for signs of skin breakdown, infection
- Advise client of the signs of infection and instruct him or her to return to clinic immediately if they occur

Referral

Arrange elective follow-up with physician as necessary.

URTICARIA (HIVES)

DEFINITION

Local wheal and erythema of skin

CAUSES

- Often unknown
- Chronic idiopathic
- Hypersensitivity to foods, drugs, inhaled allergens, insect bite or sting
- Emotional upset
- Physical agents (e.g., heat, cold, sun)
- Systemic disease (e.g., systemic lupus erythematosus)
- Infection (e.g., hepatitis, mononucleosis or other viral illness)

HISTORY

- Recent exposure to one of above causes possible
- Itchy white-to-pink patches
- Client may feel unwell

PHYSICAL FINDINGS

- May occur anywhere on body
- May be localized or generalized
- Lesions multiple, irregular in shape and size
- Raised white or light rose-pink patches, usually surrounded by red halo
- Peripheral extension and coalescence of patches may occur
- Patches may wax and wane
- Individual wheals rarely persist for > 12–24 hours
- Signs of scratching may be evident

DIFFERENTIAL DIAGNOSIS

- Vasculitis
- Insect bites
- Erythema multiforme
- Systemic lupus erythematosus

COMPLICATIONS

- Recurrence
- Severe itching
- Systemic allergic response with bronchospasm
- Anaphylaxis

DIAGNOSTIC TESTS

None.

MANAGEMENT

Goals of Treatment

- Relieve symptoms
- Identify precipitating factor
- Prevent recurrence

Appropriate Consultation

Contact physician if any of the following pertain:
- Symptoms are severe
- Complications are present
- Client is pregnant or lactating

If shortness of breath, wheezing or swelling of tongue or mouth occurs, *refer to "Anaphylaxis," in chapter 14, "General Emergencies and Major Trauma."*

Nonpharmacologic Interventions

- Application of cool compresses to reduce itching
- Avoidance of overheating
- Temporary avoidance of hot, spicy food

Client Education

- Counsel client about appropriate use of medications (dose, frequency, side effects)
- Recommend proper skin hygiene to prevent infection
- Recommend avoidance of scratching; client should keep fingernails short and clean
- Assist client in identifying causative agent (including any recent changes in food or brands, as different food companies put different additives into their products)

Pharmacologic Interventions

Apply topical antipruritic agents:

calamine lotion qid prn

Oral antihistamine to relieve itch and suppress formation of new lesions:

diphenhydramine (Benadryl) (**A class drug**), 25–50 mg PO q6–8h for 2–7 days

or

hydroxyzine (Atarax) (**A class drug**), 25–50 mg PO q6–8h for 2–7 days

Monitoring and Follow-up

- Follow up in 2–7 days
- Instruct client to return for reassessment if lesions progress despite therapy
- Instruct client to return to clinic immediately if shortness of breath, wheezing or swelling of tongue or mouth occurs; in this situation, *refer to "Anaphylaxis," in chapter 14, "General Emergencies and Major Trauma"*

Referral

Refer to a physician for evaluation if lesions are recurrent (to rule out allergies or an underlying organic pathology).

WARTS (VERRUCAE)

DEFINITION

Common, contagious, benign epithelial hyperkeratotic tumors

CAUSES

Human papillomavirus

HISTORY

- Occur most commonly in children
- May persist for many years and disappear spontaneously
- Single or multiple lesions

PHYSICAL FINDINGS

- Usually occur on hands, fingers, feet and face
- May be small or large
- May be single or in clusters
- Raised tumors with thickened, rough surface
- White, gray, yellow or brown
- Black dots (thrombosed capillaries) may be seen within wart
- Well-defined round or irregular margin
- Surface may be flat (flat wart)
- Firm, rough
- Lesions bleed from central capillaries when pared

DIFFERENTIAL DIAGNOSIS

- Corns
- Molloscum contagiosum

COMPLICATIONS

- Unacceptable cosmetic appearance
- Enlargement or spread of warts

DIAGNOSTIC TESTS

None.

MANAGEMENT

Goals of Treatment

- Eradication of lesion
- Control of spread

Appropriate Consultation

Do not treat facial warts; do not treat any warts if client is pregnant. In both of these situations, arrange consultation with physician.

Nonpharmacologic Interventions

- Give the client lots of support and encouragement to persevere, as the treatment is long and tedious
- *Before each application of medication:* soak affected area in warm water to soften wart; use a pumice stone to remove dead tissue, or pare away dead skin with scalpel

Client Education

- Counsel client about appropriate use of medications (dose, frequency, application, protection of surrounding skin)
- Suggest strategies to avoid spread to other areas of body and to other persons

Pharmacologic Interventions

Apply topical treatment to warts:

salicylic and lactic acid (Duo Film) liquid (**A class drug**), od for up to 3 months

Protect normal surrounding skin with Vaseline petroleum jelly.

Monitoring and Follow-Up

Follow up every 2 weeks to assess response and adherence to treatment regime.

Referral

Refer electively to a physician if no response after 12 weeks of therapy.

DERMATOLOGICAL EMERGENCIES

SKIN WOUNDS

DEFINITION

Breach in the integrity of the skin (external surface of the body)

CAUSES

- *Blunt trauma:* split- or crush-type injuries will swell more and tend to have more devitalized tissue and a higher risk of infection
- *Sharp trauma:* clean edges, low cellular injury and low risk of infection
- *Bite injury:* animal or human

HISTORY

- Mechanism of injury
- Contaminants: wound contact with manure, rust, dirt, etc., will increase risk of infection
- Wounds sustained in barnyards or stables should be considered contaminated (*Clostridium tetani* is indigenous in manure)
- Time of injury (after 3 hours, the bacterial count in a wound increases dramatically)
- Amount of blood lost
- Loss of function in nearby tendons, ligaments, nerves (sensation)
- Medical illnesses, conditions, treatments: diabetes mellitus, chemotherapy, steroids, peripheral vascular disease and malnutrition may delay wound-healing and increase the risk of infection
- Allergies (to drugs, dressings, local anesthetics)
- Medications currently used (especially steroids, anticoagulants)
- Status of tetanus vaccination

PHYSICAL EXAMINATION

- Temperature
- Heart rate, blood pressure (if significant blood loss from wound)
- Dimensions of wound, including depth

Assess for infection:

- Redness
- Heat
- Tenderness
- Discharge
- Fever
- Local lymphadenopathy

Assess integrity of underlying structures (nerves, ligaments, tendons, blood vessels):

- *Vascular injury:* Capillary refill should be checked distally.
- *Neurologic injury:* Check distal muscle strength, movement distal to wound and sensation. Always check sensation before administering anesthesia. For hand and finger lacerations check two-point discrimination, which should be < 1 cm at the fingertips.
- *Tendons:* Can be evaluated by inspection, but individual muscles must also be tested for full range of motion and full strength. Assess range of motion of all body parts surrounding the wound site.
- *Bones:* Check for open fracture or associated fractures.
- *Foreign bodies:* Inspect the area.

COMPLICATIONS

- Infection
- Poor healing
- Laceration of nerve
- Compartment syndrome: loss of sensation may be the first sign; pain severe, out of proportion to injury
- Crush injury may decrease two-point discrimination, and it may take several months to recover
- Injury to major vascular structures (e.g., artery)
- Injury to tendon

DIAGNOSTIC TESTS

- Usually none
- If there is strong clinical suspicion of foreign body, x-ray or ultrasound may be necessary

MANAGEMENT

Goals of Treatment

- Restore function
- Minimize risk of infection
- Repair injured tissue with a minimum of cosmetic deformity

Determine the need for:

- Suturing
- Tetanus prophylaxis
- Rabies post-exposure prophylaxis (for animal bites) (see *Canadian Immunization Guide*, 5th ed. [1998] for details)
- Antibiotics

Appropriate Consultation

Consult a physician if any of the following pertain:

- Wound is extensive, deep or infected
- Muscle, tendon, nerve or vascular compromise is present or suspected
- Significant tissue deficit is present
- Wound is more than 12 hours old

Wound Repair: General Principles

- Most wounds may be closed with sutures up to 12 hours after the injury; clean well and use clinical judgment when choosing which wounds to close.
- *Do not* suture wounds that are infected or inflamed, dirty wounds, human or animal bites, puncture wounds, neglected wounds or severe crush wounds.
- Wounds on the face that are up to 24 hours old may be closed after thorough cleaning. The blood supply in this area is much better and the risk of infection therefore much lower.
- Do not clamp vascular structures until it is determined if the vessel is a significant one needing repair.

Nonpharmacologic Interventions

Homeostasis

Direct pressure is the first choice for controlling bleeding. If a fracture is involved, immobilization will help control bleeding

Skin Preparation

- *Débridement:* Using aseptic technique, remove devitalized tissue; avoid taking healthy tissue. High-pressure irrigation is the most effective means of cleansing a wound. Use normal saline in a 60-mL syringe with a 19-gauge needle.

Scrubbing does not cleanse the wound as well, and using any disinfectant in the wound damages healthy cells needed for healing.

- *Skin disinfection:* Can be performed with povidone–iodine solution. Avoid getting the solution in the wound, because it will impede healing. Hair can be clipped in the area if necessary. Shaving hair is not recommended.

Never shave eyebrows. They are needed for alignment of the wound and may not grow back.

Open Wound Care

- To keep the wound open, pack it with bulky, wet saline gauze dressings daily. This will keep the tissue moist and help débride.
- Avoid iodine dressings because they damage healthy tissue and slow granulation.
- When clean granulation tissue is apparent, secondary closure may be considered; alternatively, the dressing can be changed to dry, sterile, packing material.

Wound Closure

- *Steri-Strips:* If the wound is small and shallow and falls together naturally along lines of tension, it may only need to be reinforced with steri-strips. Dress the wound with dry sterile gauze. Instruct client to keep wound clean and dry for 48 hours.
- *Suturing:* Larger wounds need suturing (Table 3). Close in layers as necessary using simple interrupted sutures.

Table 3: Types of Suture Material for Particular Sites

	Type of Suture	Size	Body Area
Nonabsorbable	Nylon-Dermalon, Ethilon	#3-0, 4-0	Scalp
		#5-0, 6-0	Forehead
		#3-0, 4-0, 5-0	Back
		#3-0, 4-0, 5-0	Torso
		#3-0, 4-0, 5-0	Limbs
	Nylon coated with polypropylene glycol (Prolene)	#5-0, 6-0	Face
Absorbable	Polygalactin (Vicryl, Dexon)	#4-0, 5-0	Subcutaneous tissue
	Monofilament (Monocryl)		Muscle

Types of Suture Needles

- Precision-point cutting needles and small sutures (#5-0 or #6-0) should be chosen when a cosmetic closure is important (e.g., on the face)
- Conventional cutting needles with #4-0 or #3-0 nylon sutures are used for routine skin closure

Local Anesthetic for Suturing

Lidocaine (1% to 2%) is the most frequently used local anesthetic (onset 2–5 minutes, duration 60 minutes):

lidocaine (Xylocaine) 1% with or without epinephrine (maximum 30 mL)

lidocaine (Xylocaine) 2% with or without epinephrine (maximum 10 mL)

Nurses should use 1% lidocaine without epinephrine as first choice when suturing a wound.

For adults, the maximum dose of 1% lidocaine (without epinephrine) is 4.5 mg/kg (maximum 30 mL).

Never use lidocaine with epinephrine on the ears, nose, fingers, toes or penis.

- Use a 27- or 30-gauge needle
- Infiltrate the anesthetic slowly through the open wound edge, avoiding the intact skin
- Always pull back on plunger to ensure the needle is not in a blood vessel
- Administer subsequent injections into an area that has already been anesthetized
- It may be of value to dribble a small amount of lidocaine onto the wound before infiltration to provide some initial anesthesia
- Give anesthetic at least 15–20 minutes to be effective
- If extensive suturing is required, it may be necessary to anesthetize and suture a small area at a time to prevent anesthetic from wearing off before suturing is complete
- *Toxic effects of lidocaine:* Observed if anesthetic is injected into a blood vessel inadvertently; symptoms include dizziness, tinnitus, nystagmus, seizures, coma, respiratory depression, arrhythmias and seizures (all symptoms are usually self limiting)

Pharmacologic Interventions

Antibiotic Prophylaxis

There is no medical indication for prophylactic antibiotics in routine, uncontaminated skin wounds. However, consider prophylactic antibiotic use for clients prone to endocarditis, clients with hip prostheses or lymphedema, diabetic clients with a contaminated foot wound, or other clients with peripheral vascular disease:

cloxacillin (Orbenin) (**A class drug**), 250–500 mg PO qid for 7 days

For clients with allergy to penicillin:

erythromycin (E-Mycin) (**A class drug**), 250 mg PO qid or 500 mg bid for 7 days

Topical Antibiotics

Consider topical antibiotic ointment for wounds on face and torso:

bacitracin ointment (Baciguent) (**A class drug**), qid for 5 days

Antibiotic ointment should not be left on wounds of the distal extremities for more than 24–48 hours, because it may lead to maceration and could delay wound-healing.

Antibiotics for Bites

Human Bites

Antibiotics should be given prophylactically for all human bites:

amoxicillin/clavulanate (Clavulin) (**B class drug**), 20–40 mg/kg daily, divided tid, PO for 7 days

Cefixime (Suprax) is an acceptable alternative.

Consider IV antibiotics if infection has already occurred, especially for a bite on the hand.

Cat Bites

Antibodies are routinely given for cat bites. The drug of choice is:

amoxicillin/clavulanate (Clavulin) (**B class drug**), 20–40 mg/kg daily, divided tid, PO for 7 days

Vibramycin (Doxycycline) is an alternative.

Dog Bites

Only 5% of dog bites become infected, and routine prophylaxis is not recommended. If there is a need to treat, amoxicillin/clavulanate is the drug of choice (as for other types of bites).

Tetanus Prophylaxis

For recommendations concerning tetanus prophylaxis, refer to *Canadian Immunization Guide*, 5th ed. (Health Canada, 1998; page 166).

Monitoring and Follow-up

- Risk of infection highest in the first 48 hours, so all wounds should be rechecked daily until it is clear that infection is not developing
- After that, follow up when it is time to remove sutures
- Instruct client to return for reassessment if redness, swelling, discharge, pain or fever develops

General Guidelines for Removing Sutures

- Wound appears clean and healed
- Wound appears dry; no drainage evident
- For larger wounds it is advisable to initially remove alternate sutures to ensure that wound edges stay approximated
- Sutures should be removed according to the recommendations in Table 4

Increase time before removal of sutures in diabetic or steroid-dependent clients in whom healing may take several weeks.

Table 4: Timing of Removal of Sutures

Site of Wound	Timing of Suture Removal
Face	3–5 days; steri-strip reinforcement after suture removal
Scalp	7–10 days
Trunk	7–10 days
Arms	7–10 days
Legs	10–14 days
Joints (dorsal surface)	14–21 days (splint recommended)

Referral

- Consider surgical consult if there is suspicion of injury to major structures
- Open fracture is an indication for surgical débridement and repair (except in the case of fracture of a distal phalanx, where copious irrigation and oral antibiotics are acceptable treatment if the injury can be monitored carefully for infection)

BURNS

DEFINITION

Tissue injury caused by thermal contact.

Types of Burns

Superficial (First-Degree)

Affects epidermis only; painful and erythematous.

Partial-Thickness (Second-Degree)

- *Superficial:* Affects epidermis and outer half of dermis; hairs are spared
- *Deep:* Affects epidermis, with destruction of reticular dermis; can easily convert to full-thickness burn if secondary infection, mechanical trauma or progressive thrombosis occurs

Full-Thickness (Third-Degree)

Tissue is dry, pearly white, charred, leathery. Heals by epithelial migration from the periphery and by contracture. May involve adipose, fascia, muscle or bone.

CAUSES

Thermal

- Flame; tends to cause full-thickness burn, especially if clothing burns
- Molten metal, tars or melted synthetics lead to prolonged skin contact

Electrical

- Similar to crush injuries: muscle necrosis, rhabdomyolysis, myoglobinuria occur
- Require special consideration as these burns are often more serious than they appear; always assume that an electrical burn is severe

Chemical

- Strong acids are quickly neutralized or quickly absorbed
- Alkalis cause liquefaction necrosis and can penetrate deeply, leading to progressive necrosis up to several hours after contact

Radiation

- Initially appear hyperemic; may later resemble third-degree burns
- Changes can extend deep into the tissue
- Sunburns are of this type and involve moderate superficial pain

Table 5: Assessing Depth of a Burn

Characteristic	Superficial (First-Degree)	Partial Thickness (Second-Degree)	Full Thickness (Third-Degree)
Blisters	None	Present	None
Color	Red	Red	White, charred
Moisture	Dry	Wet	Dry
Sensation	Present	Present	Absent
Pain	Moderate	Severe	Absent

HISTORY

Defer history until airway, breathing and circulation (ABC) have been assessed and stabilized.

- Obtain accurate description of exact mechanism of injury
- Inquire about any treatment given at home (e.g., cooling, application of oils)
- Obtain medical history (but only when time permits)
- Determine medications (but only when time permits)
- Determine allergies (but only when time permits)
- Determine tetanus vaccination status

PHYSICAL FINDINGS

- Assess ABC
- Temperature may be elevated if wounds infected
- Heart rate may be elevated because of pain
- Blood pressure may be low if client is in shock
- Determine depth (Table 5) and extent (Table 6) of the burn

DIFFERENTIAL DIAGNOSIS

- Small areas of deep burning within superficial burn

COMPLICATIONS

- Increasing depth of burn
- Shock
- Secondary infection
- Renal failure

Table 6: Assessing Extent of a Burn (Rule of Nines)

Body Part	Percentage of Body Surface Area
Head	9
Both arms	18
Anterior trunk	18
Posterior trunk	18
Both legs	36
Palm of hands	1
Total	100

DIAGNOSTIC TESTS

None.

MANAGEMENT

Goals of Treatment

- Promote healing and restoration of tissue
- Prevent complications

Nonpharmacologic Interventions

The first step is general first aid, cleansing and cooling the affected area.

- *Thermal burn:* Cool if area is still warm to touch. Burns caused by liquid should be cooled rapidly, and any clothing in contact with the area should be removed rapidly to decrease contact time. Immerse in cool water to reduce heat and prevent extension of burn. *Do not immerse or apply cold water if burns involve > 10% of body.*
- *Chemical burn:* Irrigate. If dry powder is still visible on the skin, brush it away before irrigating the skin with water. Irrigate with copious amounts of water for at least 15 (preferably 30) minutes after powders have been removed. This process should be started at the accident scene if possible. Alkali burns should be irrigated for 1–2 hours after injury. Call poison control center for specific instructions.
- *Tar burn:* Cool, clean gently, and apply a petrolatum-based antibacterial ointment (e.g., Polysporin) or other petroleum-based product. Do not attempt to scrape tar off the skin surface, as this can cause further damage. Avoid chemical solvents, which may cause additional burns. After 24 hours the tar can be washed away and the injury treated as a thermal burn.
- *Electrical burn:* Be cautious and observe the client closely. Watch for cardiac arrhythmias. Cardiac monitoring for 24 hours is essential if there was significant exposure to electrical current. Apply a cervical collar. Look for long-bone fractures secondary to muscle contraction. An electrical burn may cause thrombosis of any vessel in the body. Clean and dress as for a thermal burn (see below).

TREATMENT OF MINOR BURNS

Nonpharmacologic Interventions

Superficial Burns

- Cleanse with normal saline or sterile water
- *Dressings:* Cover area lightly with sterile, dry gauze dressing

Partial-Thickness (Superficial and Deep) Burns

- Remove any attached clothing and debris
- Cleanse with normal saline or sterile water
- Gently débride using sterile technique
- Small blisters may be left intact
- Remove larger blisters with forceps and scissors (blister fluid is an excellent culture medium)
- *Dressings:* Small, less severe second-degree burns (superficial partial-thickness burns) do not require antimicrobial ointment or impregnated dressings; instead, apply non-adherent porous mesh gauze dressing (e.g., Jelenet)

Client Education

- Counsel client about appropriate use of medications (dose, frequency)
- Suggest that analgesics be taken 1 hour before dressing changes
- Recommend that dressing be kept clean and dry until area healed

Adjuvant Therapy

Check whether tetanus vaccination is up to date; give tetanus vaccine as needed (refer to the *Canadian Immunization Guide*, 5th ed., 1998).

Pharmacologic Interventions

Analgesia:

ibuprofen (Motrin) (**A class drug**), 200 mg, 1–2 tabs PO q6h prn

or

acetaminophen (Tylenol) (**A class drug**), 500 mg, 1–2 tabs, q4h prn

or

acetaminophen with codeine (Tylenol #2 or #3) (**C class drug**), 1–2 tabs q4–6h prn (maximum 15 tabs)

Larger, more severe deep partial-thickness burns require topical antibiotic ointment or impregnated dressings (ointments can make evaluation of drainage difficult). Apply:

bacitracin ointment (Baciguent) (**A class drug**) od

or

Sofratulle dressing (**A class drug**) od

or

silver sulfadiazine (Flamazine) (**C class drug**), od

Absolute contraindication to silver sulfadiazine: term pregnancy

Relative contraindication to silver sulfadiazine: possible cross-sensitivity to other sulfonamides, pregnancy

Prophylactic antibiotics should rarely be required but may be considered for:

- immunocompromised clients
- clients at high risk of endocarditis
- clients with artificial joints

Broad-spectrum coverage with first-generation cephalosporin or with a penicillinase-resistant penicillin plus an aminoglycoside may be used if necessary.

Discuss choice with a physician.

Monitoring and Follow-Up

- Follow up in 24 hours and daily until the burn is healed
- Re-evaluate depth and extent of injury
- Monitor for healing and development of infection
- Cleanse and débride prn; tub soaks can help loosen coagulum and speed separation of necrotic debris
- Reapply bacitracin or silver sulfadiazine and dry sterile dressing

Absolute sterility is not mandatory during dressing changes; however, cleanliness and thorough cleaning of hands, sinks, tubs and any instruments used is emphasized. Acetic acid (0.25%) can be applied for pseudomonal prophylaxis.

TREATMENT OF MAJOR BURNS

Always watch for renal failure from rhabdomyolysis and sepsis in clients with severe burns.

Nonpharmacologic Interventions

Perform Primary Survey

- Stabilize ABC
- Establish airway and assist ventilation as required
- Administer oxygen at 6–10 L/min or more; keep oxygen saturation > 97% to 98%
- Start IV therapy with normal saline or Ringer's lactate
- Replace fluid losses; as a rule of thumb for fluid replacement in clients with major burns: initiate fluids if >15% to 20% of body surface area has been burned (adults); fluids in first 24 hours should be 2–4 mL × % of body surface area burned; give half in first 8 hours and other half in next 16 hours; maintain urine output at about 30–60 mL/h (adults)

Burn shock usually takes hours to develop. If shock is evident on initial presentation, look for other causes of volume loss such as a major injury elsewhere in the body. *Refer to "Shock," in chapter 14, "General Emergencies and Major Trauma."*

Special Considerations for Resuscitation

- Restlessness may be secondary to hypoxia
- Assume smoke inhalation; *see "Inhalation of Toxic Materials," in chapter 3, "Respiratory System"*
- Monitor for respiratory distress or respiratory failure

Perform Secondary Survey and Identify Associated Injuries

- Insert urinary catheter
- Insert nasogastric tube
- Assess peripheral circulation if client has circumferential burn on extremities
- Monitor color, capillary refilling, paresthesia and deep tissue pain

Wound Care

- Cover burns with sterile, dry dressings
- Do not break blisters
- Do not immerse or apply cold water if burns involve > 10% of body

Appropriate Consultation

Consult a physician as soon as the client's condition is stabilized.

Pharmacologic Interventions

For analgesia, consult a physician first, if possible; otherwise give:

morphine (**D class drug**), 5–10 mg IM stat

Monitoring and Follow-up

- Monitor ABC and vital signs frequently
- Watch for signs of shock (it usually takes hours for burn shock to develop)
- In circumferential burns, extensive extremity burns or electrical burns, watch for vascular or neurologic compromise, which indicates a developing compartment syndrome; immediate escharotomy is required
- Elevate extremities to minimize swelling

Referral

Medevac as soon as possible (using criteria in Table 7).

Table 7: Criteria for Transfer of Burn Patient

Full-thickness burns covering 10% or more of body surface (if age > 50 years)
Partial- and full-thickness burns covering 20% or more of body surface (any age)
Burns of face, hands, feet, perianal or genital area, over major joints
Smoke inhalation, electrical burns, chemical burns
Burns associated with major injuries or fractures
Circumferential chest or extremity burns
Lesser burns in a client with underlying disease (e.g., diabetes mellitus)

FROSTBITE

DEFINITION

Thermal injury to tissue caused by cold. Injury may occur without (Table 8) or with (Table 9) freezing of the tissue. Freezing of the tissue is defined by the formation of ice crystals.

CAUSE

Exposure to cold.

HISTORY

Most commonly affects hands and feet.

Frostnip

- Initially cold, burning pain
- Area becomes blanched
- With rewarming, area becomes reddened

Frostbite

- Cold burning pain progresses to tingling
- Later, numbness or heavy sensation
- Area becomes pale or white
- Rewarming causes pain

PHYSICAL FINDINGS (See also Tables 8 and 9)

- Variable
- Temperature may be reduced if there is associated hypothermia or elevated if there is infection
- Client in mild-to-acute distress
- Affected area may be reddened or white
- Edema may be present
- Blisters may be present
- Infection may be evident if client presents later
- Area is initially cold and hard to touch
- Sensation reduced
- If rewarming has occurred, area will be warm and tender

DIFFERENTIAL DIAGNOSIS

- Superficial versus deep frostbite

COMPLICATIONS

- Infection
- Hypothermia
- Tissue loss
- Hypersensitivity to cold in affected area may last several years or be permanent

MANAGEMENT

Goals of Treatment

- Identify associated hypothermia
- Rewarm parts
- Control pain
- Prevent infection

Treat frostnip and superficial frostbite as you would a superficial hot thermal injury. *Refer to "Burns," above, this chapter.*

Nonpharmacologic Interventions

- Rapidly rewarm affected part by immersion in 42°C water for 20–30 minutes; slow rewarming is not good!
- Be careful: do not rub and do not use hot water bottles
- Rest affected limb; avoid irritation to skin
- Continue rewarming once process has started until skin is warm, soft, pliable and flushed red
- Prevent refreezing; if in the field, do not thaw extremity until assured it will not refreeze
- Elevate limb once it is rewarmed; leave exposed if possible
- Do not break blisters
- Separate toes and fingers with dry cotton wool
- Wrap client loosely in bulky soft material and protect from injury and exposure during transport
- Give warm fluids to drink
- Forbid smoking, as nicotine narrows small arteries

Prevention Education

- Dress in layers with appropriate cold-weather gear
- Cover all exposed skin areas
- Prepare properly for trips in cold climates

Table 8: Types of Cold Injury Without Frostbite

Type of Injury	Cause	Clinical Observations	Treatment
Chilblain (peripheral cold injury without freezing of tissue)	Prolonged dry exposure at temperatures above freezing	Affected areas are pruritic, reddish blue; may be swollen; may have blisters or superficial ulcerations; areas may be more temperature sensitive in future; no permanent injury	Rewarm as for frostbite (see text); pain medication should be provided
Trench foot and immersion injury	Prolonged wet exposure at temperatures above freezing	May have tissue destruction resembling partial-thickness burns, including blisters, pain, hypersensitivity to cold; temperature sensitivity may be permanent	Rewarm as for frostbite (see text)

Pharmacologic Interventions

Mild Frostbite

Analgesia for pain:

acetaminophen (Tylenol) (**A class drug**), 325 or 500 mg, 1–2 tabs PO q4h prn

or

ibuprofen (Motrin) (**A class drug**), 200 mg, 1–2 tabs PO q4h prn

Moderate to Severe Frostbite

Analgesia for pain, which may be severe during rewarming:

meperidine (Demerol) (**D class drug**), 50–100 mg IM q3–4h

Monitoring and Follow-up

Mild Frostbite

Reassess and re-dress wound daily for 4–7 days, until the wound is healing well. Watch for signs of infection.

Appropriate Consultation

Consult a physician for all but mild frostnip.

Referral

Moderate-to-Severe Frostbite

Medevac anyone with moderate-to-severe frostbite to hospital as soon as possible.

Table 9: Classification of Frostbite

Frostnip	Superficial Frostbite	Deep Frostbite
Superficial, skin changes reversible	Tissue below skin pliable, soft	Tissue feels woody under skin; affects muscles, tendons, etc.
Skin blanched, numb; loss of sensation	Blisters appear in 24–48 hours; fluid reabsorbs; hard, blackened eschar develops; generally superficial, remains sensitive to heat and cold	Extremity cool, deep purple or red, with dark, hemorrhagic blisters and loss of distal function; may take several months to determine extent of injury
Comparable to superficial (first-degree) hot thermal burn	Treat conservatively; generally resolves without surgical intervention in 3–4 weeks	Frozen tissue will eventually slough

CHAPTER 10 – HEMATOLOGY, METABOLISM AND ENDOCRINOLOGY

Table of Contents

EXPLANATORY NOTE

For this chapter, history and examination of the system are not discussed as such, because hematologic, metabolic and endocrine disorders often manifest symptoms and signs in more than one body system. The cardiovascular, gastrointestinal, neurologic, endocrine and integumentary systems in particular should be evaluated, as problems or symptoms of hematologic, metabolic and endocrine disorders commonly manifest in these systems.

See individual chapters for information on history and physical examination relevant to each of these systems.

COMMON HEMATOLOGIC PROBLEMS

ANEMIA

DEFINITION

Anemia can be generally defined as a reduction in hemoglobin level. In determining the seriousness of the anemia, the level of hemoglobin is less important than the underlying cause. However, there are more than 200 types of anemia, which makes determining the cause difficult.

CLASSIFICATION

There are three main ways of classifying anemias.

- *Cytometric types:* depend on cell size and hemoglobin-content parameters, such as mean corpuscular volume (MCV) and mean corpuscular hemoglobin concentration (MCHC)
- *Erythrokinetic types:* take into account the rates of red blood cell (RBC) production and destruction
- *Biochemical/molecular types:* consider the cause of the anemia at the molecular level

For example, sickle cell anemia is classified as normocytic, normochromic in the cytometric classification, as hemolytic in the erythrokinetic classification, and as resulting from a DNA mutation producing amino acid substitution in the hemoglobin β chain according to the biochemical/molecular classification.

Cytometric Classification

The first task in the work-up for a client with anemia is to classify the case in one of the three major cytometric categories.

Normocytic, Normochromic Anemia (Normal MCV, Normal MCHC)

- Anemias of chronic disease
- Hemolytic anemias (characterized by accelerated destruction of RBCs)
- Anemia of acute hemorrhage
- Aplastic anemias (characterized by disappearance of RBC precursors from the marrow)

Microcytic, Hypochromic Anemia (Low MCV, Low MCHC)

- Iron deficiency anemia
- Thalassemias
- Anemia of chronic disease (rare)

Macrocytic, Normochromic Anemia (High MCV, Normal MCHC)

- Vitamin B_{12} deficiency
- Folate deficiency

CLINICAL SIGNS AND SYMPTOMS

The severity of clinical symptoms bears less relationship to the severity of the anemia than to the period of time over which the condition develops.

An acute hemorrhagic condition may produce symptoms with loss of as little as 20% of the total blood volume (or 20% of the total red cell mass). Conversely, anemias developing over periods long enough to allow compensatory mechanisms to operate will be associated with much greater loss of red cell mass before symptoms are manifested.

HISTORY

When symptoms do develop, they are related to the precarious state of oxygen delivery to the tissues:

- Dyspnea on exertion
- Easy fatigability
- Fainting, lightheadedness
- Tinnitus, roaring in the ears
- Headache
- Palpitations
- Exacerbation of pre-existing cardiovascular conditions

Angina pectoris, intermittent claudication and nighttime muscle cramps are some of the effects of anemia on already-compromised perfusion.

PHYSICAL FINDINGS

For slowly developing anemia:

- Pallor
- Tachycardia
- Systolic ejection murmur

In rapidly developing anemia (as from hemorrhage and certain catastrophic hemolytic anemias), additional symptoms and signs are noted:

- Syncope on rising from bed
- Orthostatic hypotension (i.e., the blood pressure falls when the patient is raised from a supine to a sitting or standing position)
- Orthostatic tachycardia

Keep in mind that if anemia develops through rapid bleeding, the hematocrit and hemoglobin will be normal (because in hemorrhage the loss of RBCs and plasma is proportional). Therefore, your appreciation of the clinical signs will be of more value in diagnosing this type of anemia than will the results of laboratory tests.

DIAGNOSTIC TESTS

- Hemoglobin
- Hematocrit
- White blood cell (WBC) count
- Differential WBC count
- Platelet count
- MCV
- RBC distribution width
- Reticulocyte count
- Blood smear

Subsequent investigations should be based on these values.

SPECIFIC ANEMIAS AND ADDITIONAL DIAGNOSTIC MEASURES

IRON DEFICIENCY ANEMIA

Definition and Characteristics

Anemia common in women during childbearing years and in men and women with chronic gastrointestinal blood loss. May be related to low intake of iron, poor absorption of iron or blood loss. Commonly confused with anemia of chronic disorders.

Diagnostic Measures

Determine serum ferritin level:

- Used to distinguish between iron deficiency anemia and anemia of chronic disorders
- Result reflects tissue iron stores
- Not influenced by recent transfusion or oral ingestion of iron
- May be elevated and misleading with liver congestion, renal failure, collagen disease or cancer or in acute or chronic infection or inflammation (these conditions may also give misleading serum iron results)

ANEMIA OF CHRONIC DISORDERS

Definition and Characteristics

Anemia occurring as the result of interference with the transfer of iron from the bone marrow stores into the developing RBC. The RBC is therefore depleted in hemoglobin despite the presence of normal or higher-than-normal body stores. May indicate sepsis, cancer, chronic renal failure, collagen disease or endocrine deficiency state.

Diagnostic Measures

- Determine serum ferritin level
- Consider also measuring blood urea nitrogen (BUN), antinuclear antibody (ANA) and thyroid-stimulating hormone (TSH), and performing serum protein electrophoresis (SPE)

LEAD POISONING

Definition and Characteristics

Leads to microcytosis because lead interferes with the production of heme, which results in poorly hemoglobinized cells. Stippling on RBCs is seen in peripheral blood smear.

Diagnostic Measures

Determine serum lead level.

VITAMIN B_{12} AND FOLATE DEFICIENCY

Diagnostic Measures

- Elicit the client's dietary history
- Measure serum levels of vitamin B_{12} and folate (however, on their own, low level of either of these nutrients does not implicate vitamin B_{12} or folate deficiency as the cause of anemia, unless the anemia is megaloblastic)
- Consider also Schilling test if vitamin B_{12} level is low

HEMOLYTIC ANEMIA

Definition and Characteristics

Reticulocytes are usually increased.

Diagnostic Measures

- Direct antiglobulin test (Coombs' test)
- Measure cold agglutinins and G6PD (glucose-6-phosphate dehydrogenase), to check for extravascular hemolysis

OTHER BLOOD TESTS FOR TYPING ANEMIA

Reticulocyte Count

Low Reticulocyte Count

Indicates diminished bone marrow production. May be caused by a lack of iron, folate or vitamin B_{12}, intrinsic marrow disease (such as aplastic anemia), or failure of the marrow secondary to suppression because of chronic disorders outside the marrow. Consider bleeding or cell destruction.

Other diagnostic measures: Serum ferritin, folate and vitamin B_{12} levels as appropriate on the basis of the MCV.

Elevated Reticulocyte Count

May be caused by blood loss or hemolysis. Indicates that the client is not deficient in iron, folate or vitamin B_{12}, so testing for these nutrients is not appropriate.

Other diagnostic measures: Determine if there is any history of blood loss (e.g., undertake investigations for occult blood loss as necessary). Absence of blood loss implies hemolysis, in which case the condition should be investigated as hemolytic anemia (*see "Hemolytic Anemia," above, this section*).

Blood Smear

Confirms the RBC indices.

Provides clues as to the underlying disease, e.g., microcytes may indicate iron deficiency, spherocytes may indicate congenital or acquired immune anemia, and target cells may indicate liver disease or hemoglobinopathy.

IRON DEFICIENCY ANEMIA

DEFINITION

Subnormal quantity of hemoglobin, number of RBCs or volume of packed cells in the blood. In general, clients with hemoglobin more than two standard deviations (SD) below the mean should be considered anemic, and investigation is needed. The anemia is often accompanied by depletion of iron stores.

Normal mean hemoglobin is 140 g/L (SD 20 g/L) for women and 155 g/L (SD 20 g/L) for men (see also Table 1).

CAUSES

- Inadequate dietary intake of iron (common in children, adolescents and elderly people)
- Increased requirements for iron without concomitant increase in intake (during growth spurts in infants, young children, adolescents and pregnant women)
- Blood loss due to excessive menstruation, disease of the gastrointestinal tract (e.g., peptic ulcer, hiatus hernia), malignant disease, telangiectasia, previous acute blood loss (e.g., trauma, surgery)
- Impaired absorption of iron because of partial gastrectomy, malabsorption syndromes

HISTORY

- Iron deficiency anemia is not a disease, but a sign of an underlying disorder
- A complete history and physical examination are required
- Symptoms vary according to severity of the anemia, underlying cause, rapidity with which the underlying condition developed, and presence of pre-existing heart and lung disease

Mild Condition

- Often asymptomatic
- Fatigue
- Dyspnea
- Palpitations after exertion

Moderate or Severe Condition

- Symptomatic at rest
- Exercise intolerance
- Symptoms of heart failure, syncope may be present
- Palpitations, dizziness, headache, tinnitus
- Irritability, insomnia, inability to concentrate
- Hypersensitivity to cold and malaise
- Menstrual disturbances

Table 1: Reference Values for Blood Components

Component	Age (years)	In Females	In Males
Hemoglobin (g/L)	1–4	111–145	111–145
	5–9	114–145	114–151
	10–14	124–145	124–158
	≥15	121–164	140–179
Red blood cells ($\times 10^{12}$/L)	1–4	4.0–5.2	4.0–5.2
	5–9	4.2–5.3	4.2–5.3
	10–14	4.5–5.7	4.5–5.7
	15–49	4.0–5.4	4.6–6.0
	≥50	4.0–5.6	4.4–5.8
Hematocrit (proportion)	1–4	0.35–0.45	0.35–0.45
	5–9	0.36–0.47	0.36–0.47
	10–14	0.38–0.47	0.38–0.49
	≥15	0.38–0.50	0.42–0.54
White blood cells ($\times 10^{9}$/L)	1–4	5.0–12.0	5.0–12.0
	5–49	4.0–10.5	4.0–10.5
	≥50	4.0–10.0	4.0–11.0
Platelets ($\times 10^{9}$/L)	1–4	175–500	175–500
	5–9	175–420	175–420
	10–14	175–375	175–375
	≥15	170–375	160–350

Source: Swaanenburg et al (1987)

Other Things to Ask About

- Medications such as anticonvulsants (e.g., phenytoin [Dilantin], primidone [Misoline]), triamterene, sulfamethoxazole/trimethoprim (Septra; long-term use only), oral contraceptives
- HIV medications (e.g., zidovudine [AZT] and antineoplastic drugs [for chemotherapy])
- Alcohol intake
- Dietary history (e.g., strict vegetarianism)
- Gastric or small-bowel surgery
- Chronic inflammatory disease such as rheumatoid arthritis, Crohn's disease
- Malignant disease
- Diminished renal, hepatic or thyroid function

PHYSICAL FINDINGS

- Heart rate increased
- Postural blood pressure drop may be present
- General pallor
- Appears tired and lethargic
- Conjunctival and palmar pallor
- Glossitis may occur in severe anemia
- Cracking at corners of mouth
- Nail changes
- Liver or spleen may be enlarged
- Skin and hair may feel dry
- Functional systolic murmur may be present

DIFFERENTIAL DIAGNOSIS

Rule out other causes of anemia. *See general section "Anemia," above, this chapter.*

COMPLICATIONS

- Frequent infections
- Side effects of iron therapy
- Decompensation of pre-existing medical problems

DIAGNOSTIC TESTS

- Complete blood count, differential blood count, reticulocyte count, blood smear film for RBC morphology
- Serum iron level, total iron-binding capacity (TIBC), serum ferritin level
- Test three separate samples of stool for occult blood

MANAGEMENT

Goals of Treatment

- Increase hemoglobin concentration
- Replenish body stores of iron
- Identify underlying cause

Appropriate Consultation

Consult a physician immediately if hemoglobin < 90 g/L, stool is positive for occult blood or client appears acutely ill.

Nonpharmacologic Interventions

Client Education

- Explain disease process, course and prognosis
- Counsel client about appropriate use of medications (dose, frequency, side effects)
- Suggest dietary modifications to increase intake of iron (e.g., organ meats, egg yolk, prunes, grapes, raisins)
- Recommend frequent periods of rest to reduce fatigue
- Recommend avoidance of alcohol and acetylsalicylic acid (ASA) products
- Counsel client about prevention of constipation (e.g., encourage a high-roughage diet)

Pharmacologic Interventions

Oral iron therapy:

ferrous sulfate (**B class drug**), 300 mg PO tid

or

ferrous gluconate (**B class drug**), 300 mg PO tid

Monitoring and Follow-Up

Follow up in 1 month: hemoglobin level should rise by at least 1 g/L while client is receiving therapy. Continue iron for 3 months after initial follow-up to replenish iron stores.

Referral

Any client in whom there is no response after 1 month of oral therapy should be referred to a physician for further investigation.

MEGALOBLASTIC ANEMIA

DEFINITION

Production of abnormally large, oval RBCs with elevated MCV (>100 fL [femtoliters]).

CAUSES

Vitamin B_{12} deficiency (pernicious anemia), resulting from:

- Inadequate dietary intake (e.g., strict vegetarianism)
- Impaired absorption (e.g., after gastrectomy or surgery to the ileum)
- Increased requirements (e.g., in pregnancy)
- Faulty utilization

Folic acid deficiency, resulting from:

- Inadequate intake (e.g., in elderly, alcoholic and chronically ill clients)
- Malabsorption syndromes
- Increased demand (e.g., in pregnancy, terminal illness)
- Use of drugs that are folate antagonists such as methotrexate, phenytoin (Dilantin), sulfamethoxazole/trimethoprim (Septra)
- HIV disease (and associated drug therapy)
- Other chemotherapy agents

HISTORY

- Insidious onset
- Occurs in the fifth to sixth decades of life
- Fatigue, lethargy
- Indigestion, constipation or diarrhea
- Sore tongue
- Neurological symptoms (such as peripheral neuropathy, weakness, unsteadiness, spasticity and changes in emotional affect) occur with vitamin B_{12} deficiency
- Neurological symptoms are absent in folic acid deficiency

DIFFERENTIAL DIAGNOSIS

Other types of anemia (*see general section "Anemia," above, this chapter*).

COMPLICATIONS

- Infections
- Falls or other trauma
- Heart failure

DIAGNOSTIC TESTS

- Complete blood count
- Differential blood count
- Blood smear
- Iron level
- Total iron-binding capacity (TIBC)
- Ferritin level
- Vitamin B_{12} level
- Serum level of RBC folate

MANAGEMENT

Goals of Treatment

- Determine the cause of the anemia
- Replace identified deficiencies

Appropriate Consultation

Consult a physician immediately if the symptoms of anemia are significant or if complications are present, and to obtain medication orders.

Nonpharmacologic Interventions

Client Education

- Explain disease process, course and prognosis
- Counsel client about appropriate use of medications (dose, frequency, side effects)
- Provide dietary counseling on foods rich in folic acid: green leafy vegetables, grains, wheat bran, liver
- Stress importance of returning for follow-up

Pharmacologic Interventions

For vitamin B_{12} deficiency (pernicious) anemia:

vitamin B_{12} (**B class drug**), 100 µg IM od for 5 days, then 100 µg IM monthly for life

For folic acid deficiency anemia:

folic acid (**B class drug**), 1–5 mg PO od until hematocrit is normal

Monitoring and Follow-Up

- Follow up 2 weeks after treatment is started to determine response to therapy; recheck blood work at that time
- With both types of deficiency anemia there is usually a rapid response: within 1 week, hematocrit levels begin to rise
- Continue to follow up monthly, and repeat blood work until stabilized

Serum potassium level should be monitored closely in clients with severe pernicious anemia complicated by heart failure. A rapid rise in reticulocytes and use of diuretics combine to cause hypokalemia. Supplementary potassium should be administered. Consult a physician for the medication order.

As hemoglobin rises in response to vitamin B_{12} administration, the MCV gradually decreases and the client may become microcytic, with the hemoglobin plateauing at a level below normal. If this occurs, oral iron therapy should be added to achieve maximum hemoglobin response.

COMMON ENDOCRINE AND METABOLIC PROBLEMS

DIABETES MELLITUS

DEFINITION

Diabetes mellitus is a metabolic disorder characterized by hyperglycemia, which is due to reduced insulin secretion, increased tissue resistance to insulin action or both.

CLASSIFICATION

Type 1

Type 1 diabetes mellitus is primarily the result of pancreatic β-cell destruction, which leads to absolute insulin deficiency and tendency to ketoacidosis. Onset is usually at younger age (<30 years).

Type 2

Type 2 diabetes mellitus occurs as a result of some degree of defect in insulin secretion and an increase in resistance to insulin in the tissues. Age at onset is usually middle age or older. People with type 2 diabetes are much less prone to ketoacidosis.

The prevalence of type 2 diabetes is reaching epidemic proportions among First Nations people. Age-adjusted prevalence rates are 19% to 26%, among the highest in the world. The condition is also occurring atypically in children and young adults in this population.

Gestational Diabetes

Gestational diabetes is a transient disorder, starting in pregnancy and ending with delivery. Women with gestational diabetes often go on to have type 2 diabetes later in life. Gestational diabetes is defined as fasting blood glucose ≥ 5.3 mmol/L and 1-hour pc blood glucose ≥ 10.6 mmol/L or 2-hour pc blood glucose ≥ 8.9 mmol/L. These pc glucose levels are based on a 75-g glucose load.

Impaired Glucose Tolerance (Pre-Diabetes)

Impaired Fasting Glucose Tolerance

People with a fasting blood glucose level between 6.1 and 6.9 mmol/L, which is below the diagnostic threshold for diabetes, are considered to have impaired fasting glucose tolerance.

Impaired Glucose Tolerance

People with a fasting blood glucose level < 7.0 mmol/L and a 2-hour pc blood glucose level between 7.8 and 11.0 mmol/L are considered to have impaired glucose tolerance.

Both of these groups have a higher risk of diabetes mellitus and cardiovascular disease than the general population. Preventive interventions involving lifestyle changes and more frequent screening for diabetes should be a priority for these people.

CAUSES

- Genetic
- Autoimmune
- Related to pancreatitis

Risk Factors

- Family history
- Hypertension
- Hyperlipidemia
- Central obesity
- Smoking
- High-fat diet
- Previous gestational diabetes

Dramatic changes in lifestyle, including diet and physical exercise, have had a profound impact on the health of Aboriginal people. Morbidity associated with infectious diseases is down, but chronic diseases such as diabetes and cardiovascular disease have emerged as major health threats among Aboriginal people. Diabetes mellitus is, according to some, a disease that results from poor social conditions in Aboriginal communities. Geographic isolation, poor eating patterns, lack of variety in available foods, minimal physical activity, substance abuse and psychological issues may be significant barriers to the recognition of diabetes as a priority in healthcare.

HISTORY

- Polyuria, polydipsia, polyphagia
- Nocturia
- Weight history (especially any weight loss)
- Fatigue, irritability
- Obesity (particularly in the central trunk)
- Blurred vision, changes in vision, frequent changes in optical prescription
- Nausea and vomiting
- Unresolving “flu-like” illness (ketoacidosis)
- Reversible paresthesia of fingers or toes

Past History

– Obstetric: gestational diabetes, large babies (>4.5 kg at delivery)
– Endocrine disorders
– Cardiovascular disease
– Hypertension
– Hyperlipidemia
– Recurrent or unresolving vaginal infections (yeast), urinary tract infections, skin infections (especially of feet)
– Surgery (e.g., on pancreas)

Family History

– Diabetes mellitus
– Hyperlipidemia
– Hypertension
– Renal disease
– Infertility
– Hirsutism
– Autoimmune diseases
– Pancreatitis
– Blindness

Current Health

– Eating habits (food choices, meal patterns, cultural influences concerning food)
– Physical activity level, factors limiting physical activity
– Medications
– Allergies
– Smoking habits
– Alcohol use
– Social factors: family dynamics, education, employment, lifestyle, coping skills

PHYSICAL FINDINGS

A complete review and examination of all body systems must be done to detect the presence of any damage secondary to the diabetes.

– Client appears ill if diabetes is of acute onset
– Client appears wasted if there has been weight loss
– Vital signs: changes depend on initial presenting complaint and presence of underlying damage to target organs
– Blood pressure elevated if comorbid hypertension is present
– Eyes: funduscopic signs of retinopathy
– Oral cavity: poor dental health (client at risk for infection)
– Neck: thyroid assessment
– Chest: routine respiratory exam
– Cardiac system: signs of heart failure, bruits, peripheral pulses
– Abdomen: enlargement of organs
– Genitourinary system: signs of nephropathy (e.g., proteinuria)
– Musculoskeletal system: signs of limited joint mobility, arthropathy of hands
– Skin: infection (e.g., feet or nails), color, temperature
– Signs of neuropathy: neurological effects; changes in vibrational sense (e.g., in feet), proprioception, response to light touch (with monofilament), reflexes

DIFFERENTIAL DIAGNOSIS

– Impaired fasting glucose tolerance (fasting blood glucose 6.1–6.9 mmol/L)
– Impaired glucose tolerance (2-hour pc blood glucose level with 75-g glucose tolerance test [GTT] 7.8–11.0 mmol/L)
– Nondiabetic glycosuria
– Drug side effects (e.g., oral contraceptives, corticosteroids, thiazide diuretics)
– Diabetes insipidus
– Benign pancreatic insufficiency
– Pheochromocytoma
– Cushing's syndrome

COMPLICATIONS

- Ketoacidosis (type 1); *see "Diabetic Ketoacidosis," under "Metabolic Emergencies," below, this chapter*
- Hyperosmolar nonketotic coma
- Coronary artery disease, peripheral vascular disease
- Nephropathy, urinary infections
- Retinopathy, cataracts (early onset), blindness
- Peripheral neuropathy
- Recurrent skin (yeast) infections
- Premature death from complications

DIAGNOSTIC TESTS

Diagnostic Blood Glucose Levels

Random blood glucose level ≥ 11.1 mmol/L in presence of symptoms (if random result < 11.1 mmol/L, have client return within a day or two for a fasting glucose test to ascertain definitive diagnosis)

or

Fasting blood glucose level ≥ 7.0 mmol/L

or

Blood glucose level 2 hours after oral GTT (with 75-g load) ≥ 11.1 mmol/L

Other Tests

- Screen for lipid levels, complete blood count, creatinine level and TSH
- Obtain urine sample for urinalysis (routine and microscopy)
- Dipstick test for glucose, ketones and protein, microalbuminuria

MANAGEMENT

The management and prevention of diabetes mellitus and associated complications should be a high priority in health planning and healthcare delivery in Aboriginal communities. There is no evidence at present that therapeutic strategies should differ from those used in the general population.

Goals of Treatment

- Attain optimum glycemic control
- Educate the client for self-care
- Prevent complications
- Attain optimum control of concomitant hypertension and hyperlipidemia and other cardiovascular risk factors

Appropriate Consultation

Consult a physician immediately for further management if diabetes mellitus is suspected or diagnosed. All drug therapy for clients with diabetes is initiated by a physician.

Nonpharmacologic Interventions

Lifestyle Modifications

- Nutrition therapy: consultation with dietician is recommended, at least initially
- Nutritional recommendations same as for general population: choose well-balanced diet from the four food groups; decrease saturated fats to < 10% of total calories; ensure adequate intake of carbohydrates, protein, vitamins and minerals
- Useful starting point is to plan meals with 55% carbohydrates and 30% fat content
- Exercise program: regular activity (e.g., walking for 20 minutes three times weekly)
- Weight reduction if obese (to attain healthy body weight)
- Smoking cessation (if applicable)
- Education in diabetes self-care

Client Education

- Explain nature, course and prognosis of disease, as well as possible complications: condition can be controlled, but it cannot be cured
- Counsel client about appropriate use of medications (dose, frequency, route of administration, side effects)
- If client is taking insulin, monitor ability to self-administer
- Provide dietary counseling
- Have client maintain a dietary intake journal, and review the journal regularly
- Home glucose monitoring is highly recommended; have client demonstrate ability to perform these tests accurately, provide instruction as necessary, and encourage maintenance of daily diary of results
- Discuss with client the procedure to follow in the event of an illness
- Instruct client about signs and symptoms of hyperglycemia and hypoglycemia, and tell client what to do if these conditions develop
- Discuss foot care with client: keep feet clean; avoid dry skin (apply moisturizer daily); wear appropriate shoes or boots (not tight); avoid going barefoot; avoid open-toe shoes; do not cut nails too short; give prompt attention to cuts and sores

If possible, involve the entire family in diabetic teaching to give them an understanding of diabetes and to enlist their support and assistance in the client's management of the condition.

Pharmacologic Interventions

Type 1

Insulin therapy as directed by physician (Table 2).

Type 2

Physician-initiated drug therapy:

Step 1: Monotherapy with oral hypoglycemic agents:

glyburide (Diabeta) or metformin (Glucophage) (**B class drugs**)

Metformin is a good choice for first-line therapy for obese clients with type 2 diabetes mellitus. It improves Hb_{A1C} levels but does not induce weight gain, is associated with fewer episodes of hypoglycemia than occur with other drugs, and reduces diabetic complications and all-cause mortality.

Step 2: Combine oral agents (glyburide plus metformin) until a maximum dose of each agent is reached

Step 3: Add bedtime insulin to oral agents *or* stop oral agent and start insulin

Step 4: Optimize insulin therapy

Step 5: When optimum insulin fails to control blood glucose, an oral agent (e.g., acarbose or metformin) is added to optimum insulin dosage

Low-dose ASA therapy should be considered a primary preventive therapy in high-risk clients (those > 30 years of age) with diabetes mellitus and a secondary preventive therapy in people with diabetes mellitus and large-vessel disease:

ASA (**A class drug**), 325 mg od

Monitoring and Follow-Up

Follow up every 4–6 weeks initially or more often as needed. Once stabilized, follow up three or four times a year. Monitoring should involve the following components:

- Assess compliance with medications, diet and exercise
- Review dietary journal with client and tailor diet plan to client's preferences and food availability
- Measure blood pressure and weight each visit
- Perform foot examination at least twice yearly
- Encourage weight loss if appropriate: aim to reduce excess body weight by about 0.5 kg/week (in most cases this can be achieved by reducing caloric intake by about 500 calories/day)
- Encourage client to exercise regularly (a daily walk is the best form of exercise for the general population)
- Exercise will help with weight control and will reduce blood glucose levels
- Measure fasting blood glucose as needed; measure Hb_{A1C} every 3–4 months if client is receiving insulin and every 6 months if client is receiving oral agents
- Urinalysis for gross protein: if result is *negative*, client should undergo yearly microalbuminuria screening and a random determination of daytime urinary albumin:creatinine ratio (type 2 diabetes mellitus); if result is *positive*, client should undergo 24-hour urine test for creatinine clearance and microalbuminuria every 6–12 months
- If nephropathy is diagnosed, follow-up monitoring (twice yearly) should include measuring serum potassium and creatinine and 24-hour urine test for total protein and creatinine clearance
- Annual electrocardiography (ECG) (if > 35 years of age)
- Annual fasting lipid profile
- Annual eye (dilated funduscopic) exam by physician

Referral

- Refer all newly diagnosed clients to a physician as soon as possible for complete evaluation
- Refer client to a dietician for initial assessment and dietary counseling if possible
- Arrange follow-up with a physician twice yearly if stable or more frequently as necessary

Table 2: Types of Insulin

Type	Time to Onset of Action	Peak Action	Duration of Action
Lispro	5–10 minutes	45 minutes	3–4 hours
Regular	30–45 minutes	2–5 hours	5–8 hours
NPH	1–3 hours	4–12 hours	18–24 hours
70/30	30–45 minutes	2–12 hours	18–24 hours
50/50	30–45 minutes	2–12 hours	18–24 hours
Lente	2–5 hours	7–15 hours	18–22 hours
Ultra-Lente	4–6 hours	8–20 hours	24–28 hours

PREVENTION STRATEGIES

Primary Prevention, Type 1 Diabetes Mellitus

There are no known proven strategies to prevent type 1 diabetes mellitus.

Primary Prevention, Type 2 Diabetes Mellitus

- The major focus of any diabetes strategy should be primary prevention
- Programs should be targeted to school children and their parents (to prevent diabetes in future generations) and to individuals who are at increased risk
- Primary prevention is aimed at weight control through a program of diet and exercise

Secondary Prevention

In addition to primary prevention, secondary prevention efforts are needed to improve metabolic control, follow-up and management of complications.

SCREENING STRATEGIES

Screening for Diabetes Mellitus

High-risk groups require aggressive screening for diabetes.

The *1998 Clinical Practice Guidelines for the Management of Diabetes in Canada* (Meltzer et al. 1998) recommended the following screening principles.

People > 45 years of age should be screened every 3 years. Screening should be annual for anyone with any of the following risk factors:

- Obesity (body mass index > 27 kg/m^2)
- First-degree relative with diabetes mellitus
- Member of a high-risk population (e.g., Aboriginal Canadian)
- Low level of high-density lipoprotein (HDL) (<0.90 mmol/L) or elevated fasting level of triglyceride (>2.8 mmol/L)
- History of gestational diabetes
- History of impaired fasting glucose tolerance (fasting blood glucose 6.1–6.9 mmol/L)
- History of impaired glucose tolerance (fasting blood glucose < 7.0 mmol/L, 2-hour pc blood glucose level [2 hours after oral GTT] 7.8–11.0 mmol/L)
- Hypertension
- Coronary artery disease
- Presence of complications associated with diabetes

Screening for Complications

People with type 1 and 2 diabetes mellitus require aggressive screening for retinopathy, nephropathy, neuropathy and cardiovascular disease.

The United Kingdom Prospective Diabetes Study Group (1998) showed that the risk of microvascular complications such as retinopathy, neuropathy and nephropathy can be reduced by tight glucose control (e.g., fasting blood glucose < 6.0 mmol/L), whether insulin or oral agents are used.

The *1998 Clinical Practice Guidelines for the Management of Diabetes in Canada* (Meltzer et al. 1998) recommended the following screening principles.

Retinopathy

- Screening and evaluation for retinopathy should be performed annually, starting 5 years after the onset of diabetes for those ≥ 15 years of age with type 1 diabetes and at the time of diagnosis for anyone with type 2 diabetes
- Interval for follow-up is based on severity of retinopathy
- In those with type 2 diabetes who have no or minimal retinopathy, the recommended interval is 2 years, but not to exceed 4 years
- Retinopathy findings necessitate referral to an ophthalmologist
- Development and progression of retinopathy may be prevented by achieving optimal metabolic control

Nephropathy

- Diabetic nephropathy is the primary cause of end-stage renal failure in Canada
- In addressing nephropathy, the focus is on preventing complications through early screening and detection
- Elevated microalbuminuria is the earliest and most reliable clinical sign of diabetic nephropathy in both type 1 and type 2 diabetes
- Screening for nephropathy should begin 5 years after onset of diabetes for those ≥ 15 years with type 1 diabetes and at the time of diagnosis for anyone with type 2 diabetes
- Recommended screening test is measurement of the albumin:creatinine ratio in a random daytime urine sample; if abnormal, a 24-hour urine test for microalbuminuria should be done
- Once nephropathy is diagnosed, follow-up monitoring (twice yearly) should include measurement of serum potassium and creatinine and 24-hour urine test for total protein and creatinine clearance

Neuropoathy

- Detectable neuropathy will develop within 10 years of onset of diabetes in 40% to 50% of patients with either type of diabetes mellitus
- Screening for peripheral neuropathy should be done annually to identify those at risk for foot ulcers
- Neuropathy can be detected by assessing decrease in or loss of ability to sense vibration, loss of sensitivity to a 10-g monofilament, or decrease in or absence of ankle reflexes

Cardiovascular Disease

- People with type 1 or 2 diabetes should be encouraged to adopt a healthy lifestyle to reduce their risk of coronary artery disease
- Clients should achieve and maintain healthy eating habits and a desirable weight, should engage in regular physical activity and should stop smoking
- A fasting lipid profile (total cholesterol, triglycerides, HDL cholesterol and calculated low-density-lipoprotein [LDL] cholesterol) should be carried out in diabetic adults, every 1–3 years as clinically indicated
- Treatment of dyslipidemia should be instituted for primary and secondary prevention of coronary artery disease
- Hypertension (blood pressure >140/90 mmHg) in people with diabetes mellitus should be aggressively controlled
- The United Kingdom Prospective Diabetes Study Group (1998) showed that tight blood pressure control (target blood pressure < 150/80 mm Hg), even more than tight glucose control, can dramatically reduce the risk of death and diabetic complications from cardiovascular events such as myocardial infarction and stroke.

HYPERTHYROIDISM

DEFINITION

One form of thyrotoxicosis in which an excess of thyroid hormone is secreted.

CAUSES

- Graves' disease
- Toxic multinodular goiter (which develops in response to some bodily need, e.g., pregnancy)
- Thyroid cancer
- Postpartum thyroiditis (onset 2–6 months postpartum) is a mild, short-term form

Risk Factors

- *For Graves' disease:* positive family history, female 20–40 years of age, other autoimmune disorders
- *For toxic multinodular goiter:* older age; recent exposure to iodine-containing medication (e.g., amiodarone or radiocontrast dye); long-standing simple goiter; conditions such as puberty or pregnancy; immunologic, viral or genetic disorders

HISTORY

- Usually woman between 20 and 40 years of age
- Symptoms (as listed below) variable in severity
- Fatigue, weakness
- Insomnia
- Weight loss with no change in diet or appetite
- Heat intolerance
- Excessive sweating
- Alterations in bowel habits (e.g., diarrhea, constipation)
- Menstrual changes (e.g., decreased menses)
- Restlessness, nervousness, irritability
- Inability to concentrate
- Mood swings (from depression to extreme euphoria)
- Visual changes (e.g., diplopia, photophobia, eye irritation, bulging eyes, decreased blinking)
- Difficulty swallowing, hoarse voice
- Palpitations
- Exertional dyspnea, fatigue, chest pain
- Edema (e.g., periorbital, in feet and ankles)
- Loss of hair, change in hair texture (hair becomes fine and silky)

Special considerations in the elderly client:

- Classic presentation may be absent
- Usually only three clinical signs: fatigue, weight loss, tachycardia
- Goiter is much less common in this age group

Special considerations in the pregnant client:

- Radioactive iodine is contraindicated in pregnancy
- Propylthiouracil is the drug of choice in pregnancy; however, it can induce hypothyroidism or cretinism in the fetus
- Thyrotoxicosis may improve during pregnancy but will relapse in the postpartum period

PHYSICAL FINDINGS

- Heart rate increased, may be irregular (client may present with atrial fibrillation)
- Blood pressure: systolic hypertension may be present
- Weight decreased
- Skin warm, moist and velvety; palms may be sweaty
- Hair thin and silky
- Eyes prominent or protruding, staring; lid lag present (exophthalmos)
- Only 50% of patients have enlargement of the thyroid gland
- Thyroid diffusely enlarged, smooth, possibly asymmetrical and nodular; a thrill may be felt or a bruit may be heard directly over the gland
- Heart: point of maximal impulse (PMI) displaced if enlargement has occurred; thrills or systolic murmur may be present
- Lungs normal unless in heart failure
- Liver and spleen enlarged
- Hands: fine resting tremor may be present
- Legs: bilateral non-pitting edema (pretibial myxedema)
- Hyperactive reflexes

DIFFERENTIAL DIAGNOSIS

- Transient thyroiditis
- Thyroid cancer
- Pheochromocytoma
- Menopause
- Anxiety

COMPLICATIONS

- Exophthalmos
- Loss of vision
- Corneal abrasions
- Atrial fibrillation
- Angina
- Heart failure
- Hypertension
- Thyrotoxic storm (rare)
- Osteoporosis (in elderly women)

DIAGNOSTIC TESTS

Measure TSH (will be decreased) and thyroxine (T_4) level (will be elevated).

MANAGEMENT

Goals of Treatment

- Identify complications (e.g., cardiac, ophthalmological)
- Relieve symptoms
- Return to euthyroid state
- Prevent complications

Appropriate Consultation

Consult a physician. Clients with hyperthyroidism require further investigation and treatment beyond the scope of practice of the nurse.

Nonpharmacologic Interventions

- Dietary modifications: high-calorie diet, frequent nutritious snacks, caffeine restriction
- Frequent rest periods to avoid fatigue
- Protection of the eyes to prevent irritation and abrasions: sunglasses, patches at night, use of artificial tears to prevent drying

Client Education

- Explain disease course and expected outcome
- Counsel client about appropriate use of medications (dose, frequency, side effects, avoidance of abrupt discontinuation)

Pharmacologic Interventions

Options for definitive treatment include radioactive iodine therapy and drug therapy.

Radioactive Iodine Therapy

One dose is usually sufficient. Permanent hypothyroidism requiring life-long replacement therapy is the notable complication.

Drug Therapy

Antithyroid drugs, e.g., propylthiouracil, which blocks synthesis of thyroid hormone. Clinical improvement in 2–3 weeks, euthyroid state achieved in 4–6 weeks on average.

Monitoring and Follow-Up

- Clients treated with radioactive iodine should be seen monthly until a euthyroid state achieved; thereafter, follow up every 6 months
- Monitor TSH level for hypothyroidism
- Elderly women with hyperthyroidism are at increased risk for accelerated bone loss; consider monitoring bone density annually in these clients

Referral

- Once diagnosis is confirmed, refer client to a physician
- Clients with eye involvement need referral to an ophthalmologist

HYPOTHYROIDISM

DEFINITION

A clinical state resulting from decreased secretion of thyroid hormones or from resistance to hormone action; this leads to a progressive slowing of all body functions. Myxedema is the severest form of hypothyroidism.

CAUSES

Primary Hypothyroidism

- Idiopathic decrease in production of hormone
- Autoimmune thyroiditis (Hashimoto's disease)
- Endemic iodine deficiency
- Congenital defects

Secondary Hypothyroidism

- Radioactive iodine therapy
- Thyroidectomy
- Insufficient dose of thyroid replacement therapy
- Subacute thyroiditis (after a viral illness)
- Acute bacterial thyroiditis (rare)
- Common in the postpartum period as subacute granulomatous thyroiditis
- Insufficient stimulation from the pituitary or hypothalamus axis (pituitary or adrenal disease)

Risk Factors

- Woman > 40 years of age (at highest risk)
- Presence of another autoimmune disorder
- Recent acute viral or bacterial infection
- Treatment with radioactive iodine
- Thyroidectomy
- Evidence of pituitary or hypothalamic disease
- Postpartum period

HISTORY

Symptoms may be subtle, insidious.

Early Symptoms

- Weakness
- Fatigue
- Cold intolerance
- Lethargy
- Dry, flaky skin
- Headache
- Menorrhagia
- Anorexia

Late Symptoms

- Slowing of intellectual and motor activity
- Absence of sweating
- Modest weight gain
- Constipation
- Periorbital and peripheral edema
- Pallor
- Hoarseness
- Decreased sense of taste and smell
- Muscle aches and stiffness
- Dyspnea
- Deafness
- Cessation of menses
- Night blindness
- Depression
- Infertility

PHYSICAL FINDINGS

- Heart rate decreased
- Blood pressure normal (diastolic hypertension may be present)
- Postural hypotension (with pituitary or hypothalamic failure)
- Facial pallor
- Jaundice may be present
- Puffiness of face and eyelids (myxedema)
- Thin, brittle nails
- Coarse, thin hair
- Occasional purpura
- Thickening of nose and lips in more advanced cases
- Poor skin turgor
- Dry, rough, thickened skin
- Thyroid gland may be enlarged
- Pleural effusion may be present
- Displaced apical beat (if enlargement of left ventricle has occurred)
- Heart sounds may seem distant
- Delayed return of deep tendon reflexes (Achilles)

DIFFERENTIAL DIAGNOSIS

- Thyroid cancer
- Euthyroid sick syndrome
- Nephrotic syndrome
- Nephritis
- Depression
- Dementia from other causes
- Heart failure

COMPLICATIONS

- Coronary artery disease, congestive heart failure
- Constipation, megacolon
- Increased susceptibility to infection
- Mental disturbances including depression, organic psychosis
- Myxedema coma
- Infertility
- Hypersensitivity to opiates
- Adrenal crisis with vigorous treatment
- Bone demineralization from overtreatment for long period

DIAGNOSTIC TESTS

- Measure TSH (which will be elevated) and T_4 (which will be decreased)
- Obtain blood sample for complete blood count (hemoglobin may be reduced)
- Measure cholesterol and triglycerides (hyperlipidemia common)
- Perform liver function tests (LFTs) (if jaundice present)

MANAGEMENT

Goals of Treatment

- Return to euthyroid state
- Prevent complications

Appropriate Consultation

Consult with a physician if the TSH level is elevated. Clients with hypothyroidism may require further investigation, and thyroid replacement medication may need to be instituted.

Nonpharmacologic Interventions

Client Education

- Explain nature, course and prognosis of disease
- Counsel client about appropriate use of medications, including side effects
- Emphasize the need for lifelong treatment and the dangers of not taking medications
- Teach client about signs and symptoms of hyperthyroidism (indicating medication overdose) and hypothyroidism (indicating medication underdose)
- Provide dietary advice (e.g., increase fiber and fluids to prevent constipation)

Pharmacologic Interventions

levothyroxine (Eltroxin) (**B class drug**), 100–150 µg PO od

The dose is titrated to the lowest dose needed to maintain a euthyroid state. The drug should be taken on an empty stomach, as dietary fiber can interfere with absorption.

Monitoring and Follow-Up

- Follow up every 6 weeks until stabilized
- Monitor weight, blood pressure and energy level
- Assess compliance with medications
- Monitor TSH and T_4 levels every 6 weeks until euthyroid state is attained
- Follow up every 6–12 months after TSH level is normalized

Referral

Arrange follow-up with a physician as required:

- During initial replacement phase
- Whenever symptoms are not controlled by therapy
- If there is evidence of complications
- Once yearly when maintenance dose is established

OSTEOPOROSIS

DEFINITION

Generalized, progressive disorder of bone metabolism characterized by reduction of bone tissue mass, resulting in bone fragility.

CAUSES

Rarely due to a single factor.

Primary Osteoporosis

- Type 1 results from postmenopausal endocrine changes and occurs between 51 and 75 years of age
- Type 2 occurs in people > 70 years of age and probably results from age-related reduction in vitamin D synthesis or resistance to vitamin D effects

Secondary Osteoporosis

- Endocrine basis: glucocorticoid excess, hyperthyroidism, hyperparathyroidism, diabetes mellitus
- Drug-induced: corticosteroids, barbiturates, heparin, thyroid hormones
- Other causes: chronic renal failure, liver disease, chronic obstructive pulmonary disease (COPD), rheumatoid arthritis, malignant disease, Cushing's syndrome, multiple myeloma

Risk Factors

- Family history
- Older age
- Female sex
- Low initial bone mass (slender body frame)
- Menopause (estrogen deficiency)
- Deficient calcium and vitamin D intake or absorption
- Smoking
- Excessive alcohol consumption
- Excessive coffee intake
- Sedentary lifestyle (with reduced stress on bones)

HISTORY

- Postmenopausal female (90% of cases)
- Generalized aching in bones, particularly lower back
- Non-traumatic fractures, often of weight-bearing bones of spine
- Progressive structural changes of spine (e.g., kyphosis and lordosis)
- Loss of height
- Minimal trauma may cause hip and Colles' fractures

PHYSICAL FINDINGS

- Usually thin, frail elderly woman
- Various degrees of bony deformity, often of spine (kyphosis)
- Height decreased (compared with known previous height)
- Bone tenderness to deep palpation may be present (particularly over tibia)
- Difficulty with mobility

DIFFERENTIAL DIAGNOSIS

- In premenopausal women and in men, rule out organic disease (*see "Causes, Secondary Osteoporosis," above*)
- Osteoarthritis
- Renal or collagen disease
- Metastatic bone disease
- Multiple myeloma
- Hyperthyroidism

COMPLICATIONS

- Vertebral crush fractures
- Physiological fractures
- Chronic pain and disability

DIAGNOSTIC TESTS

- Screening tests: complete blood count and erythrocyte sedimentation rate (ESR); levels of glucose, TSH, parathyroid hormone, estrogen, alkaline phosphatase, calcium, vitamin D
- Bone densitometry test (but do not order this test until you have consulted with a physician)

MANAGEMENT

Goals of Treatment

- Primary prevention
- Reduce rate of bone loss in elderly clients
- Detect and manage fractures

Nonpharmacologic Interventions

- Ensure adequate calcium and vitamin D intake in diet (dietary sources of calcium include salmon, sardines, green vegetables, cheeses, skim milk)
- Recommend an exercise program (walking 50–60 minutes three times a week provides optimum benefit)
- Provide smoking cessation counseling (if applicable)
- Encourage elimination of alcohol and caffeine from diet
- Assess home environment for hazards to mobility; modify or provide aids as required

Client Education

- Explain disease course and outcome: this is a chronic condition that can be controlled but not cured; pain is often chronic
- Counsel client about appropriate use of medications (dose, frequency, side effects, importance of compliance)
- Advise client to return to clinic for assessment if character of pain changes or if pain becomes more severe

Pharmacologic Interventions

Preventive Therapy

Calcium and Vitamin D Supplementation

Elemental calcium, 1000 mg daily, for all postmenopausal women (increase to 1500 mg if client is not receiving hormone replacement therapy [HRT])

Vitamin D 400 IU daily for all postmenopausal women (increase to 800 IU if client is not receiving hormone replacement therapy)

If dietary intake insufficient:

calcium carbonate (Apo-cal) (**B class drug**), 500 mg, 1 tab PO bid–tid

with or without

vitamin D (**B class drug**), 400–800 IU daily

Hormone Replacement Therapy

estrogen (Premarin) (**B class drug**), 0.625 mg PO od

and

progesterone (Provera) (**B class drug**) if uterus intact

Treatment

Women with symptomatic osteoporosis who are unable or unwilling to use estrogen may benefit from bisphosphonate drug therapy, e.g., etidronate (Didrocal) (**B class drug**).

Monitoring and Follow-Up

- Women should undergo Pap smear testing when HRT is started and should be seen 1–2 months later
- Women receiving treatment for established osteoporosis should undergo repeat bone densiometry every 1.5–2 years until clinical condition stabilizes

People taking calcium supplements may be at risk for kidney stones.

Some women do not respond to HRT and continue to lose bone tissue. It is appropriate to monitor those at high risk for osteoporosis more closely.

Referral

Refer the following clients to a physician for assessment:

- Women in menopause (for prophylactic hormone replacement)
- Women with high risk for or clinical evidence of osteoporosis
- Anyone in whom fracture is suspected

METABOLIC EMERGENCIES

DIABETIC KETOACIDOSIS

DEFINITION

A condition due to insulin deficiency that is characterized by hyperglycemia, ketonemia, ketonuria, acidosis and dehydration.

CAUSES

Diabetic ketoacidosis may be the initial manifestation of type 1 diabetes mellitus.

- Noncompliance with diet
- Failure to take insulin properly
- Concurrent illness or infection or failure to adjust diabetic regimen when ill
- Inadequate insulin (dose, type)

HISTORY

- Gradual onset
- Malaise, weakness, marked fatigue
- Thirst
- Polyuria, polydipsia, polyphagia
- Weight loss
- Anorexia
- Nausea and vomiting
- Abdominal pain
- Muscle aches
- Headache
- Blurred vision
- Reversible paresthesia in fingertips

PHYSICAL FINDINGS

- Client appears ill
- Temperature normal unless intercurrent infection present
- Heart rate rapid
- Respirations deep and rapid (Kussmaul respiration)
- Blood pressure normal or may be low
- Postural blood pressure drop
- Reduced level of consciousness may be present
- Fruity odor on breath
- Mucous membranes dry
- Skin warm and dry, loss of turgor

DIFFERENTIAL DIAGNOSIS

- Hypoglycemia
- Other causes of stupor or coma (e.g., stroke, head injury, alcohol or drug overdose)

COMPLICATIONS

- Severe dehydration
- Electrolyte imbalance (e.g., hyponatremia, hypokalemia, hyperkalemia, decreased serum bicarbonate)
- Cerebral edema related to overaggressive rehydration
- Hypoglycemia related to overcorrection of hyperglycemia
- Gastric dilatation
- Paralytic ileus

DIAGNOSTIC TESTS

- Determine concentration of ketones in urine
- Determine random blood glucose level with glucometer
- Draw blood for baseline creatinine and electrolyte levels and complete blood count
- If client is older, also draw blood for levels of cardiac enzymes
- ECG may be helpful: look for the tall T-wave of hyperkalemia and watch for signs of silent myocardial infarction in the older diabetic client

MANAGEMENT

The reversal of diabetic ketoacidosis should be gradual to prevent overcorrection.

Goals of Treatment

- Assess and stabilize airway, breathing and circulation (ABC): ensure that airway is patent and protected, and that ventilation is adequate in any client with reduced level of consciousness
- Rehydrate
- Identify precipitating factors
- Treat any underlying cause (e.g., infection)
- Reduce blood glucose to about 13.8 mmol/L

Appropriate Consultation

Consult a physician immediately after stabilization of ABC.

Adjuvant Therapy

Oxygen at 4–6 L/min or more as needed; keep oxygen saturation > 97% to 98%.

Intravenous Therapy

Reversing the dehydration will assist in reducing the blood glucose level.

- Start IV therapy with 0.9% normal saline
- Run at 500–1000 mL/h (10–20 mL/kg per hour) for 1–4 hours
- Then change to 0.45% normal saline IV fluids (if available)
- Run at about 250–500 mL/h for 4–6 hours
- After this, adjust IV infusion rate according to clinical response, state of hydration and ongoing urinary losses

When blood glucose level reaches 11 mmol/L, change to 5% glucose at 100 mL/h to prevent rebound hypoglycemia.

Nonpharmacologic Interventions

- Insert indwelling urinary catheter
- Insert nasogastric tube if client is comatose

Pharmacologic Interventions

Consult a physician to start insulin therapy.

Regular Humulin insulin is generally used, unless client is known to be receiving animal insulin.

Initial bolus dose:

regular insulin (**B class drug**), 0.1–0.2 units/kg IV stat

Further doses are based on response in terms of lowering of blood glucose. Aim is to reduce blood glucose by 2.5–3.0 mmol per hour.

Monitoring and Follow-Up

- Check blood glucose hourly and before insulin administration: avoid falls in glucose > 5.5 mmol per hour
- Monitor heart rate, blood pressure, postural blood pressure changes and mental status frequently
- Undertake cardiac monitoring if available
- Measure intake and output hourly; test urine for ketones hourly (hyperglycemia will resolve before ketonuria)
- Assess ongoing urinary losses; replace urinary losses that exceed the maximum normal amount by adjusting the IV rate (the maximum normal urine output is 2 mL/kg each hour)
- Clients may take fluids orally when they can be tolerated

Referral

Medevac as soon as possible.

HYPOGLYCEMIA

DEFINITION

Subnormal blood glucose level.

CAUSES

- Delayed meal
- Inadequate total caloric intake
- Unusual physical exertion
- Insulin measurement error
- Insulin overdose
- "Brittle" diabetic

HISTORY

- Sudden onset
- Hunger
- Sweating
- Shakiness, tremor
- Anxiety, restlessness
- Faintness, weakness
- Nausea
- Palpitations
- Progression to mental confusion, bizarre behavior, personality changes, reduced consciousness or loss of consciousness, seizures

PHYSICAL FINDINGS

- Heart rate rapid
- Blood pressure elevated
- Pale
- Diaphoretic
- Anxious, restless
- Tremor
- Confusion
- Bizarre or aggressive behavior
- Staggering gait, may appear intoxicated
- Unconscious or experiencing seizure
- Cold, clammy skin

DIFFERENTIAL DIAGNOSIS

- Alcohol intoxication
- Alcohol-induced hypoglycemia
- Drug-induced hypoglycemia (e.g., overdose)

COMPLICATIONS

- Injury due to a fall
- Hypoxia of brain
- Seizures
- Death

DIAGNOSTIC TESTS

Determine blood glucose level with glucometer (< 3.3 mmol/L is the autonomic warning level; if ≤ 2.8 mmol/L, client will have symptoms of neuroglycemia).

MANAGEMENT

Goals of Treatment

- Increase blood glucose level quickly
- Identify intercurrent illness or associated injury

Nonpharmacologic Interventions

- Assess and stabilize ABC
- Ensure that the airway is patent and protected and that ventilation is adequate
- Give the conscious client 12 oz (360 mL) sweetened orange juice or some other form of rapidly absorbed sugar
- If the client is taking acarbose in conjunction with insulin or sulfonylureas, use milk or glucose tablets

Adjuvant Therapy

Adjuvant therapy should be undertaken if client is nauseated, stuporous or unconscious or is unable to take oral therapy.

– Oxygen 4–6 L/min or more as needed; keep oxygen saturations at 97% to 98%
– Start IV therapy with 5% dextrose in water (D5W) at 100–150 mL/h

Pharmacologic Interventions

dextrose (**D class drug**), 50% solution, preloaded syringe, 25–50 mL IV stat over 1–3 minutes

or

glucagon (**D class drug**), 0.5–1.0 mg SC, IM or IV

Monitoring and Follow-Up

– Observe response to treatment
– Recheck serum glucose level immediately
– When client regains consciousness or recovers, obtain an accurate history and do a thorough examination
– Identify any associated illness, previous episodes of hypoglycemia, head trauma or other injuries
– Give client a balanced meal
– Monitor glucose hourly with glucometer for recurring hypoglycemia

Appropriate Consultation

Consult a physician as soon as possible after emergency interventions to discuss further care unless cause of hypoglycemia is obvious.

Referral

Medevac client if you are unable to stabilize blood glucose or if underlying cause is not clear; otherwise discharge home when condition has stabilized.

Admission Criteria

– No obvious cause for episode
– Client is taking an oral hypoglycemic agent or long-acting insulin
– Client has persistent neurological deficits

Discharge may be considered after a high-carbohydrate meal if:

– Obvious cause has been found and treated
– Episode was rapidly reversed

CHAPTER 11 – COMMUNICABLE DISEASES

Table of Contents

Communicable Diseases in Children

For information about communicable diseases more commonly seen in children, refer to the *MSB Clinical Guidelines in Pediatrics for Northern Nursing Stations* (Medical Services Branch, Health Canada, 1995). These guidelines cover the following topics:

- Diphtheria
- Pertussis
- Measles
- Mumps
- Rubella
- Chickenpox
- Botulism
- Pinworms
- Meningitis
- Acquired immunodeficiency syndrome (AIDS)

Human Immunodeficiency Virus

For information about HIV infection and AIDS, refer to the *MSB Guidelines for Delivery of HIV/AIDS Programs and Services* (Medical Services Branch, Health Canada, 1995).

Immunization

For information about and guidelines for vaccination and immunization, refer to the *Canadian Immunization Guide*, 5th ed. (Health Canada, 1998).

COMMON COMMUNICABLE DISEASES

SEXUALLY TRANSMITTED DISEASES

HISTORY OF PRESENT ILLNESS AND REVIEW OF SYSTEM

When investigating any possible sexually transmitted disease (STD) the practitioner must obtain the following information in a nonjudgmental, factual manner.

General History

A detailed, comprehensive sexual history is mandatory.

- Site(s) of sexual contact (vaginal, oral, anal)
- Sexual orientation (homosexual, bisexual, heterosexual)
- Use of condoms to prevent STDs
- Use of other birth control methods
- Number of sexual partners in recent past
- History of sex with injection drug users
- Exchange of sex for money or drugs
- Period since last sexual intercourse with most recent partner
- Previous history of STDs
- Present symptoms of STDs in client and in his or her partner(s)
- Injection drug use, needle-sharing
- Enlargement of lymph nodes
- Fever or chills

Specific History

Men

- Urethral discharge (amount, color and time of day it is most noticeable [in urethritis the discharge is most prominent after a long period without voiding])
- Dysuria
- Itch or irritation in distal urethra or meatus
- Pain or swelling in the scrotum or inguinal region
- Genital rash or lesions
- Rectal discharge, itch or pain
- Joint pain, arthritis, conjunctivitis, rash at other body sites

Women

- Vaginal discharge (amount and color, presence of vaginal itch)
- Painful intercourse on penetration or deep dyspareunia
- Burning sensation with urination (as urine passes over the external genitalia)
- Genital rashes or lesions
- Lower abdominal pain
- Postcoital, midcycle or excessive menstrual bleeding
- Dysuria, frequency, urgency, nocturia, he maturia
- Joint pain, arthritis, conjunctivitis, rash at other body sites, enlargement of lymph nodes, fever
- Last menstrual period and any possibility of pregnancy

EXAMINATION OF THE SYSTEM

When an STD is suspected, the practitioner is advised to perform a detailed, comprehensive examination of the entire genitourinary region, as well as a full extragenital examination to detect other manifestations of the possible STD. Remember to inspect the pubic hair for lice and nits and the perianal region for abnormalities.

Pay special attention to the pharynx, the conjunctiva, the lymph nodes, the joints and the skin on the lower abdomen, thighs, palms, forearms and soles.

Physical Examination

Men

- Inspect and palpate the penis and glans for lesions
- Retract foreskin if required
- Examine meatus for urethral discharge
- Milk urethra from base of penis to glans three or four times to detect small amounts of discharge
- Inspect and palpate scrotum for heat, tenderness, swelling and lesions
- Examine perianal area

Women

- Genital examination must also include a speculum examination with adequate visualization of the cervical os
- Inspect and palpate the external genitalia, including the labia, to detect lesions, swelling, erythema, discharge
- Inspect color of vaginal walls
- Observe the amount and color of vaginal and endocervical discharge
- Wipe off secretions overlying the cervix, and inspect for erythema and edema
- Monitor for bleeding induced by taking endocervical swabs

Differential Diagnosis of STDS

The client's symptoms and signs may suggest the specific STD (Table 1).

Diagnostic Tests

Men

- Obtain samples from urethra, rectum and pharynx to be cultured for *Chlamydia* and *Neisseria gonorrheae*
- Obtain sample for VDRL test (for syphilis)
- Obtain samples for viral culture (e.g., herpes; dark-field smear for syphilis), which may be warranted if there are genital lesions
- Offer HIV counseling and testing if client has apparent risk factors

Women

- Obtain samples from the endocervix, rectum and pharynx to be cultured for *Chlamydia*, *N. gonorrheae* and other bacteria
- Obtain potassium hydroxide wet mount (to test for *Candida*) and saline wet mounts (to test for *Trichomonas* and bacterial vaginosis)
- Observe for clue cells on saline wet mount
- Perform "whiff test" of vaginal secretions
- Offer HIV counseling and testing if client has apparent risk factors

CLINICAL PRESENTATION AND MANAGEMENT

For a complete discussion of the clinical presentation and treatment of STDs, refer to and follow the *Canadian STD Guidelines* (Health Canada, 1998).

Table 1: Symptoms and Signs of Some Sexually Transmitted Diseases

Symptoms and Signs	Possible STD Syndrome
In men	
Urethral discharge, burning on urination, urethral or meatal itch	Urethritis
Painful genital ulcers or lesions, painful inguinal lymphadenopathy	Genital ulcer disease (e.g., genital herpes, syphilis, chancroid)
Painless genital lesions with or without inguinal lymphadenopathy	Genital ulcer disease, genital warts (condyloma accuminata or human papillomavirus infection)
Acute onset of unilateral scrotal pain or swelling	Epididymitis
Rectal discharge, rectal bleeding, tenesmus constipation	Proctitis
In women	
Vaginal discharge, odor, genital itch, introital dyspareunia, external dysuria	Vulvovaginitis (e.g., *Trichomonas vaginalis* infection)
Recent onset of abdominal pain, unusual vaginal bleeding, deep dyspareunia, with or without genital discharge	Cervicitis or pelvic inflammatory disease
Painful genital ulcers or lesions, painful inguinal lymphadenopathy	Genital ulcer disease (e.g., genital herpes, syphilis, chancroid)
Painless genital lesions with or without inguinal lymphadenopathy	Genital ulcer disease, genetal warts (e.g., condyloma accuminata or human papillomavirus infection)
Rectal discharge, rectal bleeding, tenesmus constipation	Proctitis

CONTACT TRACING

General Principles

- A client who presents with symptoms suggestive of an STD should be considered an index case until proven otherwise.
- Investigate this symptomatic client by obtaining appropriate swab and blood samples, and treat with appropriate medications as if the test results were positive.
- Obtain a list of all sexual contacts in the past month. Fill out the appropriate reporting forms and send to the Public Health Department.
- If the test results are negative for an STD, further steps are not necessary.
- If the test results are positive for an STD, call in the contacts of the index case.
- Treat each contact as if he or she were a new index case.
- Obtain the appropriate swab and blood samples from each contact.
- Treat each new index case with appropriate medications as if the test results were positive.
- Index cases should be treated with the appropriate antibiotic(s) at the time of presentation because of the length of time required to receive test results.
- Be alert to the fact that notifiable diseases may differ from one province or territory to another. Become familiar with the notifiable diseases in your province or territory and report accordingly.

HEPATITIS

DEFINITION

Inflammation of liver cells resulting in necrosis and bile stasis.

CAUSES

Five distinct viruses: hepatitis A virus, hepatitis B virus, hepatitis C virus, hepatitis D virus and hepatitis E virus (not seen in Canada) (Table 2).

HISTORY

The five types of hepatitis are similar in clinical presentation and therefore cannot be readily distinguished by clinical features. Serologic testing is needed for accurate diagnosis. The severity of symptoms depends on the infective agent, and many of those infected are asymptomatic.

- Fever (unusual with hepatitis B or C, occurs in 60% of those with hepatitis A)
- Malaise
- Nausea and vomiting
- Anorexia
- Dark, tea-colored urine
- Abdominal pain, especially in right upper quadrant
- Jaundice (in 60% of affected adults)
- Headache

PHYSICAL FINDINGS

Findings depend on stage of disease.

- Temperature may be elevated in pre-icteric phase
- Client appears mildly-to-moderately ill
- Lethargy
- Sclera jaundiced
- Skin jaundiced
- Liver may be tender and enlarged; edge of liver smooth and soft
- Bowel sounds normal
- Bruising (a sign of severe disease)

DIFFERENTIAL DIAGNOSIS

- Hepatic cancer
- Cirrhosis
- Infectious mononucleosis
- Alcohol-induced hepatitis
- Drug-induced hepatitis
- Obstructive jaundice

Table 2: Comparison of Five Forms of Viral Hepatitis

Form	Transmission	Incubation Time	Chronicity
A	Fecal–oral	15–50 days	No
B	Parenteral, sexual, perinatal	45–160 days	Yes (1% of cases)
C	Parenteral	14–140 days	Yes (70% of cases)
D	Parenteral; may coexist with hepatitis B	Unknown	Yes
E	Fecal–oral	14–60 days	No

COMPLICATIONS

- Fulminant hepatitis (occurs in 0.1% of cases, but prevalence is higher among pregnant women)
- Spread to close contacts or community

DIAGNOSTIC TESTS

- Take sample for urinalysis: urine dark, tea-colored; dipstick test positive for bilirubin
- Perform liver function tests (LFTs): increased AST (aspartate aminotransferase) and ALT (alanine aminotransferase) (ALT in particular shows marked elevation)
- Measure alkaline phosphatase (mild-to-moderate increase)
- Measure bilirubin (normal to markedly elevated)
- Perform hepatitis serology screening (see Table 3 for details of findings)

It is impossible to distinguish a flare-up of chronic hepatitis B or C from acute cases; only over time will it be possible to identify a carrier of the virus.

MANAGEMENT

Hepatitis is a reportable communicable disease. In most cases no specific therapy is indicated, and it usually resolves spontaneously in 4–8 weeks without complications or sequelae.

Clients are most infective before the onset of jaundice. Virus may be shed for up to 1 week after jaundice appears.

Goals of Treatment

- Prevent disease
- Minimize liver damage
- Reduce spread of infection

Appropriate Consultation

Consult a physician for all cases except those that are clearly mild hepatitis A and for any client who is acutely ill at the time of presentation.

Nonpharmacologic Interventions

- Increase hydration (8–10 glasses of fluid daily)
- Adequate, well-balanced diet
- Abstention from alcohol for 3–4 months
- Activity as tolerated
- Client should be symptom-free before returning to work and usual routines

Community Outbreaks of Hepatitis A

During community outbreaks of hepatitis A, advise community members about the following preventive measures:

- Water purification (boiling of water for 20 minutes) before drinking
- Impeccable hand-washing to reduce fecal–oral spread
- Sanitary disposal of fecal material
- Use of separate linens and dishes may be helpful but proper cleansing of these items is more important

Pharmacologic Interventions

Provide symptomatic treatment of symptoms such as fever, nausea and vomiting, pruritis and abdominal pain:

acetaminophen (Tylenol) (**A class drug**), 325 or 500 mg, 1–2 tabs PO q4h prn

and

dimenhydrinate (Gravol) (**A class drug**), 5 mg PO q6h prn

- Any hepatotoxic drugs should be identified and discontinued until recovery is complete
- *Stop* oral contraceptives to avoid cholestatic symptoms, and counsel client about alternative contraceptive method

Table 3: Serologic Features of Viral Hepatitis

Form	Serologic Marker	Interpretation
A	IgM anti-HAV	Acute disease
	IgG anti-HAV	Remote infection and immunity
B	HB_SAg	Acute or chronic disease
	HB_eAg	Active replication
	IgM anti-HB_CAg	Acute disease
	IgG anti-HB_CAg	Acute disease
	• HB_SAg positive	Chronic disease
	• HB_SAg negative	Prior exposure
C	Anti-HCV	Acute, chronic or unresolved disease; co-infection with HIV
D	HB_SAg and anti-HDV	Acute disease
	• IgM anti-HB_CAg positive	Co-infection with HBV
	• IgG anti-HB_CAg positive	Superinfection
E	None	

HAV = hepatitis A virus, HB_SAg = hepatitis B surface antigen, HB_eAg = hepatitis B e antigen, HB_CAg = hepatitis B core antigen, HCV = hepatitis C virus, HDV = hepatitis D virus, HBV = hepatitis B virus.

Monitoring and Follow-Up

- Follow up all acute cases of hepatitis A in 24–48 hours to re-evaluate condition. After that, see client weekly for 2–4 weeks and again at 6 weeks to verify resolution of symptoms.
- Repeat LFTs at 6 weeks (in acute hepatitis B and C, elevation of liver enzymes may be prolonged, so LFTs should be repeated every 3 months until normal).
- Clients with chronic hepatitis B and C should be seen every 3–4 months for symptoms and signs, and liver function should be monitored.

Referral

- Referral to a physician is required for further assessment, diagnosis and investigation for all but hepatitis A, as hepatitis B, C and D can become chronic
- Medevac anyone who is acutely ill at time of presentation

PREVENTION OF SPREAD AND MANAGEMENT OF CONTACTS

Management of contacts depends on the underlying cause of disease.

Hepatitis A

Immune serum globulin is effective in preventing or modifying hepatitis A in household contacts:

immune globulin (**A class drug**), 0.02 mL/kg

Use of immune globulin more than 2 weeks after last exposure is not indicated.

Routine prophylaxis with hepatitis A vaccine is not indicated but is advisable for people traveling to areas of high prevalence, for people living in areas where disease is endemic and there are recurrent outbreaks, for immunocompromised people (e.g., HIV-positive clients) and for gay men.

This vaccine is not yet one of those routinely supplied by provincial government programs. Check with the public health department in your region for information on how to obtain this vaccine for a client who might benefit from prophylaxis.

Control measures: Impeccable hand-washing to prevent fecal–oral spread is the key. Sanitary disposal of feces is also important.

Children and adults with hepatitis A should be excluded from school, daycare and work places until at least 1 week after onset of illness (until jaundice disappears).

Schoolroom exposure does not generally pose a risk to others, and mass vaccination with immune globulin is not indicated.

Hepatitis B

Immunoprophylaxis with hepatitis B vaccine is indicated for all persons at risk, and in many provinces it has become a routine part of the childhood vaccination program.

Groups at risk: healthcare workers, dialysis patients, recipients of blood or blood products, injection drug users, sexually active homosexual males, people in household or sexual contact with an infected person, people with needlestick injury, people engaging in high-risk sexual behavior (e.g., receptive anal intercourse), newborns of infected mothers.

Give:

hepatitis B vaccine, 1.0 mL IM at 0, 1 and 6 months (3 doses) (where time zero is the time of the first dose)

Hepatitis B human immune globulin 0.06 mg/kg IM can be given within 24 hours of percutaneous or permucosal exposure (e.g., needlestick injury) in a previously un-immunized person. Follow with three doses of hepatitis B vaccine as outlined above.

Hepatitis C

There are no specific prevention strategies other than avoidance of contact with the blood of an infected person through universal blood and body fluid precautions. Safe sex practices are recommended. Once infected, minimal alcohol use (< 4 drinks/week) is important to prevent liver damage.

Hepatitis D

Hepatitis D cannot be transmitted except in the presence of hepatitis B virus. Prevention of hepatitis B is therefore key in preventing hepatitis D. Universal precautions for blood and body fluids should be observed.

Hepatitis E

Immunoprophylaxis for hepatitis E (which is not seen in Canada) does not exist. Prevention through good sanitation and hygiene is key.

MONONUCLEOSIS (INFECTIOUS)

DEFINITION

Acute viral infection with classic triad of symptoms: fever, pharyngitis and enlarged lymph glands.

CAUSES

- Epstein–Barr virus
- Spread from person to person by the oropharyngeal route (via saliva), and only rarely by blood transfusion
- Incubation period 4–6 weeks
- Period of communicability is prolonged, and pharyngeal excretion of virus may persist for a year or more after illness

HISTORY

Adolescents and young adults are most often affected.

- Fever
- Sore throat
- Fatigue, malaise
- Headache
- Eyelid and orbital swelling
- Lymph glands swollen (especially posterior cervical glands)

PHYSICAL FINDINGS

- Temperature may be mildly elevated
- Client appears tired
- Eyelid and periorbital edema (in 35% of cases)
- Pharynx red, swollen; may have tonsillar exudate
- Petechiae on the palate (in 35% of cases)
- Enlargement of lymph nodes of the neck (especially posterior cervical nodes) (in 85% of cases)
- Splenomegaly (in 45% of cases)
- Hepatomegaly (in 35% of cases)

DIFFERENTIAL DIAGNOSIS

- Group A streptococcal (GAS) pharyngitis
- Hepatitis
- Viral pharyngitis
- Cytomegalovirus infection
- Toxoplasmosis
- Secondary syphilis
- Rubella

COMPLICATIONS

- Guillain–Barré syndrome
- Hepatitis
- Aseptic meningitis
- Encephalitis
- Hemolytic anemia
- Thrombocytopenia
- Agranulocytosis
- Myocarditis
- Splenic rupture

DIAGNOSTIC TESTS

- Obtain serum sample for mononucleosis spot test
- Complete blood count (lymphocytosis is characteristic)
- Take a throat swab to rule out group A streptococcal (GAS) pharyngitis

MANAGEMENT

Goals of Treatment

- Provide supportive care until recovery
- Prevent complications

The duration of the illness is variable, with the typical, uncomplicated illness lasting 3–4 weeks.

Nonpharmacologic Interventions

- Warm salt water gargles for sore throat

Client Education

- Advise client to eat foods as tolerated, but recommend well-balanced nutrition
- Advise client to undertake activity as tolerated; help client to plan a realistic schedule of rest, with modification of school or work responsibilities as needed
- Suggest increasing fluid intake, which may be beneficial
- Teach client good hand-washing technique to prevent spread, but client does not need to be isolated from others
- Suggest that client decrease stress if possible
- Recommend that client avoid contact sports for at least 1 month or until full resolution of enlarged spleen because of the increased risk of splenic rupture

Pharmacologic Interventions

Mild analgesic:

ibuprofen (Motrin) (**A class drug**),
200 mg, 1–2 tabs PO q4h prn

or

acetaminophen (Tylenol) (**A class drug**),
325 or 500 mg, 1–2 tabs PO q4h prn

Monitoring and Follow-Up

Follow up once weekly until symptoms resolve.

Appropriate Consultation

Consult a physician if symptoms persist for more than 3 weeks or if there are any complications, such as jaundice or neurological symptoms.

Referral

Not usually required.

BACTERIAL GASTROENTERITIS

DEFINITION

Bacterial infection of gastrointestinal (GI) tract.

CAUSES

The two most common causative organisms are *Salmonella* and *Shigella*.

Salmonella

- Transmission by fecal–oral route
- Primary reservoir in animals, including poultry, livestock and the foods obtained from them, and pets such as turtles and chicks

Shigella

- Feces of infected humans are the source; no animal reservoir known
- Ingestion of contaminated food or water is most common route of transmission in adults
- Infection most common in children 1–4 years of age (important problem in daycare centres)

HISTORY AND PHYSICAL FINDINGS

The history and physical findings differ for the two causative agents (Table 4).

SIGNS OF DEHYDRATION

- Blood pressure normal or low if dehydration is significant
- Postural blood pressure drop may be present in early moderate dehydration
- Eyes sunken, mucus membranes dry
- Skin warm, dry, with poor turgor

DIFFERENTIAL DIAGNOSIS

- Viral gastroenteritis
- Giardiasis
- Ulcerative colitis

COMPLICATIONS

- Dehydration
- Death in elderly or debilitated clients

DIAGNOSTIC TESTS

- Obtain three consecutive stool samples for culture and sensitivity

Table 4: History and Physical Findings for *Salmonella* and *Shigella* Infection

Salmonella	*Shigella*
History	**History**
Symptoms begin 8–48 hours after ingestion of contaminated food or water	Spread by fecal–oral route or through contaminated food
Generally an acute, self-limited illness, lasting 3–6 days	Incubation ranges from 1 to 7 days (typically 2–4 days)
Usually several members of household or community are affected	Condition usually resolves within 4–8 days
Sudden onset of colicky abdominal pain	Usually more than one member of household or community is affected
Watery brown diarrhea, may contain blood and mucus	Sudden onset of fever, anorexia, vomiting, gripping abdominal pain
Fever	Initially, stool is formed
Nausea and vomiting may be present	Passage of stool temporarily relieves abdominal pain
Headache	Stools become more frequent and less solid (diarrhea)
Myalgia	Diarrhea is watery brown and contains mucus, blood and pus
Physical Findings	**Physical Findings**
Temperature may be elevated	Temperature elevated
Heart rate may be elevated	Heart rate elevated
Client appears moderately ill	Client appears ill, may double over with waves of abdominal pain
Abdomen may be distended	Abdomen may be distended
Stool watery brown, possibly streaked with blood	Stool watery brown and contains blood, mucus and pus
Bowel sounds hyperactive	Bowel sounds hyperactive
Abdomen diffusely tender	Abdomen diffusely tender

MANAGEMENT

Goals of Treatment

- Prevent complications
- Prevent spread of infection to others
- Identify asymptomatic household carriers of *Salmonella*

Infection with *Salmonella* and *Shigella* are notifiable communicable diseases.

Appropriate Consultation

Consult a physician for treatment of clients who are immunocompromised or debilitated and those who have severe symptoms or are dehydrated.

Nonpharmacologic Interventions

Refer to "Diarrhea," in chapter 5, "Gastrointestinal System," for details of general management of diarrhea.

Rehydrate with small amounts of fluids, given frequently; use oral rehydration fluids if necessary or IV therapy if serious dehydration is present (*see "Dehydration" in chapter 5, "Gastrointestinal System"*).

Client Education

- Recommend increased rest during acute phase
- Recommend water purification (boiling all water used in the house for 20 minutes)
- Counsel client about appropriate personal hygiene (hand-washing after touching soiled material and after using the washroom; separate utensils)
- Teach client how to avoid spreading bacteria to other household and community members (impeccable hand-washing after toileting is the most useful intervention)
- Teach client the signs of dehydration and advise client to return to clinic if these occur
- Enteric precautions are required during acute illness, because *Shigella* infection is highly contagious
- Clients should not handle food or provide child or patient care until follow-up stool cultures are negative

Pharmacologic Interventions

Control nausea and vomiting:

dimenhydrinate (Gravol) (**A class drug**), 25–50 mg IM prn stat, then 50 mg PO q4–6h prn

Do not use anti-diarrheal medications (e.g., loperamide [Imodium] or diphenoxylate–atropine [Lomotil]), as these slow the clearance of bacteria from the bowel.

Consult with a physician before giving antibiotics, as they may prolong the carrier state and encourage development of resistant strains.

Monitoring and Follow-Up

- Instruct client to return for follow-up in 24–48 hours if symptoms are not diminishing
- Isolation not necessary
- Household contacts or contacts involved in direct client care must be investigated (obtain three stool samples for culture)

Referral

Usually not necessary unless there is significant dehydration or failure to improve with therapy.

GIARDIASIS GASTROENTERITIS

DEFINITION

Parasitic intestinal infection.

CAUSES

- *Giardia lamblia*, one of the most commonly identified intestinal parasites
- Infection caused by ingestion of infective cysts
- Person-to-person transmission (fecal–oral) and poor hygiene are the primary means of infection
- Giardiasis may also be contracted through the ingestion of contaminated water, a mechanism responsible for a significant number of waterborne outbreaks
- Venereal transmission occurs among sexually active homosexuals through direct fecal–oral transmission

HISTORY

A broad spectrum of clinical syndromes may occur. Most symptoms are gastrointestinal.

A small number of people have the following symptoms:

- Abrupt onset of explosive, watery diarrhea
- Abdominal cramps
- Foul flatus
- Vomiting
- Fever and malaise

These symptoms last 3–4 days before transition into the more common subacute syndrome.

Most patients experience a more insidious onset of symptoms, which are recurrent or resistant:

- Stool malodorous, mushy and greasy
- Watery diarrhea may alternate with soft stools or even constipation
- Stools do not contain blood or pus, since dysenteric symptoms are not a feature of giardiasis

Upper GI symptoms, often exacerbated by eating, accompany stool changes or may be present in the absence of soft stools:

- Upper and mid-abdominal cramping
- Nausea
- Early satiety
- Bloating
- Sulfurous belching
- Substernal burning and acid indigestion
- Anorexia
- Fatigue, malaise
- Weight loss (occurs in > 50% of patients, average weight loss is 4.5 kg [10 lb])
- Chronic illness (adults present with long-standing malabsorption syndrome and children with failure-to-thrive syndrome)

Unusual presentations include:

- Allergic manifestations, such as urticaria
- Erythema multiforme
- Bronchospasm
- Reactive arthritis
- Biliary tract disease

PHYSICAL FINDINGS

- Physical examination generally unremarkable
- Abdominal examination may reveal nonspecific tenderness without evidence of peritoneal irritation
- Rectal examination should reveal heme-negative stool
- In severe cases, evidence of dehydration or wasting may be present

DIFFERENTIAL DIAGNOSIS

- Gastroenteritis (viral, bacterial)
- Amebiasis
- Bacterial overgrowth syndromes
- Crohn's ileitis
- *Cryptosporidium enteritis*
- Irritable bowel syndrome
- Sprue (celiac [nontropical] or tropical)
- Lactose intolerance

COMPLICATIONS

- Dehydration
- Malabsorption and weight loss

DIAGNOSTIC TESTS

Stool samples (three) taken at 2-day intervals should be examined for ova and parasites.

MANAGEMENT

Goals of Treatment

- Relieve symptoms
- Prevent complications
- Prevent spread to others

Nonpharmacologic Interventions

Emergency care consists of restoration of volume status through oral rehydration or IV administration of crystalloid solution if client is dehydrated on presentation. For details, *see "Dehydration" in chapter 5, "Gastrointestinal System."*

- Advise client to eat foods as tolerated; low-lactose and low-fat diet may be helpful until symptoms diminish
- Advise client to undertake activity as tolerated
- Frequent, impeccable hand-washing, especially after toileting, is essential
- Drinking water should be purified by boiling for 20 minutes
- Ensure that close contacts of the client are also examined for giardiasis and treated, if appropriate

Pharmacologic Interventions

Antibacterial, antiprotozoan to treat infection:

metronidazole (Flagyl) (**A class drug**), 250 mg PO tid for 5–7 days

High-dose, short-course regimens are less efficacious and should be avoided. The most common side effects include a metallic taste in the mouth, nausea, dizziness and headache.

Do not give to pregnant women, especially those in the first trimester. Consult a physician for alternative treatment for a pregnant woman.

Monitoring and Follow-Up

- Follow up closely (e.g., daily) if dehydrated on presentation: monitor hydration status, weight and symptoms
- Obtain repeat stool samples in 1–2 weeks to ensure resolution of infection

Appropriate Consultation

Consultation is generally not necessary for giardiasis unless there is no improvement with treatment.

Referral

Refer to a physician as soon as possible if symptoms persist or worsen despite treatment.

TUBERCULOSIS

DEFINITION

Acute granulomatous infection with a mycobacterium. Organism is initially inhaled into the body through the pulmonary system. After pulmonary inoculation, the organism can spread to other areas of the body, including the middle ear, bones, joints, meninges, kidney and skin.

Spread is contiguous or via the lymph or blood.

Approximately 85% of patients present with pulmonary disease. Most active cases are confirmed by culture of *Mycobacterium tuberculosis*.

Extrapulmonary disease may be diagnosed on the basis of characteristic pathological findings and clinical presentation. Extrapulmonary disease is more common in clients with HIV infection and those from certain ethnic groups, including Asians and Aboriginal Canadians, than in other clients.

STAGES OF DISEASE

Latent Infection

The person has a primary infection with the organism and has low numbers of tubercle bacilli in the body but does not have active disease. The risk of active infection is high in certain groups of people with latent disease. (*See "Risk Factors," below.*)

Active Tuberculosis

The person has active infection and high numbers of tubercle bacilli, and the condition is contagious. The risk of active disease is highest in the first 2 years after exposure.

CAUSES

Mycobacterium tuberculosis

Risk Factors

- Aboriginal Canadian ancestry
- Single men > 65 years of age
- Urban homelessness
- Institutional living (e.g., in a correctional facility or nursing home)
- Immunocompromise (e.g., HIV/AIDS)
- Medications that suppress immunity (e.g., high-dose steroids)
- Diabetes mellitus
- Chronic renal failure
- Malnutrition
- Alcoholism
- Close contact with an infected person

HISTORY

TB should always be considered if the classic symptoms are present in a client from a high-risk group, if unexplained cough and constitutional symptoms persist for more than a few weeks or if pneumonia fails to resolve in any client.

- Cough
- Hemoptysis
- Fever
- Night sweats
- Anorexia
- Weight loss
- Fatigue
- Exposure to TB
- History of active TB and adequacy of previous treatment
- History of positive Mantoux test and adequacy of prophylaxis

Be alert to the diseases, drugs and conditions that predispose an infected client to active TB

PHYSICAL FINDINGS

Perform a complete physical examination.

- Client may appear chronically ill, cachectic
- Weight loss
- Signs of pleural effusion on chest examination
- Enlargement of liver or spleen
- Enlargement of lymph nodes

DIFFERENTIAL DIAGNOSIS

- Pneumonia
- Bronchiectasis
- Lymphoma
- Fungal infection

COMPLICATIONS

- Lung abscess
- Empyema
- Spread of infection to extrapulmonary structures
- Spread of infection to others
- Drug resistance
- Death

DIAGNOSTIC TESTS

Mantoux Test (Tuberculin Skin Test)

The Mantoux test has three indications: diagnosis of infection, diagnosis of active disease and epidemiological tool.

The test should not be performed in the following situations:

- client who has had previous severe blistering reactions to the Mantoux test
- client with documented active TB
- client with extensive burns or eczema
- client who has had a viral infection (such as measles or mumps) in the past month or who has received vaccination with a live-virus vaccine in the past month

False-negative results may occur in seriously ill, anergic people (e.g., those with HIV/AIDS or active TB).

Reaction to tuberculin antigen may wane to non-reactivity with age, whereas repeat skin testing may boost reactivity. Thus, it is important to perform a two-step Mantoux test in populations who are likely to undergo serial testing (e.g., nursing home residents and healthcare workers). This will identify those whose response has waned over time.

BCG (bacille Calmette-Guérin) vaccination may trigger a positive Mantoux result. This response wanes over time, usually disappearing in 10–15 years. In general, a positive Mantoux result > 10 years after BCG vaccination *should not be* attributed to the BCG.

The standard dose of the purified protein derivative (PPD) used in the Mantoux test is 5 tuberculin units. The result is determined 48–72 hours after injection by measurement (in millimeters) of the transverse diameter of induration (Table 5) (the surrounding erythema should be ignored).

It is insufficient to describe the test result as simply "positive" or "negative." These designations are arbitrary and have different meanings in different people.

Consult your provincial or territorial TB control office for its guidelines for significant and insignificant Mantoux test results.

Other Diagnostic Tests

- Complete blood count
- Chest x-ray
- Obtain three sputum samples for acid-fast bacilli and *M. tuberculosis* culture
- Obtain three urine samples for acid-fast bacilli culture

MANAGEMENT

Goals of Treatment

- Prevent latent infection from progressing to active disease
- Ensure adequate treatment of active disease
- Prevent spread of disease to others

Appropriate Consultation

Consult a physician immediately for all cases of suspected active TB and for any client who has a newly positive Mantoux test result.

Nonpharmacologic Interventions

- Notify the provincial or territorial Department of Health of clients whose Mantoux tests have recently converted to positive, as well as all new cases of active TB
- Carry out contact tracing: all close family, friends and job contacts should undergo screening Mantoux test, repeated 3 months later if the initial result is negative
- Guidelines for contact tracing may vary according to provincial or territorial guidelines: check with the TB control officer in the province or territory of residence for additional information
- Adequate balanced nutrition, which aids healing and may help prevent active TB in those with latent infection
- Adequate rest, especially in active disease

Table 5: Diameter of Induration Considered Significant after Purified Protein Derivative (PPD) Skin Test with 5 Tuberculin Units

Client	Significant Diameter
Person with HIV *and* expected high risk of TB	0–4 mm
Person with HIV infection	>5 mm
Close contact (especially child or young adult) of person with confirmed TB	>5 mm
Person with insignificant PPD skin test reaction in the previous 2 years	>10 mm
Person with previously documented active TB that was untreated or treated inadequately	>10 mm
Person with signs of apical scarring on chest x-ray	>10 mm
Person with other risk factors	>10 mm

Client Education

– Explain disease process, course and prognosis
– Stress importance of strict adherence to medication regimen
– Explain risks, benefits and side effects of drugs
– Stress importance of close follow-up

Pharmacologic Interventions

Latent Disease

Therapy with a single drug, isoniazid (INH), can greatly reduce the risk of active TB in those with latent infection. Therefore, for those with a positive Mantoux test result, INH prophylaxis may be considered. The risk of adverse effects from INH must be weighed against its benefit in reducing the risk of active disease.

isoniazid (INH) (**B class drug**), 300 mg PO od for 6–9 months

and

pyridoxine (vitamin B_6) (**B class drug**), 25 mg PO od

Active Infection

Treatment is always with multiple drugs for 6–12 months on average *and only initiated by a physician*.

The optimal initial regimen is three or four drugs, including INH, rifampin (Rifadin), pyrazinamide (Tebrazid), ethambutol (Myambutol) and streptomycin (Table 6). If drug resistance is a possibility, a four-drug regimen should be considered.

In addition to the antituberculous drugs, the client may also be given vitamin B_6 (especially in the presence of alcoholism, diabetes mellitus or pregnancy, or if there is a concern about nutritional status), although this is optional:

pyridoxine (vitamin B_6) (**B class drug**), 25 mg PO od

After 2 months of therapy, pyrazinamide is usually discontinued if culture results indicate the presence of a fully sensitive organism. Then, INH and rifampin can be given twice weekly.

A twice-weekly schedule lends itself to fully supervised directly observed therapy (DOT). This optimal regimen should last at least 6 months in total.

A total of 9 months or more may be needed if clinical, radiologic or bacteriologic findings show a slow response. If second-line regimens are required, and particularly if there is a concern about drug resistance, much longer courses of treatment (15–18 months) are required. Regimens of 18 months or longer are needed if neither INH or rifampin is used in the drug regimen.

TB medications are prescribed by TB specialists. Consult your local TB medical authority before TB drugs are prescribed.

Monitoring and Follow-Up

– Follow client closely while on therapy (at least monthly)
– Monitor adherence to medication regimen, for symptoms of disease and for drug side effects
– Liver enzyme levels should be checked regularly
– Clients receiving ethambutol should have color vision screened every 6 months
– Clients with active TB need repeat chest x-ray monthly for the first 3 months
– Have a physician review client at every opportunity during therapy

Referral

All clients with suspected active TB should be admitted to hospital for investigation and treatment. If transport is in a public vehicle (e.g., aircraft), the client should wear an appropriate mask (one that can filter particles of 1 µm in diameter and that provides a tight facial seal) to protect others.

Table 6: Doses of and Common Adverse Reactions to First-Line Antituberculous Drugs

Drug	Usual Daily Dose	Adverse Reactions*
Isoniazid	300 mg	Hepatitis, paresthesia
Rifampin	600 mg	Hepatitis, flu-like illness
Pyrazinamide	1500–2500 mg in divided doses	Hepatitis, elevated serum level of uric acid, arthralgia
Ethambutol	2400 mg in divided doses	Retrobulbar neuritis
Streptomycin	1000 mg	Vertigo, tinnitus, renal failure

*All of these drugs may cause rash, nausea and fever.

INVASIVE GROUP A STREPTOCOCCAL INFECTION

DEFINITION

Invasive group A streptococcal (GAS) disease is a severe and sometimes life-threatening infection in which the bacteria have invaded various parts of the body, such as the blood, the cerebrospinal fluid, deep muscle and fat tissue, or the lungs.

Invasive GAS infections may manifest as any of several clinical syndromes, including pneumonia, bacteremia in association with cutaneous infection (e.g., cellulitis, erysipelas or infection of a surgical or non-surgical wound), deep soft-tissue infection (e.g., myositis or necrotizing fasciitis), meningitis, peritonitis, osteomyelitis, septic arthritis, postpartum sepsis (i.e., puerperal fever), neonatal sepsis or non-focal bacteremia.

Two of the most severe, but least common, forms of invasive GAS disease are necrotizing fasciitis (infection of muscle and fat tissue) and streptococcal toxic shock syndrome (STSS). Approximately 20% of patients with necrotizing fasciitis and 60% with STSS die. Only about 10% to 15% of patients with other forms of invasive GAS disease die.

CAUSE

Group A *Streptococcus*.

Risk factors

Although anyone can get GAS disease (including STSS), people with underlying health problems such as diabetes mellitus, chronic heart, lung or kidney problems, cancer or HIV infection are at greater risk for invasive GAS disease.

A break in the skin, such as a cut or surgical wound, or chickenpox may increase a person's risk. Close contacts of a case (family or household members, healthcare providers, nursing home staff) may be at increased risk for infection because of direct contact with secretions from the infected person.

HISTORY AND PHYSICAL FINDINGS

Presence of risk factors.

Early signs and symptoms of necrotizing fasciitis:

– Fever
– Severe pain, swelling and redness at the wound site

Early signs and symptoms of STSS:

– Fever
– Dizziness
– Confusion
– Rash and abdominal pain
– Severe pain, swelling and redness at the wound site

Streptococcal Toxic Shock Syndrome

STSS is an illness with the following clinical manifestations occurring within the first 48 hours of illness: hypotension (defined by systolic blood pressure ≤ 90 mm Hg for adults or less than the fifth percentile by age for children < 16 years of age) and multiorgan involvement characterized by two or more of the following:

– renal impairment
– coagulopathy
– liver involvement
– acute respiratory distress syndrome (defined by acute onset of diffuse pulmonary infiltrates and hypoxemia in the absence of cardiac failure or by evidence of diffuse capillary leak manifested as acute onset of generalized edema or pleural or peritoneal effusion with hypoalbuminemia)
– generalized erythematous macular rash that may show desquamation
– soft-tissue necrosis, including necrotizing fasciitis or myositis, or gangrene

DIFFERENTIAL DIAGNOSIS

– Cellulitis
– Sepsis
– Septic shock

COMPLICATIONS

– Sepsis
– Septic shock
– Amputation
– Death

DIAGNOSTIC TESTS

None.

MANAGEMENT

Prevention of Invasive GAS Infection

– Spread of all types of GAS infections may be reduced by proper hand-washing, especially after coughing and sneezing, before preparing foods and before eating
– For anyone with a significant sore throat, a throat swab should be taken for culture and sensitivity if clinically indicated (*see Appendix 1, "Sore Throat Score," in chapter 2, "Ears, Nose and Throat"*) to determine whether it is a streptococcal infection; if so, the person should stay home from work, school or daycare until 24 hours or more after antibiotic therapy has been initiated
– All wounds should be kept clean and should be monitored for possible signs of infection (e.g., increasing redness, swelling and pain at the wound site); clients should be advised to seek medical help immediately if any of these signs occur, especially if fever is also present

Appropriate Consultation

Consult a physician immediately if there is suspicion of invasive GAS infection.

Nonpharmacologic Interventions

– Protect airway and ensure adequate ventilation
– Bed rest
– Protect infected area from further injury
– In addition to antibiotics, supportive care in an intensive care unit and sometimes surgery are necessary with these diseases

Adjuvant Therapy

– Oxygen 6–10 L/min or more prn to keep oxygen saturation > 97% to 98%
– Start IV therapy with normal saline to keep vein open

If client presents with signs of sepsis or septic shock, aggressive fluid resuscitation is necessary, as follows:

Start two large-bore IV lines with normal saline (for details, *see "Shock," in chapter 14, "General Emergencies and Major Trauma"*)

If client's symptoms are suspicious for GAS disease or he or she would be at higher risk of invasive disease (e.g., if he or she has diabetes mellitus, cancer, chronic heart disease, alcoholism), antibiotic therapy may be started while waiting for transfer. Choice of antibiotics should be determined in consultation with a physician.

Monitoring and Follow-Up

Monitor ABC and symptoms frequently.

Referral

Medevac.

CHAPTER 12 – OBSTETRICS

Table of Contents

ASSESSMENT OF THE FEMALE REPRODUCTIVE SYSTEM

HISTORY OF PRESENT PREGNANCY AND REVIEW OF SYSTEM

GENERAL

Is this a planned or desired pregnancy?

MENSTRUAL HISTORY

- Age at which menarche occurred
- Start and end dates of most recent normal menstrual period
- Was most recent period like others in duration and amount of flow? (if not, determine dates of previous period)
- Was there any bleeding after most recent normal menstrual period?
- Contraceptives: type, when last used

PRESUMPTIVE SYMPTOMS OF PREGNANCY

- Fatigue
- Urinary frequency
- Breast tenderness, tingling or enlargement
- Nausea and vomiting

CURRENT SYMPTOMS

- Nausea and vomiting
- Weight loss or gain
- Headache
- Edema
- Abdominal pain
- Bleeding (determine amount)
- Vaginal discharge or fluid leakage (color, odor)
- Urinary symptoms
- Constipation (usually a later symptom)
- Backache (usually a later symptom)
- Calculate estimated date of delivery: last normal menstrual period vs. uterine size

Assess client for risks in current pregnancy: infections (e.g., hepatitis B carrier, vaginal group B streptococcus [GBS] status), Rh antibody status (if negative, it is important to know father's blood group)

HISTORY OF PREVIOUS PREGNANCIES

- Dates and locations of previous deliveries
- Period of gestation (term or preterm)
- Antepartum complications (e.g., preeclampsia, gestational diabetes, abruptio placentae)
- Labour history and complications
- Intrapartum complications (e.g., fetal distress)
- Delivery history (e.g., spontaneous vaginal delivery, cesarean section)
- Condition of infant (e.g., Apgar scores, if known)
- Postpartum complications

OTHER RELEVANT INFORMATION

- Medical and surgical history
- Family history (e.g., genetic disorders, neural tube defects, multiple gestation, congenital anomaly, mental retardation, bleeding disorders)
- Complete review of all systems
- Smoking, alcohol use, use of street drugs
- Use of medications (type, dosage, period of use, prescription or over the counter [OTC])

PHYSICAL EXAMINATION

GENERAL

- Apparent state of health
- Appearance of comfort or distress
- Color (e.g., flushed, pale)
- Nutritional status (obese or emaciated)
- Facial edema

VITAL SIGNS

- Temperature
- Heart rate
- Respiratory rate
- Blood pressure
- Fetal heart rate

BREASTS

- Signs of infection
- Masses, tenderness
- Nipples: shape (e.g., inverted), erosion, discharge

ABDOMEN

- Striae
- Scars
- Measurement of fundal height, shape of fundus
- Agreement between fundal height and expected date of delivery
- Fetal position, presentation and movements
- Engagement
- Uterine tenderness or hardness
- Contractions (e.g., Braxton–Hicks)

PELVIS

- Perineal varicosities
- Vaginal bleeding, discharge (color, odor, consistency)
- Cervical assessment
- Pelvic adequacy (if a primigravida)
- Hemorrhoids
- Previous tears, episiotomy
- Muscular support in the pelvic floor (e.g., cystocele, rectocele)

OTHER ASPECTS

- Edema (facial, hands, pretibial, pedal)
- Reflexes
- Pregnancy test

PRENATAL CARE: INITIAL AND SUBSEQUENT VISITS

HISTORY

On Initial Visit

- One or two periods missed (however, may be amenorrheic because of Depo Provera effect)
- Feels pregnant and has had unprotected intercourse
- Easily fatigued
- Frequent urination
- Nausea and vomiting in the morning
- Anorexia may be present
- Obtain complete medical, social and obstetric history

On Subsequent Visits

The following features should be assessed at each subsequent visit:

- Headaches
- Facial or peripheral edema
- Abdominal pain
- Vaginal bleeding or discharge
- Urinary complaints
- Respiratory or gastrointestinal disturbances, which may present as pregnancy progresses
- Stressors

Quickening

Advise client to record date of first perceived fetal movement (usually occurs at 20 weeks gestational age in primigravida and at 18 weeks in secundigravida or multigravida).

Lightening

- Occurs at 38 weeks gestational age in primigravida
- Timing variable in secundigravida or multigravida
- Fetal head engages in maternal pelvis
- May produce urinary and musculoskeletal disturbances

PHYSICAL FINDINGS

Perform a complete examination of all systems on first visit.

Vital Signs

- Heart rate: elevated (by 10%) in second half of pregnancy because of increased blood volume
- Blood pressure: a physiological drop usually occurs in second trimester
- Fetal heart rate: 120–160 bpm (heard at 12–18 weeks gestational age)
- Weight gain: ideally 10–12 kg (2 kg in first trimester, about 4–5 kg in second trimester and 4–5 kg in third trimester)

Inspection

- Abdomen: at initial visit, enlarged uterus usually not visible; striae may be present
- Breasts: enlarged; areolae and nipples darker and enlarged
- Pelvis: cervix and vaginal walls have bluish color

Palpation

On Initial Visit

- Uterus: palpable only on pelvic examination in first trimester and in obese women
- Describe uterine size (e.g., orange, grapefruit)
- Assess adequacy of pelvis in primigravida (pelvic adequacy proven in secundigravida or multigravida)
- Mild, diffuse, nontender thyroid enlargement may be present

On Subsequent Visits

- Measure fundal height from top of fundus to symphysis with tape measure and record (in centimetres [cm])
- As a general rule, measurement in centimetres equals number of weeks of gestation after 20 weeks until 36–38 weeks (Table 1)
- Assess fetal lie and presentation (e.g., transverse, breech)
- Assess fetal head for engagement in maternal pelvis later in pregnancy

Auscultation

- All systems should be functioning normally on initial visit
- Soft systolic ejection flow murmur may be present (because of expanded vascular volume)
- Fetal heart should be checked on subsequent visits: rate and rhythm of heartbeat, location of heart tones (e.g., above umbilicus at term may mean breech)

DIAGNOSTIC TESTS

Routine Prenatal Blood Work

- Complete blood count
- Blood smear
- Rh and ABO grouping
- Antibody screening
- Rubella titre
- VDRL testing
- Hepatitis B screening
- Maternal serum screening (at 16 weeks gestational age)
- Repeat Rh antibody testing as needed if Rh negative
- HIV test (offered)
- Hemoglobin: screen once during each trimester (a drop in hemoglobin is expected in the second trimester because of increased blood volume)

Urine Testing

- At initial visit: urinalysis, routine and microscopy, culture and sensitivity
- Repeat urinalysis at each visit
- Repeat microscopic examination and culture and sensitivity as required

There is increased risk of asymptomatic bacteriuria in pregnancy.

Cervical and Vaginal Examination

- Pap smear and cervical/vaginal swabs for culture (*Neisseria gonorrhoeae*, *Chlamydia*, group B streptococcus [GBS]) at initial visit
- May be necessary to do repeat cultures at 36–38 weeks gestational age and just before delivery

Diabetes Screening

Perform 50-g glucose tolerance test (GTT) at 26–28 weeks gestational age or earlier if woman is at high risk.

Table 1: Approximate Measurements of Fundal Height*

Weeks of Gestation	Fundal Height (cm)	Fundal Height (as Measured with Fingers)
8	Not palpable in abdomen (still in pelvis)	Size of a small grapefruit (bimanual examination)
12	Variable	At symphysis
16	Variable	Halfway between symphysis and umbilicus
20	20	At umbilicus
24	24	3 or 4 fingers above umbilicus
28	28	Halfway between umbilicus and xyphoid process
32	34	3 or 4 fingers below xyphoid
36	36	At xyphoid process
38–40	Variable	2 fingers below xyphoid

*Measurements differ between primigravida and multigravida.

MANAGEMENT: ANTENATAL CARE

Goals

- Ensure maternal and fetal well-being
- Provide reassurance and education
- Identify problems and complications early

Appropriate Consultation

Arrange a consultation with the physician once per trimester if possible and as necessary if an abnormality is identified or suspected. Attempt to have final prenatal visit coincide with physician visit.

Nonpharmacologic Interventions

Client Education

- Encourage adequate dietary intake of protein and fiber
- Recommend avoidance of overeating and excessive weight gain
- Recommend smoking cessation if appropriate
- Encourage abstinence from alcohol and any drug substances
- Advise client to minimize use of over-the-counter (OTC) drugs
- Recommend daily exercise to maintain physical and mental health
- Recommend proper daily personal and perineal hygiene
- Teach client about signs of preterm labor
- Recommend avoidance of restrictive clothing around legs (e.g., knee socks, "knee highs")
- Recommend loose-fitting, comfortable clothing
- Counsel client about infant nutrition options early in pregnancy
- Teach proper breast care: cleaning, proper support and preparation of nipples for breast-feeding
- Advise client that sexual intercourse may be continued if she feels comfortable and there are no specific contraindications
- Encourage attendance at prenatal classes if offered in the community

Instruct client to return to clinic if any of the following develop:

- Severe continuous headaches or visual disturbances
- Edema of face and hands
- Recurrent vomiting
- Abdominal pain
- Bleeding
- Rupture of membranes
- Decrease in or lack of fetal movement
- Fever, chills or infection in any area

Pharmacologic Interventions

Prenatal vitamins:

Prenavite (**A class drug**), 1 tab PO daily throughout pregnancy

If hemoglobin < 100 g/L, start iron:

ferrous gluconate (**A class drug**), 300 mg PO 1–3 times per day throughout pregnancy

For Rh-negative women, Rh antibody screening should be repeated at 28 weeks gestational age, and clients should be given Rh immune globulin injection. Follow-up Rh antibody screening should be done 32–34 weeks after the injection.

Monitoring and Follow-Up

- Up to 32 weeks gestational age: every 4 weeks
- 32–36 weeks gestational age: every 2 weeks
- 36 weeks until delivery or evacuation: weekly

Need for follow-up will vary depending on risk factors.

Referral

- Refer to an obstetrician as soon as possible if high risk identified
- Arrange for transfer to hospital for delivery at 36–38 weeks gestational age (sooner if a high-risk pregnancy)

DELIVERY IN THE NURSING STATION

HISTORY

- Lightening within past 2 weeks (usually only in primigravida)
- Frequency of micturition increased
- Easier breathing
- Greater difficulty walking
- Braxton–Hicks contractions may have occurred within past few weeks
- Passage of red mucus-like material per vagina ("bloody show")
- Fluid gush (may be described as loss of bladder control but more probably amniotic fluid)
- Onset of painful, rhythmic uterine contractions
- Contractions may be felt in back and low in abdomen
- Record time of onset, frequency and duration of contractions

PHYSICAL FINDINGS

- Heart rate increased
- Blood pressure may be mildly elevated
- Fetal heart rate 120–140 bpm; determine location of heart tones
- Client may appear anxious
- Abdominal contour changes with contraction
- Bloody mucus may be seen on perineum
- Assess frequency, strength and duration of contractions
- Assess fetal lie and presentation
- Assess engagement of fetal head
- Assess rupture of membranes using litmus paper inserted into lower vagina
- Perform vaginal examination using aseptic technique: assess effacement and dilatation of cervix, presentation and descent of fetal head
- Monitor fetal heart rate
- Assess changes during and after contractions

DIAGNOSTIC TESTS

- Urinalysis: routine and microscopy; measure for glucose and proteinuria
- Measure blood glucose (random)
- Measure hemoglobin

MANAGEMENT

Goals of Treatment

- Ensure maternal and fetal well-being
- Delivery of healthy baby

Appropriate Consultation

If time permits, consult a physician to arrange transfer to hospital for delivery.

Adjuvant Therapy

Start IV therapy with normal saline to maintain hydration and for administration of medications.

Nonpharmacologic Interventions

- Assist client to breathe through each contraction
- Assist with relaxation techniques between contractions to avoid maternal exhaustion
- Provide encouragement to client during labor
- If possible, have a family member or friend stay with client during labor
- Provide sips of water or juice during early labor
- If client is unable to tolerate fluids orally, provide mouth care with glycerine swabs and gel to coat the lips

Monitoring and Follow-Up

- Monitor progress of labor
- Monitor contractions, maternal vital signs and fetal heart rate hourly in early labor, more frequently as delivery nears
- Perform vaginal exams to assess effacement and cervical dilatation

Keep the number of vaginal examinations to an absolute minimum.

Progression of Normal Labor

In a primigravida (rule of thumb):

- Cervix will efface first, then dilate
- Dilatation progresses at about 1 cm every hour
- Full dilatation takes approximately 10–12 hours
- Once full dilatation is achieved, delivery of baby may take 1–2 hours

In a multigravida:

- Effacement and dilatation are extremely variable, but usually occur together
- Time to delivery of baby is also extremely variable

Referral

When considering evacuation of a client in labor the following factors should be considered:

- Progress of labor
- Stage of dilatation
- Parity
- Estimated length of time required for evacuation
- If there is a possibility of the client delivering en route, keep client at nursing station and deliver baby there

When Delivery Is Imminent

Prepare delivery equipment, resuscitation equipment and incubator.

Care during Delivery

- Control delivery of head
- Support perineum to prevent tears
- Once head is delivered, check for presence of cord around neck
- If cord is wrapped around neck, gently slip a finger under cord and pull it over head
- Wipe face clear of secretions
- Suction nose and mouth
- Guide anterior shoulder out under symphysis pubis, and deliver posterior shoulder through the curve of Carus—do not pull on baby
- Body will slip out quickly without much assistance from practitioner

Care after Baby is Delivered

- Clamp cord in two places, and cut between clamps
- Dry baby
- Keep baby warm and ensure that respiration is established
- Assess Apgar scores at 1 and 5 minutes
- Give baby to mother (unless problems identified)
- Obtain 20-mL sample of cord blood

Delivery of Placenta

Wait for delivery of placenta (can take up to 30 minutes).

Look for signs of placental separation:

- Client may state she feels another contraction
- Cord will lengthen
- A gush of blood will occur
- Uterus will be seen to tighten with a contraction

Do not pull on the cord to hasten delivery unless you are sure placenta has separated!

Once the placenta has separated:

- Place one hand on abdomen, just above symphysis
- Hold uterus and apply gentle traction on cord
- Deliver placenta
- Examine placenta and membranes for completeness

Do not give oxytocin until placenta has been delivered.

After Delivery of Placenta

- Massage uterus to ensure it is firm
- Examine perineum for tears

Pharmacologic Interventions

Administer oxytocin to promote contraction of uterus:

oxytocin (Syntocinon) (**D class drug**), 10 units IV push or IM

and

oxytocin (Syntocinon) (**D class drug**), 20 units in a 1-L bag of Ringer's lactate (run IV at 125–175 mL/h)

Postpartum Monitoring

- Monitor vaginal blood loss, uterine firmness and vital signs every 15 minutes during the first hour, then monitor every 30 minutes for 2 hours
- Examine and clean baby

Referral

Transfer mother and baby to hospital if necessary.

COMMON OBSTETRIC PROBLEMS AND SITUATIONS

GESTATIONAL DIABETES

DEFINITION

Carbohydrate intolerance of variable severity, with onset or first recognition during pregnancy. After the birth, blood sugars usually return to normal levels; however, frank diabetes often develops later in life.

CAUSES

- Genetic predisposition
- Increased tissue resistance to insulin during pregnancy, due to increased levels of estrogen and progesterone

Current Risk Factors

- Maternal obesity (>20% above ideal weight)
- Excessive weight gain during pregnancy
- Low level of high-density-lipoprotein (HDL) cholesterol (<0.9 mmol/L) or elevated fasting level of triglycerides (>2.8 mmol/L)
- Hypertension or preeclampsia (risk for gestational diabetes is increased to 10% to 15% when hypertension is diagnosed)
- Clinical or sonographic polyhydramnios
- Repeated glycosuria (> +1)
- Clinical or sonographic macrosomia
- Maternal age > 25 years
- Member of high-risk population (e.g. Aboriginal people, Hispanic, Asian or African descent)

Historical Risk Factors

- Family history of diabetes
- History of gestational diabetes or glucose intolerance
- Unexplained stillbirth
- Infant with congenital malformations
- Neonate with hypoglycemia, hyperbilirubinemia or hypocalcemia
- Infant with birth weight > 4000 g
- Recurrent loss of fetus during early pregnancy

HISTORY

Most clients with gestational diabetes are asymptomatic.

- Polydipsia
- Polyuria
- Polyphagia
- Weight loss
- Failure to gain weight
- Recurrent urinary tract infections or vaginal candidiasis

PHYSICAL FINDINGS

- Fundal height may be greater than expected for gestational dates (in centimeters or relative to umbilicus or xyphoid)

LABORATORY FINDINGS

- Urine: glucose or ketones may be indicated by dipstick test

COMPLICATIONS

- Ketoacidosis
- Postpartum hypoglycemia
- Polyhydramnios
- Intrauterine death
- Intrauterine growth retardation (IUGR)
- Premature labor and delivery
- Stillbirth or neonatal death
- Respiratory distress syndrome in the newborn
- Hypoglycemia in the newborn
- Congenital malformations

DIAGNOSTIC TESTS

Gestational Diabetes Screening

All pregnant First Nations women should be screened for asymptomatic gestational diabetes with an oral 50-g glucose load challenge test at 28 weeks gestational age:

- If 1-hour glucose level >11.1 mmol/L, client has gestational diabetes; no further screening required
- If 1-hour glucose level >7.8 mmol/L, full 3-hour glucose tolerance test (GTT) is warranted

Three-Hour Glucose Tolerance Test

- Determine fasting blood glucose level
- Give 100-g oral glucose load
- Determine blood glucose levels at 1, 2 and 3 hours after administration of glucose load (diagnostic levels given in Table 2)
- If any two values are met or exceeded, client has gestational diabetes
- If only one value is met or exceeded, client has impaired glucose tolerance

Table 2: Diagnostic Glucose Levels in 3-Hour Glucose Tolerance Test

Time after Glucose Load	Diagnostic Glucose Level
Fasting	>5.8 mmol/L
1 hour	>10.6 mmol/L
2 hours	>9.2 mmol/L
3 hours	>8.1 mmol/L

If client has symptoms suggestive of gestational diabetes before 24 weeks gestational age, do glucose tolerance test (GTT) at the time of presentation.

MANAGEMENT

Goals of Treatment

- Identify condition early
- Optimize control of blood sugar
- Prevent maternal and fetal complications

Appropriate Consultation

Consult a physician as soon as abnormal glucose tolerance is diagnosed in a pregnant woman. Thereafter, consult a physician if client fails to gain weight or loses weight, if she is symptomatic, if premeal glucose levels cannot be maintained below 5 mmol/L or if any complications are identified.

Nonpharmacologic Interventions

Dietary adjustment is the mainstay of therapy.

- Caloric intake should be 30–35 kcal/kg daily
- Client should avoid cakes, candy and other fast-acting carbohydrate foods
- Dietary composition should be 50% to 60% carbohydrate, 20% to 25% protein and 20% fat, with high fiber content
- Regular meals are important
- Complex carbohydrates are recommended (e.g., bread, pasta, beans, potatoes)
- Discourage excessive salt use
- Encourage exercise, which has been shown to be especially beneficial when used in combination with dietary therapy
- Encourage home glucose monitoring four times daily (before meals and at bedtime)
- Encourage use of a diabetic log, and review home monitoring at each visit
- Prevention of excessive weight gain is important
- Provide support and reassurance during pregnancy

Attendance for diabetic education, if available, would be ideal.

Pharmacologic Interventions

If fasting glucose remains >11.0 mmol/L, insulin therapy is indicated and will be prescribed by the physician.

Insulin requirement tends to rise as pregnancy progresses, so frequent dose adjustments may be needed. Consult a physician for help with this.

Monitoring and Follow-Up

Follow up every 2 weeks until 36 weeks gestational age and then weekly. Assess the following:

- Dietary compliance
- Weight gain or loss
- Peripheral edema
- Blood pressure
- Uterine size
- Fetal growth
- Home glucose monitoring results

Check fasting blood glucose level at each visit. If >10.5 mmol/L (or postprandial values are 12.0–13.0 mmol/L), the client should be admitted to hospital to ensure adherence to diet.

Ultrasonography

- Ultrasonography should be done early in the pregnancy for accurate gestational dating.
- If macrosomia is suspected, ultrasonography should be performed. If the estimated fetal weight is > 4000 g, cesarean section may be considered at term.

Other Follow-Up

- Antepartum non-stress testing is often initiated on a weekly basis at 34–35 weeks of gestation but may be started earlier.
- After 40 weeks of gestation, fetal surveillance is initiated, and delivery is recommended if there is any evidence of fetal compromise.
- Women with gestational diabetes should have a 75-g oral glucose tolerance test (GTT) 6 weeks postpartum to rule out persistent carbohydrate intolerance. Counsel the client that her risk of frank diabetes at some point later in her life is approximately 35%.

Referral

- Referral to an obstetrician for complex care is usually needed for all but the mildest cases
- Follow-up should be by a physician whenever possible
- Client would benefit from assessment and counseling by a dietician if this service is readily available
- Transfer for delivery is earlier than for client without gestational diabetes (i.e., at 34–36 weeks)

HYPEREMESIS GRAVIDARUM

DEFINITION

Persistent nausea and vomiting severe enough to produce weight loss and dehydration and to affect the woman's ability to function in her daily activities.

CAUSES

Largely unknown. The prevalence of hyperemesis gravidarum (severe nausea and vomiting causing ketosis and dehydration and leading to hospitalization) is about 1% overall. It is greater in multiple gestation and molar pregnancies. The recurrence rate in subsequent pregnancies is 26%.

HISTORY

- Persistent and excessive nausea and vomiting throughout the day
- Client unable to keep down any solids or liquids

If the condition is prolonged, client may also report:

- Fatigue
- Lethargy
- Headache
- Faintness
- Weight loss

PHYSICAL FINDINGS

- Heart rate may be elevated and weak
- Blood pressure normal, but may be low if dehydrated
- Postural blood pressure drop may be present if dehydrated
- Weight may be reduced from previous measurement
- Client appears in mild-to-moderate distress
- Various degrees of dehydration may be present: skin may be pale, there may be dark circles under eyes, eyes may appear sunken, mucous membranes may be dry, skin turgor may be poor
- Mild jaundice, which returns to normal after adequate hydration and nutrition
- Uterus may be smaller or larger than expected for dates

LABORATORY FINDINGS

Urinalysis: urine concentrated; ketones may be present; oliguria.

DIFFERENTIAL DIAGNOSIS

- Hydatidiform mole
- Multiple gestation
- Other medical causes of vomiting (e.g., gastroenteritis, pancreatitis)

COMPLICATIONS

- Dehydration
- Electrolyte disturbances
- Nutritional deficiencies
- Intrauterine growth retardation (IUGR)
- Fetal death

DIAGNOSTIC TESTS

- Urinalysis: routine and microscopic

MANAGEMENT

Goals of Treatment

- Recognize condition early
- Prevent complications
- Exclude organic causes (e.g., urinary infection, hepatitis, disorders of the gastrointestinal tract, gallbladder or pancreas)

Appropriate Consultation

- Consult a physician if nonpharmacologic interventions fail to control symptoms in milder cases
- Consult a physician immediately if the woman shows signs of dehydration on presentation

Nonpharmacologic Interventions

- Reassure client that condition improves with time, usually by end of first trimester
- Advise client to arise slowly and to keep soda crackers at the bedside (to be eaten before rising)
- Suggest that client eat small amounts, at frequent intervals, of whatever food and fluids appeal
- Emphasis is on intake, not on content, while client is symptomatic; see Table 3 for suggestions of foods that appeal to pregnant women because of their taste and texture
- Suggest that someone else do the cooking at home, as food odors may initiate nausea
- Omit iron supplementation until nausea resolves
- Ask client to monitor intake and urine output at home
- Recommend increased rest, as fatigue seems to exacerbate symptoms; client may need help with other children in the home
- Arranging for leaves of absence from work early in the pregnancy may reduce the overall time lost from outside employment
- Psychotherapeutic measures (e.g., stimulus control, biofeedback, relaxation techniques and imagery) may be helpful

Acupressure at the P6 (Neiguan) point has been demonstrated to be helpful. This point is on the inner aspect of the wrists, just proximal to the flexor crease.

Table 3: Foods that May Appeal to Pregnant Women

Taste or Texture	Food Suggestions
Salty	Chips, pretzels
Tart, sour	Pickles, lemonade
Earthy	Brown rice
Crunchy	Celery sticks, apples
Bland	Mashed potatoes
Soft	Bread, noodles
Sweet	Sugary cereal
Fruity	Juices, fruity Popsicles
Wet	Juices, seltzer drinks
Dry	Crackers

Pharmacologic Interventions

If medication needed to control vomiting:

dimenhydrinate (Gravol) (**A class drug**), 25–50 mg PO q4–6h prn

or

Drug of choice:

doxylamine/B_6 (Diclectin) (**B class drug, not on formulary**), 10-mg tab, 2 tabs PO hs; if effect is insufficient, client may take an additional tablet bid

Monitoring and Follow-Up

Follow up weekly until symptoms resolve:

- Measure fundal height and compare with previous values
- Monitor fetal heart rate
- Monitor vital signs, urine output and ketones

If client is significantly dehydrated:

- Initially maintain nothing by mouth
- Bed rest

Adjuvant Therapy

- Start IV therapy with normal saline
- Adjust rate according to state of hydration

If hypovolemia is present, *see protocol for managing hypovolemic shock, under "Shock," in chapter 14, "General Emergencies and Major Trauma."*

Referral

Medevac for further investigation and treatment.

INTRAUTERINE GROWTH RETARDATION

DEFINITION

- Slow fetal growth within uterus
- Fetus small for gestational age

CAUSES

- Placental dysfunction secondary to smoking
- Alcohol abuse
- Substance abuse
- Poor maternal weight gain
- Anemia
- Chronic illness
- Diabetes mellitus
- Pregnancy-induced hypertensive disease
- Fetal infection or congenital malformations

HISTORY

- Usually occurs in second trimester
- Client may be aware of lack of growth
- Altered fetal movements (increased or decreased)
- Preeclampsia and gestational diabetes may be present
- Other illnesses may be present

PHYSICAL FINDINGS

- Weight unchanged from previous visit
- Fundal height unchanged or less than expected from previous visit

Suspicion should be raised if fundal height does not exhibit the predicted 1 cm/week growth between 20 and 36 weeks of gestation. A lag in fundal height by 4 cm warrants ultrasonographic evaluation. Serial ultrasonic scanning may confirm the diagnosis.

DIFFERENTIAL DIAGNOSIS

- Miscalculation of dates
- Improper measurement on previous assessment
- Intrauterine death

COMPLICATIONS

Antepartum Complications

- Oligohydramnios
- Intrapartum fetal acidosis
- Intrauterine death

Neonatal Complications

- Persistent fetal circulation
- Meconium aspiration syndrome
- Hypoxic ischemic encephalopathy
- Hypoglycemia
- Hypocalcemia
- Hyperviscosity
- Defective temperature regulation

DIAGNOSTIC TESTS

- Urinalysis
- Blood sugar measurement
- Ultrasonography

Ultrasonography is needed for definitive diagnosis.

MANAGEMENT

Goals of Treatment

- Prevent condition through education about nutrition, avoidance of substance use, smoking
- Identify associated disorders early (e.g., diabetes mellitus, hypertension)

Appropriate Consultation

Consult a physician immediately if this diagnosis is detected or suspected.

Nonpharmacologic Interventions

Provide support to client and family.

Pharmacologic Interventions

None.

Monitoring and Follow-Up

Once this diagnosis is made, more frequent prenatal visits are essential for monitoring. The frequency of visits will depend on establishing the underlying cause of the growth retardation.

Referral

Refer to an obstetrician as soon as possible for further assessment. Close antenatal surveillance is required, and the decision as to when to deliver the infant is complex.

MULTIPLE GESTATION

DEFINITION

Presence of more than one fetus in a single pregnancy.

CAUSES

- Fertilization of more than one ovum
- Splitting of one fertilized ovum into two separate fetuses
- Predisposing factors: familial history of multiple gestation, treatment of infertility with ovulatory drugs

HISTORY

Suspect multiple gestation in clients with family history of multiple gestation and in those receiving drug treatment for infertility.

- Discomforts of pregnancy present earlier and are more pronounced
- Morning sickness, nausea and heartburn present earlier and are more persistent
- Later in pregnancy, dyspnea and indigestion are more pronounced

PHYSICAL FINDINGS

- Fundal height greater than expected for dates
- Fetal movements may be seen over wide area
- Excessive number of fetal parts may be felt
- Two distinct fetal hearts may be heard

DIFFERENTIAL DIAGNOSIS

- Polyhydramnios
- Large single baby (macrosomia)

COMPLICATIONS

Maternal Complications

- Preeclampsia
- Anemia
- Premature labor and delivery
- Polyhydramnios
- Hyperemesis gravidarum

Fetal Complications

- Intrauterine growth retardation (IUGR)
- Congenital anomalies
- Intrauterine death
- Prematurity

DIAGNOSTIC TESTS

Ultrasonography is needed for definitive diagnosis.

Clients with multifetal pregnancies should undergo periodic sonographic evaluation (i.e., every 2 weeks), beginning at 24 weeks gestational age. These evaluations assess the growth of each fetus to rule out discordancy, anomalies and fetofetal transfusion syndromes, and are also used to measure cervical length.

MANAGEMENT

Goals of Treatment

- Identify multiple gestation early
- Identify complications early

Appropriate Consultation

Consult a physician if this diagnosis is suspected. Thereafter, consult physician if complications are suspected or detected.

Nonpharmacologic Interventions

Because multifetal pregnancies are often complicated by prematurity, the following recommendations can be made to the client:

- Restrict physical activity
- Avoid unnecessary travel
- Limit exposure to psychologic stress (this may mean leaving the work force around 28–30 weeks gestational age).

The evidence for the validity of these interventions is currently inconclusive.

- In addition, instruct client about proper nutrition (including vitamin and iron supplementation): nutritional demands in a multifetal pregnancy differ from those of a singleton pregnancy, and an increase of 300 kcal daily over intake for a singleton pregnancy is recommended
- Assess family support and readiness for multiple birth

Pharmacologic Interventions

Iron intake should be doubled.

Monitoring and Follow-up

- Follow up in clinic biweekly from time of diagnosis
- Have a physician review at every opportunity

Referral

- Refer to an obstetrician for care
- Arrange earlier transfer to hospital for delivery
- In most multifetal pregnancies delivery occurs at about 36 weeks of gestation
- Multiple pregnancies lasting beyond 38 weeks of gestation are considered “postdates,” and induction of labor may be considered

Cesarean Section

Most twins can be delivered vaginally. Cesarean section is indicated under the following conditions.

Absolute Indications

- Monoamniotic twins
- Conjoined twins
- Twin “A” presenting as a footling breech
- Abnormal placental location (e.g., placenta previa)
- More than two fetuses present

Relative Indications

- Twin “A” is a frank breech
- One or both twins have non-reassuring fetal status
- Fetal discordancy > 20% in abdominal circumference, especially if the first twin is smaller

POLYHYDRAMNIOS

DEFINITION

Accumulation of excessive amounts of amniotic fluid (>1500 mL).

CAUSES

- Largely unknown
- Gestational diabetes
- Twins
- Fetal anomalies

HISTORY

- Develops after 28–32 weeks of gestation
- Presence of predisposing maternal conditions
- Abdominal discomfort due to overstretching of uterus and abdominal wall
- Dyspnea and heartburn due to excessive elevation of diaphragm
- Leg and vulvar edema
- Excessive weight gain

PHYSICAL FINDINGS

- Weight increased (by 2–4 kg in 4 weeks) without explanation
- Uterus larger than expected for dates
- Shape of abdomen is globular
- Skin over abdomen shiny, with prominent veins and marked striae
- Fundal height greater than expected for dates
- Fetal parts difficult to feel
- Uterus tense
- Fluid thrill present: to test for this, place left hand on one side of uterus, give a sharp tap on other side of uterus—a wave will be felt against left hand
- Fetal heart beat muffled or distant or may be inaudible

DIFFERENTIAL DIAGNOSIS

- Multiple pregnancy

COMPLICATIONS

- Premature labor
- Malpresentation
- Prolapse of umbilical cord with rupture of membranes
- Postpartum hemorrhage
- Preeclampsia

DIAGNOSTIC TESTS

- Ultrasonography needed to confirm diagnosis

MANAGEMENT

Goals of Treatment

Identify condition early.

Appropriate Consultation

Consult a physician if this diagnosis is suspected.

Nonpharmacologic Interventions

Provide support and counseling as necessary to client and family.

Pharmacologic Interventions

None.

Referral

Arrange referral for investigation.

PREGNANCY-INDUCED HYPERTENSIVE DISORDERS

DEFINITION

Hypertensive disorders diagnosed during pregnancy should be classified as one of the following:

- Pre-existing hypertension
- Gestational hypertension with or without proteinuria
- Pre-existing hypertension with superimposed gestational hypertension with proteinuria
- Unclassifiable antenatally but final classification 42 days after delivery

Source: Canadian Hypertension Society Consensus Conference (Helewa et al. 1997)

CAUSES

- Unknown
- Predisposing factors: hypertension, diabetes mellitus, chronic renal disease, multiple gestation, teenage client, polyhydramnios, hydatidiform mole

HISTORY

- Most common in primigravida client
- Client often < 20 years of age or > 35 years of age
- Possible presence of one of predisposing factors listed above
- Excessive weight gain may be first warning signal
- Symptoms range from minimal to severe
- Mild disease: facial or peripheral edema (e.g., rings too tight) may be present
- Severe disease: headache, visual disturbance, facial and peripheral edema, altered consciousness, epigastric or right upper quadrant pain, oliguria, dyspnea

PHYSICAL FINDINGS

- Physical findings depend on severity of disease
- Severity of disease determined by relative increase in blood pressure above client's normal readings, and presence of symptoms and signs

RECOMMENDATIONS ON CRITERIA FOR DIAGNOSIS

- Edema and weight gain should not be used as diagnostic criteria.
- Diastolic blood pressure ≥ 90 mm Hg should be the criterion for diagnosis of hypertension in pregnancy and should trigger investigation and management.
- Except for very high diastolic readings (≥ 110 mm Hg or more), all diastolic readings ≥ 90 mm Hg should be confirmed after 4 hours.
- A regularly calibrated mercury sphygmomanometer, with an appropriate-sized cuff, is the instrument of choice. A rest period of 10 minutes should be allowed before the blood pressure is measured. The woman should be sitting upright and the cuff should be positioned at the level of the heart. Both Korotkoff phase IV and V sounds should be recorded, but the phase IV sound should be used for initiating clinical investigation and management.
- A urine protein level of more than 0.3 g/day should be the criterion for a diagnosis of proteinuria; 24-hour urine collection should be the standard method for determining proteinuria.

Source: Canadian Hypertension Society Consensus Conference (Helewa et al. 1997)

Severe disease

- Edema of face, hands and feet may be present
- Edema may be absent, but rapid weight gain may be present
- Abdominal tenderness in the right upper quadrant
- Deep tendon reflexes show hyperreflexia
- Heart and lungs: gallop rhythm and crackles may be present (because of pulmonary edema)

LABORATORY FINDINGS

- Urine: ≥ 3+ proteinuria

DIFFERENTIAL DIAGNOSIS

- Pre-existing hypertension

COMPLICATIONS

- Eclampsia
- Maternal and fetal morbidity and mortality
- Preterm delivery
- Abruptio placentae
- Baby small for gestational age (e.g., intrauterine growth retardation [IUGR])
- HELLP syndrome (see below)

The combination of elevated liver enzyme levels, hemolysis and thrombocytopenia characterizes a severe form of gestational hypertension, the HELLP syndrome (hemolysis, elevated liver enzymes, low platelet count).

Abnormal liver enzyme levels are associated with gestational hypertension. Involvement of the liver is frequently accompanied by involvement of other organs, including the kidneys and the brain. In the HELLP syndrome, LDH (lactate dehydrogenase) and thrombocytopenia are measures of severity and potential for recovery in the postpartum period.

DIAGNOSTIC TESTS

- Measure hemoglobin level
- Urinalysis (determine protein level)
- 24-hour urine collection (to determine protein)

MANAGEMENT

Goals of Treatment

- Identify the condition early
- Prevent maternal and fetal complications

Appropriate Consultation

Consult a physician if symptomatic disease is discovered.

Nonpharmacologic Interventions

- Nonpharmacologic management should be considered for any pregnant woman with a systolic blood pressure of 140–150 mm Hg or a diastolic pressure of 90–99 mm Hg, or both, as measured in a clinical setting.
- A short-term stay in hospital may be required for diagnosis and to rule out severe gestational hypertension (preeclampsia); in preeclampsia, the only effective treatment is delivery.
- Palliative management, dependent on blood pressure, gestational age, and presence of associated maternal and fetal risk factors, includes close supervision, limitation of activities and some bed rest.
- A normal diet without salt restriction is advised.
- Promising preventive interventions that may reduce the occurrence of gestational hypertension, especially with proteinuria, include calcium supplementation (2 g/day) and fish oil, particularly in women at high risk for early-onset gestational hypertension.
- Pre-existing hypertension should be managed the same way as before pregnancy. However, additional concerns are the effects on fetal well-being and the worsening of hypertension during the second half of pregnancy.
- There is, as yet, no treatment that will prevent exacerbation of the condition.

Source: Canadian Hypertension Society Consensus Conference (Moutquin et al. 1997)

Client Education

- Explain disease course and expected outcome
- Stress the necessity of frequently monitoring condition for early detection of disease progression
- Instruct client to return to clinic immediately if symptoms progress

Pharmacologic Interventions

Calcium supplementation (2 g/day) is associated with a reduction of blood pressure in gestational hypertension, with or without proteinuria, in both low- and high-risk women (grade B recommendation [good evidence to suggest use of this measure]). There is no apparent effect on the prevention of more severe gestational hypertension in women with established gestational hypertension (grade B recommendation).

Source: Canadian Hypertension Society Consensus Conference (Moutquin et al. 1997)

Do not prescribe calcium unless advised to do so by physician.

Monitoring and Follow-Up

- Monitor vital signs and general condition for progression of symptoms to severe preeclampsia or eclampsia
- Assess fetal heart and fetal movement
- Monitor intake and urine output closely

Referral

Medevac to hospital for evaluation may be advisable if there are significant symptoms and at-home management is not deemed feasible.

For clients with severe preeclampsia or eclampsia, *see "Severe Preeclampsia and Eclampsia," in "Obstetric Emergencies," below, this chapter.*

GROUP B STREPTOCOCCAL INFECTION PROTOCOL

Group B streptococci (GBS) continue to be a major cause of neonatal sepsis. The source of the infection in the newborn is the colonized birth canal. Transmission occurs before or during the birth process.

Estimates of GBS colonization rates among pregnant women range from 15% to 40%. GBS infection is transmitted in 40% to 70% of cases, but sepsis develops in only 1% to 2% of affected newborns.

GBS sepsis presents in the early neonatal period (<7 days of age) or somewhat later (7 days to 3 months of age). Early onset is more common and is associated with a higher mortality rate.

Several strategies using antibiotics have been developed to prevent this type of infection in the newborn: neonatal, antepartum and intrapartum. However, no strategy can prevent all cases of early-onset GBS sepsis.

MANAGEMENT

The Society of Obstetricians and Gynaecologists of Canada recommends the following steps:

- Universal screening of all pregnant women at 35–37 weeks of gestation with a vaginal swab and the offer of intrapartum chemoprophylaxis to all women with GBS.
- No universal screening but intrapartum chemoprophylaxis for all women with identified risk factors (see below). This strategy should also be used in cases where universal screening is a policy but either the swab was not done or the result is unavailable.

Risk Factors

- Preterm labor at <37 weeks gestational age.
- Term labor at >37 weeks gestational age when there is prolonged rupture of membranes (>18 hours) or there is maternal fever during labor (>38°C).
- Antepartum oral antibiotic therapy for GBS bacteriuria. These women should be considered to have GBS colonization at the time of onset of labor. They do not need to undergo re-screening once they have been identified.
- Women who previously gave birth to an infant with GBS disease regardless of their status on screening.

Pharmacologic Interventions

Antibiotic regimen of choice for intrapartum prophylaxis:

ampicillin (Ampicin) (**D class drug**), 2 g IV, followed by 1–2 g IV q4–6h until delivery or until labor is stopped

For clients with allergy to penicillin:

clindamycin (Cleocin) (**B class drug**), 300–600 mg IV q8h

OBSTETRIC EMERGENCIES

BLEEDING IN PREGNANCY

A variety of conditions or problems may cause bleeding during pregnancy (Table 4). Many of these are obstetric emergencies and are discussed in detail below.

Table 4: Differential Diagnosis of Bleeding in Pregnancy

Gestational Age < 20 Weeks	Gestational Age ≥ 20 weeks
Implantation bleeding	Placenta previa
Delayed normal menses	Abruptio placentae
Cervical lesions (erosion, polyp, dysplasia)	Premature labor
Ectopic pregnancy	Hydatidiform mole
Spontaneous abortion (threatened, inevitable or incomplete)	Intrauterine death
Missed abortion	

SPONTANEOUS ABORTION

DEFINITION

Loss or impending loss of products of conception before 20th week of pregnancy.

Threatened Abortion

- Early symptoms of pregnancy may be present
- Mild cramps with bleeding
- Cervix long and closed
- Uterus appropriate for gestational age
- Progresses to inevitable abortion in approximately 50% of cases

Inevitable Abortion

- Persistent cramps and moderate bleeding
- Cervical os is open
- Should not be confused with incompetent cervix, which is not associated with cramping and is potentially treatable; incompetent cervix is associated with painless cervical dilatation

Incomplete Abortion

- Symptoms the same as for inevitable abortion but some products of conception are retained in the uterus (where blood clots may be mistaken for tissue) or cervical canal, a situation that causes ongoing cramping and excessive bleeding
- Speculum examination reveals dilated internal os and tissue within the endocervical canal or vagina
- Bleeding may be heavy

Complete Abortion

- Entire conceptus expelled, followed by decrease or cessation of cramps and bleeding
- On examination, uterus is firm and smaller than would be expected for gestational length of pregnancy

Missed Abortion

- Products of conception retained 3 or more weeks after fetal death
- Signs and symptoms of pregnancy abate; pregnancy test becomes negative
- Brownish vaginal discharge (rarely frank bleeding) occurs
- Cramping rare
- Uterus soft and irregular
- Ultrasonography rules out live fetus

Septic Abortion

- Any of the above scenarios and temperature > 38°C without other source of fever
- Associated with intrauterine device or instrumentation during therapeutic abortion procedure
- Abdominal and uterine tenderness are present, as well as purulent discharge and possibly shock

CAUSES

Spontaneous abortion occurs in 15% to 25% of clinically recognized pregnancies and perhaps closer to 50% of all conceptions.

- Fetal abnormalities incompatible with life (chromosomal and other)
- Defective implantation
- Maternal infection
- Uterine and cervical anoma lies

HISTORY

- Symptoms and signs suggestive of pregnancy (missed period or periods, nausea, vomiting, breast tenderness)
- Cramping pain
- Vaginal bleeding often with passage of tissue

All clients with bleeding sufficient to soak one pad per hour or symptoms of orthostatic drop in blood pressure (dizziness upon standing, faintness) need to be examined.

PHYSICAL FINDINGS

Examination should include stability of vital signs, orthostatic vital signs, pelvic examination to look for open or closed cervical os, presence of tissue and other causes of vaginal bleeding (such as cervical erosion, polyp, infection, vaginal lesion or ectopic fetus). The uterus should be measured. Fetal heart tones should be checked with Doppler scanning if gestational age is 10–12 weeks.

- Heart rate may be elevated
- Blood pressure may be low
- Postural blood pressure drop may be present
- Oxygen saturation may be abnormal if in shock
- Client appears anxious

Pelvic Examination

- *Threatened abortion*: cervical os closed, bleeding from os may be seen
- *Inevitable abortion*: cervical os open, some products of conception bulging through os, bleeding from os can be seen
- *Incomplete abortion*: cervical os open, bleeding from os can be seen, mild suprapubic tenderness present, uterus may be small for dates

DIFFERENTIAL DIAGNOSIS

- Ectopic pregnancy
- Hydatidiform mole
- Other common causes of vaginal bleeding (e.g., cervical erosion, polyp, cervicitis, local trauma)

For other entities, *see Table 4, above, this chapter*.

COMPLICATIONS

- Severe hemorrhage
- Hypovolemic shock
- Retention of products with or without endometritis
- Cervical shock (vasovagal hypotension due to dilatation of cervix by tissue)

DIAGNOSTIC TESTS

Pregnancy test positive in 75% of cases, so negative result does not rule out spontaneous abortion.

- Measure hemoglobin level
- Urinalysis

MANAGEMENT

Goals of Treatment

- Prevent complications
- Control blood loss
- Maintain blood volume

In an outpatient setting it is often difficult to determine if a spontaneous abortion is complete or incomplete. It is probably prudent to manage all spontaneous abortions as incomplete abortions if there is significant, active vaginal bleeding associated with abdominal pain.

Threatened, Incomplete or Inevitable Abortion without Hemodynamic Compromise

If there is no hemodynamic compromise, threatened, incomplete or inevitable abortion should be managed as outlined in Table 5.

Inevitable or Incomplete Abortion in Hemodynamically Unstable Client

Appropriate Consultation

Consult a physician as soon as client is stabilized.

Nonpharmacologic Interventions

- Nothing by mouth
- Bed rest
- Trendelenburg position (prn) to aid venous return
- Insert urinary catheter if client is in shock
- Monitor intake and output hourly
- Aim for urine output of 50 mL/h

Adjuvant Therapy

Initial aggressive fluid resuscitation is needed if client is in hypovolemic shock:

- Start IV therapy with normal saline
- Start two large-bore IV lines if client is hypotensive
- Give 20 mL/kg normal saline as a bolus over 15 minutes
- Reassess for signs of shock
- Repeat 20 mL/kg boluses until systolic blood pressure stabilizes at >90 mm Hg, then adjust rate according to severity of vaginal bleeding and vital signs
- Oxygen 6–10 L/min by mask; keep oxygen saturation > 97% to 98%

Refer to protocol for managing hypovolemic shock, under *"Shock," in chapter 14, "General Emergencies and Major Trauma."*

Pharmacologic Interventions

oxytocin drip (Syntocinon) (**D class drug**), 20 units in 1 L normal saline or Ringer's lactate, 50–100 mL/h

If you cannot start IV therapy and bleeding is significant:

oxytocin (Syntocinon) (**D class drug**), 5–10 mg IM

or

consult physician about ergotamine (**B class drug**), 0.25 mg IM

Verify Rh status (clients must be given Rh immune globulin [RhIG] within 48 hours, if indicated).

Monitoring and Follow-Up

- Monitor vaginal bleeding, cramps, passage of tissue or clots, vital signs, intake and output
- Save all products of conception passed and send to hospital with client

Referral

Medevac as soon as possible.

Table 5: Management of Threatened, Incomplete or Inevitable Abortion without Hemodynamic Compromise

Threatened Abortion	Incomplete or Inevitable Abortion
Increased rest if possible	Tissue visible in os should be gently removed with ring forceps to allow contraction of uterus; minimize manipulation to minimize risk of infection
Acetaminophen (**A class drug**), 500 mg, 1–2 tabs PO q4h prn for discomfort	Consider IV drip with oxytocin (Syntocinon) (**D class drug**) as an alternative (20 units in 1 L normal saline or Ringer's lactate at 50–100 mL/h)
Nothing in the vagina (no tampons, douches, intercourse)	If you cannot start IV therapy and bleeding is significant:
Consider ultrasonography to visualize gestational sac and cardiac activity or to rule out ectopic pregnancy (cardiac activity predictive of continued pregnancy in > 90% of cases)	oxytocin (Syntocinon) (**D class drug**), 5–10 mg IM
Consider monitoring quantitative β-HCG (human chorionic gonadotropin) for prognosis (increase of < 66% in 48 hours predictive of abortion or ectopic pregnancy)	*or*
Provide emotional support	consult a physician about ergotamine (**B class drug**), 0.25 mg IM (contraindicated if client is hypertensive)
	Clients with incomplete abortion (tissue passed with continued bleeding) often require suction curettage or dilatation and curettage
	Give Rh immune globulin (RhIG) to Rh-negative women within 48 hours
	Provide emotional support

ANTEPARTUM HEMORRHAGE (LATE)

DEFINITION

Vaginal bleeding that occurs after 20 weeks of gestation.

CAUSES

The two most common causes are placenta previa and abruptio placentae, described in Table 6.

Table 6: Description and Classification of Placenta Previa and Aruptio Placentae

Placenta Previa	Abruptio Placentae
Definition	**Definition**
Aberrant implantation of placenta in lower uterine segment	Separation of the placenta from the uterine wall; may be partial, rarely complete
Classification	**Classification**
Marginal: low-lying implantation, near the cervical os but not covering it	*Mild:* slight vaginal bleeding (<100 mL); no fetal heart rate abnormalities; no evidence of shock or coagulopathy
Partial: partly covering cervical os	*Moderate:* moderate vaginal bleeding (100–500 mL) and uterine hypersensitivity with or without elevated tone; mild shock and fetal distress may be present
Complete: completely covering cervical os	*Severe:* extensive vaginal bleeding (>500 mL), tetanic uterus and moderate to profound maternal shock; fetal death and maternal coagulopathy are characteristic
Prevalence	**Prevalence**
1 in 200 deliveries (diagnosis in second trimester very common, but in more than 95% of these cases, placenta previa is not present at delivery)	10% of all deliveries (severe form rare)
Risk Factors	**Risk Factors**
Increasing maternal age, multiparity, prior uterine scar; associated with breech and transverse presentations	Prior history of abruption, maternal hypertension, cigarette or cocaine use, increasing maternal age, multiparity; may be associated with preterm premature rupture of membranes, twin gestation after delivery of first infant and trauma
Clinical Presentation	**Clinical Presentation**
Vaginal bleeding is typically painless, with bright red blood	Vaginal bleeding in 80% of cases, but may be concealed in the remainder (i.e., retroplacental bleeding); therefore, maternal hemodynamic situation may not be explained by observed blood loss
Blood loss is usually not massive with initial bleed, but bleeding tends to recur and become heavier as the pregnancy progresses	Pain and increased uterine tone typical
Verify Rh status	Pain increases in severity
	Verify Rh status
Physical Findings	**Physical Findings**
Heart rate may be normal or elevated	Depend on degree of detachment, amount of blood loss
Blood pressure normal, low or hypotensive	With mild abruption, signs may be minimal
Postural blood pressure drop may be present	Heart rate mildly to severely elevated
Fetal heart rate usually normal	Blood pressure normal, low or hypotensive
Mild distress to frank shock	Fetal heart rate elevated, reduced or absent
Bright red bleeding per vagina	Client appears in acute distress
Fundal height consistent with dates	Client may be pale or unconscious (if in shock)
Uterus soft, normal tone, nontender	Vaginal bleeding moderate, profuse or absent
Uterine size consistent with dates	If membranes ruptured, amniotic fluid may be bloody
Transverse, oblique or breech lies common	Uterus may be larger than expected for dates
Should be suspected in client with persistent breech presentation	Uterus tender
	Increased uterine tone (tense or hard)
Fetal heart rate depends on amount of bleeding	Uterine contractions may be present and prolonged
Advisability of speculum examination debatable	Uterus may fail to relax completely between contractions
Digital examination contraindicated	

DIAGNOSTIC TESTS

- Measure hemoglobin level
- Urinalysis

MANAGEMENT

Goals of Treatment

- Identify condition early
- Resuscitate and stabilize if client is in shock
- Prevent complications

Appropriate Consultation

Consult a physician as soon as client is stable.

Nonpharmacologic Interventions

- Nothing by mouth
- Bed rest
- Trendelenburg position (prn) to aid venous return if client is in shock
- Insert urinary catheter if client is in shock
- Monitor intake and output hourly
- Aim for urine output of 50 mL/h

Adjuvant Therapy

Initial aggressive fluid resuscitation is needed if client is in hypovolemic shock:

- Start IV therapy with normal saline
- Give 20 mL/kg normal saline as a bolus over 15 minutes
- Reassess for signs of shock
- Repeat 20 mL/kg boluses until systolic blood pressure stabilizes at >90 mm Hg
- Ongoing IV therapy is based on response to initial fluid resuscitation, continuing losses and underlying cause
- Adjust IV rate accordingly, to maintain urine output of 50 mL/h
- Oxygen 6–10 L/min by mask; keep oxygen saturation > 97% to 98%

Pharmacologic Intervention

None.

Monitoring and Follow-Up

- Monitor vital signs q10–15min if hypotension is present or vaginal bleeding continues
- Monitor fetal heart rate q15min
- Monitor for signs of onset of labor
- Assess stability of pre-existing medical problems

Referral

Medevac as soon as possible.

ECTOPIC PREGNANCY

DEFINITION

Implantation and growth of fertilized ovum outside of uterus. Commonly occurs in a fallopian tube, but may also occur in the abdominal cavity, on an ovary or in the cervix.

CAUSES

Unknown.

Risk factors

- Previous pelvic inflammatory disease with adhesions
- Current use of intrauterine device
- Previous tubal or abdominal surgery
- Previous ectopic pregnancy
- Relative infertility

HISTORY

- Amenorrhea of 6–8 weeks
- Symptoms of pregnancy, followed by abnormal vaginal bleeding, which may be only scanty spotting of dark blood
- Lower abdominal pain: crampy, unilateral
- Amenorrhea may be absent, in which case most recent period abnormal in length and duration
- May have had previous positive pregnancy test
- Assess for Rh status

Acute (Ruptured) Ectopic Pregnancy

- Accounts for 40% of cases
- Sudden onset of unilateral lower abdominal pain
- Pain usually severe
- Pain may be constant or intermittent
- Pain may be severe enough to cause fainting
- Pain may become generalized or remain localized in one quadrant
- Pain may radiate to shoulder tip (in cases of massive hemorrhage)
- Nausea and vomiting frequently present
- Backache may be present

Chronic (Unruptured) Ectopic Pregnancy

- Accounts for 60% of cases
- Slight, persistent vaginal spotting over several days
- Lower abdominal discomfort (often mild)
- Attacks of sharp pain and faintness occasionally present
- Distension may be present

PHYSICAL FINDINGS

- Heart rate elevated
- Blood pressure low to hypotensive (if ruptured)
- Postural blood pressure drop may be present as an early sign of blood loss
- Client in moderate-to-acute distress
- Pale, sweating
- Client walks carefully, bent slightly forward, holding lower abdomen
- Abdominal distension may be present
- Bowel sounds may be decreased
- Lower abdominal tenderness
- Rebound, guarding, rigidity may be present

Pelvic Examination

- Unilateral adnexal tenderness
- Tender adnexal mass or fullness may be present
- Cervical os closed
- Bleeding from os, but no tissue present
- Pain on movement of cervix
- Uterus may be soft, enlarged, nontender

DIFFERENTIAL DIAGNOSIS

- Acute appendicitis
- Acute pelvic inflammatory disease
- Ruptured ovarian cyst or torsion of ovarian cyst
- Other acute abdominal pathology
- Spontaneous abortion

COMPLICATIONS

- Shock
- Future ectopic pregnancy

DIAGNOSTIC TESTS

- Pregnancy test: result may be positive or negative

MANAGEMENT

Maintain a high index of suspicion for this diagnosis in a sexually active female who has pain and vaginal bleeding.

Goals of Treatment

- Manage complications

If Pain Not Severe and Client Hemodynamically Stable

Appropriate Consultation

Consult a physician.

Referral

Refer same day for ultrasonography and definitive diagnosis.

If Pain Severe or Client Hemodynamically Compromised

Severe pain or hemodynamic compromise suggests possible rupture.

Nonpharmacologic Interventions

- Bed rest
- Trendelenburg position (prn) to aid venous return if client is in shock
- Nothing by mouth
- Monitor vital signs
- Insert urinary catheter

Adjuvant Therapy

- Oxygen 6–10 L/min by mask; keep oxygen saturation > 97% to 98%
- Start 2 large-bore (14- or 16-gauge) IV lines with normal saline or Ringer's lactate
- Give 20 mL/kg IV fluids as a bolus over 15 minutes
- Reassess for signs of shock
- Repeat 20 mL/kg boluses of IV fluids until systolic blood pressure stabilizes at >90 mm Hg

See protocol for managing hypovolemic shock, under "Shock," in chapter 14, "General Emergencies and Major Trauma."

Monitoring and Follow-Up

- Monitor vital signs closely q5–15min
- Monitor intake and urine output hourly
- Aim for urine output of 50 mL/h

Referral

Medevac as soon as possible.

HYDATIDIFORM MOLE

DEFINITION

Mass of vessels resulting from cystic proliferation of chorionic epithelium. May be benign or malignant.

CAUSES

Largely unknown; genetic malformations suspected.

HISTORY

- Bleeding during late first trimester, early second trimester
- Vaginal blood dark brown to bright red
- Spotting or profuse bleeding
- Passage of cysts (in grape-like clusters)
- Absence of quickening
- Preeclampsia may be present
- Exaggerated signs of pregnancy
- Excessive nausea and vomiting (may present as hyperemesis gravidarum)

PHYSICAL FINDINGS

- Blood pressure may be elevated
- Fundal height may be greater than expected for dates
- Examine all material passed per vagina for presence of cysts
- Uterus larger than expected for dates
- Mild uterine tenderness may be present because of overdistension
- Fetal parts not felt
- Fetal heart not heard

Most clients are symptomatic before 17th week of pregnancy.

Suspect this diagnosis in clients with the following signs and symptoms:

- Pregnancy-induced hypertension during first half of pregnancy
- Hyperthyroidism
- Bleeding during pregnancy, accompanied by no detectable fetal heartbeat and uterine enlargement after 12 weeks gestation by dates

DIFFERENTIAL DIAGNOSIS

- Threatened or inevitable abortion

For differential diagnosis of bleeding in pregnancy, *see "Bleeding in Pregnancy," above, this chapter*.

COMPLICATIONS

- Hemorrhage
- Sepsis
- Choriocarcinoma (typically occurs later)

DIAGNOSTIC TESTS

- Urine pregnancy test
- Urinalysis: routine and microscopic
- Measure hemoglobin level if client is bleeding

MANAGEMENT

Goals of Treatment

- Identify condition early
- Prevent complications

Appropriate Consultation

Consult a physician if this diagnosis is suspected.

Referral

Refer for definitive assessment, which requires ultrasonography and measurement of serum β-human chorionic gonadotropin (HCG) as soon as possible. Definitive treatment is surgical evacuation.

Long-Term Follow-up

Follow up after surgery is critical.

- Serial measurement of β-HCG (weekly) until three consecutive negative results, then monthly for 6–12 months
- Educate client about need to use contraception (preferably oral contraceptives) to ensure no subsequent pregnancy during the surveillance period

POSTPARTUM HEMORRHAGE

Postpartum hemorrhage is typically classified as primary or secondary (Table 7).

Blood loss is frequently up to 600 mL after spontaneous vaginal delivery and between 1 and 1.5 L after instrumental or operative delivery. Therefore, clinical experience is necessary to determine when bleeding is occurring too rapidly or at the wrong time or is unresponsive to appropriate treatment. Blood loss will be less well tolerated if the client has low hemoglobin (anemia) or has not had the normal expansion of blood volume during pregnancy, as in cases of preeclampsia.

COMPLICATIONS

- Hypotension
- Hypovolemic shock
- Secondary infection
- Sepsis
- Maternal death
- Anemia

DIAGNOSTIC TESTS

None.

Table 7: Definition, Causes, History and Physical Findings for Primary and Secondary Postpartum Hemorrhage

Primary	Secondary
Definition	**Definition**
Blood loss >500 mL immediately after or within 24 hours of delivery	Blood loss >500 mL per vagina 24 hours to 6 weeks postpartum (usually occurs between 10th and 14th day)
Causes	**Causes**
Atonic uterus	Retained placental fragments
Laceration of cervix, vagina, perineum	Endometritis
Episiotomy	
Predisposing factors: prolonged labor, rapid labor, high parity, bladder distension, multiple gestation, partial separation of placenta, retained fragments, retained blood clots, antepartum hemorrhage, uterine inversion	
History	**History**
Presence of one of the above causes	Persistent bright red lochia of large or small amount
Vaginal bleeding	Lochia may have returned to normal
Restlessness, anxiousness	Client presents with sudden, severe, bright red bleeding
Nausea and vomiting may develop	Passage of clots and tissue
Note Rh status	Fatigue and dizziness may be present (if bleeding is slow, continuous)
	Symptoms of shock may be present (if bleeding is sudden, acute)
	Foul discharge and fever may be present (if there is a secondary infection)
Physical Findings	**Physical Findings**
Heart rate rapid	Temperature may be elevated
Blood pressure low or hypotensive	Heart rate rapid; may be weak, thready (if client is in shock)
Postural blood pressure drop may be present	Blood pressure low to hypotensive (if client is in shock)
Acute distress possible	Postural blood pressure drop may be present (early sign of pending shock)
Client pale, possibly diaphoretic	Client in moderate-to-severe distress
Continued profuse bleeding after delivery	Fundus visible high in abdomen, usually up to umbilicus
Placenta or membranes may be incomplete	Bright red bleeding per vagina
Fundus above level of umbilicus	Purulent or foul-smelling discharge may be present (if there is an infection)
Uterus soft, boggy	Fundus can be palpated high in abdomen
	Fundus may be soft
	Tenderness may be present (secondary infection)
	Pelvic examination
	Cervical os open, bright red bleeding from os, tissue may be present in os

MANAGEMENT

Goals of Treatment

- Replace blood losses
- Stimulate uterus to contract

Appropriate Consultation

Consult a physician as soon as client has been stabilized.

Nonpharmacologic Interventions

- Nothing by mouth
- Bed rest
- Warmth
- Trendelenburg position if client is in hypovolemic shock (this may cause pooling of blood in uterus, but it is helpful)
- Massage fundus manually to stimulate uterine contraction
- Bimanual compression may be necessary if bleeding uncontrolled with your therapy: capture uterus between both hands and exert firm pressure
- Insert Foley catheter (bladder distension can prevent effective contraction of uterus)

Adjuvant Therapy

- Oxygen 6–10 L/min by mask; keep oxygen saturation > 97% to 98%
- Start 2 large-bore (14- or 16-gauge) IV lines with normal saline
- Aggressive fluid resuscitation as necessary for hemodynamic stabilization
- Give 20 mL/kg IV fluids as a bolus over 15 minutes
- Reassess for signs of shock
- Repeat 20 mL/kg boluses of IV fluids until systolic blood pressure stabilizes at >90 mm Hg

See protocol for managing hypovolemic shock, under "Shock," in chapter 14, "General Emergencies and Major Trauma."

Pharmacologic Interventions

Assist uterine contraction:

oxytocin (Syntocinon) (**D class drug**), 40 units in 1 L normal saline IV fluid infused at 200 mL/h

or

oxytocin (Syntocinon) (**D class drug**), 10 units IM stat

Bolus oxytocin can cause transient hypotension then hypertension.

If no response to therapy, consult physician about giving:

ergonovine maleate (Ergometrine) (**B class drug**), 0.25 mg IM

or

ergonovine maleate (Ergometrine) (**B class drug**), 0.125 mg IV

Monitoring and Follow-up

- Monitor vital signs and condition frequently
- Monitor intake and hourly urine output
- Aim for urine output of about 50 mL/h

Referral

Medevac as soon as possible. Surgical intervention may be required.

PRETERM LABOR

DEFINITION

Onset between 20 and 37 weeks gestational age of contractions occurring at least every 10 minutes and lasting at least 30 seconds. Discrimination from "false labor" is difficult, unless there is cervical dilatation, which indicates true labor; however, postponement of treatment until such dilatation occurs may lower the chances of treatment success.

CAUSES

Frequently unknown. Several factors have been associated with preterm labor.

Maternal Factors

- Infection (systemic, vaginal, urinary tract, amnionitis)
- Uterine anomalies
- Fibroids
- Retained intrauterine device
- Cervical incompetence
- Overdistended uterus (polyhydramnios, multiple gestation)
- Rupture of membranes

Fetal Factors

- Congenital anomalies
- Intrauterine death

HISTORY

- Presence of one or more risk factors
- Onset of contractions
- Contractions regular, becoming stronger and closer together
- Rupture of membranes and passage of bloody mucus may have occurred
- Clients at risk should be identified during routine prenatal visits

PHYSICAL FINDINGS

- Moderate distress
- If contractions moderate to strong, uterine changes seen on abdomen
- "Bloody show" may be present
- Contractions (strength, frequency, duration)
- Uterine tenderness or hardness
- Assess position and presentation of fetus, engagement of head
- Cervical dilatation, effacement, descent and presentation of fetal parts
- Fetal heart rate: identify changes with contractions

DIFFERENTIAL DIAGNOSIS

- Braxton-Hicks contractions in later pregnancy
- False labor in later pregnancy

COMPLICATIONS

- Progression to preterm delivery

DIAGNOSTIC TESTS

- Fern test of amniotic fluid
- Litmus paper test: blue if membranes ruptured
- Urinalysis: evidence of infection may be present

MANAGEMENT

Goals of Treatment

- Slow or halt labor
- Deliver preterm infant safely, if delivery necessary

Appropriate Consultation

Consult a physician.

Nonpharmacologic Intervention

Bed rest in left lateral decubitus position.

Adjuvant Therapy

- Oxygen 4–6 L/min by mask
- Start IV therapy with normal saline to keep vein open
- If pregnancy > 20 weeks, cervical dilatation < 4 cm and membranes intact, attempt to halt uterine contractions

Use a fluid bolus, which may suppress release of oxytocin from pituitary gland:

500 mL of 5% dextrose in 0.25% normal saline (D5W/0.25% NS) infused over 30 minutes

Pharmacologic Interventions

Tocolytic agent

Discuss with a physician possible use of tocolytic agent, such as:

ritodrine (Yutopar) (**D class drug**), 150 mg in 500 mL D5W/0.25% NS

Start at 100 µg/min for 10 minutes. Then increase incrementally by 50 µg/min every 10 minutes until there is a response or side effects occur (e.g., hypotension or tachycardia).

Contraindications

- Evidence of fetal distress
- Fetal anomalies
- Abruptio placentae
- Placenta previa with heavy bleeding
- Severe maternal disease such as cardiac disease, toxemia, hypertension, diabetes mellitus

Risks of Treatment

If membranes are ruptured, there is increased risk of cord prolapse and amnionitis. The risk of fetal death increases if labor is suppressed in cases of intrauterine growth retardation (IUGR). The mother may experience tachycardia, nervousness or pulmonary edema secondary to the medication.

The medication is likely to be ineffective if labor is well established or if the cervix is dilated to 4 cm or more. Preparation should be made to deliver in the optimal setting. Up to now there have been no large-scale controlled clinical trials demonstrating that tocolytic agents delay delivery.

Experience up to now indicates that β-adrenergic receptor antagonists may inhibit uterine contractility but only prolong gestation for about 48 hours in preterm labor. Consequently, some authors state that, to a large extent, the goal of tocolysis is to arrest labor long enough for exogenous steroids to stimulate fetal surfactant production so as to prevent the pulmonary complications of preterm birth.

Steroids

Steroids to accelerate fetal lung maturation:

dexamethasone (Decadron) (**B class drug**), 12.5 mg IM q24h (2 doses) for 48 hours

Monitoring and Follow-Up

Monitor uterine contractions, vital signs and fetal heart rate.

Assess probability of imminent delivery on the basis of the following factors:

- Cervical effacement and dilatation
- Frequency of uterine contractions
- Parity
- Previous obstetric history

Prepare for delivery as necessary.

Refer to "Delivery in the Nursing Station," above, this chapter.

Referral

Medevac as soon as possible.

PREMATURE RUPTURE OF MEMBRANES

DEFINITION

Rupture of membranes is considered premature if it occurs more than 1 hour before onset of labor. "Preterm premature" rupture of membranes is rupture that occurs before 37 weeks of gestation.

CAUSES

- Unknown
- Abdominal trauma
- Incompetence of cervix
- Hydramnios
- Multiple gestation
- Abnormal lie of fetus
- Placenta previa
- Viral or bacterial intrauterine infection

HISTORY

- Sudden gush of fluid
- Sometimes described as loss of control of bladder
- May be described as continuous trickle of fluid from vagina
- No uterine contractions felt
- Assess (from history or from records) for vaginal group B streptococcus (GBS) status during pregnancy

PHYSICAL FINDINGS

- Assess fundal height for consistency with dates
- Assess fluid leaking from vagina (color, odor, amount)
- Assess for bleeding from vagina
- Evaluate for uterine contractions
- Assess fetal engagement through abdominal wall
- Place litmus paper in vagina and observe for color change to blue

Cervical digital examination increases risk of chorioamnionitis. Therefore, evaluate cervix visually with sterile speculum. Avoid digital examination if possible, unless client is in labor and delivery is inevitable. Check for cord prolapse.

If rupture of membranes has been documented, a sterile vaginal examination should be performed with the following goal:

- Assess cervix for changes and signs of onset of labor

DIFFERENTIAL DIAGNOSIS

- Loss of bladder control
- Premature labor
- Term labor

COMPLICATIONS

- Intrauterine infection
- Preterm delivery
- Cord prolapse

DIAGNOSTIC TESTS

- Fern test of amniotic fluid on microscopic slide
- Urinalysis (routine, microscopic and culture)

MANAGEMENT

Goals of Treatment

- Identify presence of amniotic fluid
- Prevent infection

Appropriate Consultation

Consult a physician as soon as possible if you suspect this diagnosis.

Nonpharmacologic Interventions

- Bed rest
- Diet as tolerated
- Change sanitary pad at least q2h

Pharmacologic Interventions

Antibiotics: Discuss with a physician the need for prophylactic antibiotics depending on vaginal GBS status and clinical presentation (i.e., febrile or not, in labor or not)

Steroids: If transport is delayed and gestational age is less than 34 weeks, discuss with a physician the role of corticosteroids in fostering fetal lung maturation.

Monitoring and Follow-Up

- Monitor for development of labor or infection
- Monitor vital signs, including temperature, q2h
- Monitor fetal heart rate q2h if not in labor (q15min if in labor)
- Monitor vaginal loss for foul-smelling discharge
- Monitor fundus for development of tenderness

Referral

Medevac as soon as possible.

SEVERE PREECLAMPSIA AND ECLAMPSIA

DEFINITIONS

- *Severe preeclampsia:* Development of severe hypertension, proteinuria and edema during second half of pregnancy and first week postpartum.
- *Eclampsia:* Convulsions or coma in pregnant or postpartum woman. Convulsion may occur in stable client with mildly elevated blood pressure in absence of excessive weight gain and/or edema.

CAUSES

Extension of preeclampsia.

HISTORY

Severe Preeclampsia

- Most common in young primigravida or older multigravida
- Prior signs and symptoms of preeclampsia usually present
- Fluid retention and weight gain may be present without edema
- Increasingly severe headache
- Visual disturbances, altered consciousness
- Vomiting
- Epigastric pain

Eclampsia

- Grand mal seizure may have occurred before presentation
- Facial twitching rapidly progresses to body rigidity
- Generalized contraction and relaxation of body muscles follows
- Typically lasts for 60–75 seconds
- Coma follows the convulsion
- Client usually does not remember anything of the event
- Respiration absent during seizure
- Rapid and deep respiration usually begins after convulsion ends

One-third of seizures occur prenatally, one-third occur during labor, and one-third occur within the first 24 hours postpartum.

PHYSICAL FINDINGS

- Physical findings in eclampsia extremely variable
- Physical findings in severe preeclampsia more consistent
- Blood pressure: ≥160 mm Hg systolic or ≥ 110 mm Hg diastolic or relative hypertension compared with previous readings (in 20% of eclampsic clients)
- Heart rate rapid
- Unexpected weight gain (1 kg/week) with or without edema (but excessive weight gain and/or edema are not required for diagnosis)
- Fetal heart rate >160 bpm
- Client in acute distress
- May be stuporous, unconscious or in convulsion
- Vomiting or retching may be present
- Abdominal tenderness in right upper quadrant
- Deep tendon reflexes hyperreactive
- Clonus may be present
- Urine: 3–4+ proteinuria

COMPLICATIONS

- Maternal injury during seizure
- Repeated seizures
- Aspiration
- Fetal distress
- Preterm labor and delivery
- Abruptio placentae
- HELLP syndrome (hemolysis, elevated liver enzymes, low platelet count)
- Disseminated intravascular coagulopathy
- Maternal death
- Fetal death

DIAGNOSTIC TESTS

- Urinalysis (for proteinuria)
- Measure blood glucose level
- Measure hemoglobin level

MANAGEMENT

Goals of Treatment

- Prevent intracranial hemorrhage and serious damage to other vital organs
- Prevent convulsions
- Prevent maternal injury during convulsion

Appropriate Consultation

Consult a physician as soon as client is stable and you are able to do so.

The stabilization of the client should be discussed with the referral center to determine what drug therapy should be initiated before transfer and whether the therapy should be continued in transit. If intravenous magnesium sulfate or hydralazine hydrochloride (Apresoline) is used during transport, a physician should accompany the client. Tracheal intubation and ventilation might become necessary if there is respiratory depression.

Adjuvant Therapy

- Oxygen 6–10 L/min
- Start IV therapy with normal saline to keep vein open
- Adjust IV rate if there is unusual fluid loss (vomiting, diarrhea, other)

Do not overhydrate with IV fluids as this may increase risk of iatrogenic pulmonary edema.

Nonpharmacologic Interventions

- Bed rest in a quiet, darkened room
- Position client on her left side
- Stay with client at all times; do not leave her alone
- Nothing by mouth
- Protect airway
- Place artificial airway in client's mouth prn
- Ensure that breathing and ventilation are adequate
- Have oral airway and Ambu bag at bedside
- Wipe away and suction oral secretions
- Document time, duration and type of seizure
- Insert Foley catheter attached to a closed drainage bag to monitor urine output closely (recommended); urinary output should be greater than 25 mL/h
- Check urine for protein hourly

Pharmacologic Interventions

Infuse over 15 minutes:

magnesium sulfate (**B class drug**), 2–4 g in 100 mL of normal saline via a drip chamber

Then reassess respiratory rate and reflexes. Piggyback administration of this drug via a main line.

Magnesium sulfate is a cerebral depressant that reduces neuromuscular irritability. It can cause vasodilation and reduction in blood pressure. Symptoms of magnesium sulfate toxicity: respiratory depression or arrest, reduced or absent deep tendon reflexes, cardiac arrest, coma. The antidote is **calcium gluconate (B class drug). Keep preloaded syringe of 10% calcium gluconate at bedside.**

After the loading dose of magnesium sulfate:

solution of 20 g magnesium sulfate in 1 L normal saline or Ringer's lactate, 1–2 g/h (50–100 mL/h)

Transport may be commenced once the loading dose is complete and the maintenance dose has been started.

Antihypertensive therapy is added if maternal diastolic blood pressure is ³ 105 mm Hg:

hydralazine (Apresoline) (**B class drug**), 5 mg IM stat or 1 mg IV as test dose, then 5–25 mg IV over 2–4 minutes; may need to be repeated in 20–30 minutes (5–10 mg IV) if the blood pressure is not reduced effectively with the first dose

With severe hypertension (diastolic pressure ≥ 110 mm Hg), the administration of an antihypertensive agent should be considered as follows:

hydralazine (Apresoline) (**B class drug**), 5–10 mg via intermittent IV bolus administration

Check blood pressure every 5 minutes.

Do not decrease the diastolic pressure to < 90 mm Hg as this would reduce the placental perfusion and be detrimental to the fetus. Abruptio placentae is a possible complication of acute changes in blood pressure.

Precautions with Hydralazine

- Antihypertensive effects start within 30–60 minutes and last for about 4–6 hours
- Contraindication: heart disease
- Side effects: tachycardia, palpitations, faintness, headache, hypotension

Monitoring and Follow-Up

- Monitor state of consciousness and respiratory rate constantly; monitor deep tendon reflexes (patellar) and blood pressure q15min; monitor fetal heart rate q30min.
- If respiratory rate 8–12/min, reflexes reduced or urine output < 100 mL in previous 4 hours, reduce infusion of magnesium sulfate by 50%.
- If respiratory rate < 8/min or reflexes absent, stop infusion of magnesium sulfate, then unclamp main line of Ringer's lactate and run at 100 mL/h. Consult a physician and then give antidote:

  10% calcium gluconate (**B class drug**), 10 mL (1 g) IV over 5–10 minutes

If a seizure occurs:

- Suction nasopharynx prn
- Administer oxygen
- Position the client on her side and cushion appropriately
- Record length and type of seizure
- After seizure, assess uterine contractions, vaginal bleeding, uterine tenderness, abdominal pain and fetal heart rate
- Discuss the use of additional seizure medications with physician
- In case of prolonged seizure activity, consideration should be given to intubation

Referral

Medevac as soon as client is stabilized.

CHAPTER 13 – WOMEN'S HEALTH AND GYNECOLOGY

Table of Contents

ASSESSMENT OF THE FEMALE REPRODUCTIVE SYSTEM

HISTORY OF PRESENT ILLNESS AND REVIEW OF SYSTEM

GENERAL

The following characteristics of each symptom should be elicited and explored:

- Onset (sudden or gradual)
- Chronology
- Current situation (improving or deteriorating)
- Location
- Radiation
- Quality
- Timing (frequency, duration)
- Severity
- Precipitating and aggravating factors
- Relieving factors
- Associated symptoms
- Effects on daily activities
- Previous diagnosis of similar episodes
- Previous treatments
- Efficacy of previous treatments

CARDINAL SYMPTOMS

In addition to the general characteristics outlined above, additional characteristics of specific symptoms should be elicited, as follows.

Menstrual History

- Age at menarche
- Interval, regularity, duration and amount of flow
- Date of most recent menstrual period
- Was most recent menstrual period normal?
- Dysmenorrhea
- Premenstrual symptoms (e.g., swelling, headache, mood swings, pain)
- Abnormal uterine bleeding
- Symptoms of menopause
- Age at menopause
- Postmenopausal bleeding

Obstetric History

- Number of pregnancies, live deliveries, stillbirths, abortions
- Difficulties with pregnancies, deliveries
- Birth weight of babies
- Problems with infertility

Use of Contraception

- Type used (past and present)
- Difficulties with method, suitability
- If discontinued, reasons for doing so

Sexual History

- Sexual orientation
- Regularity of intercourse
- Number of partners in the past 12 months
- Associated symptoms (e.g., pain, postcoital bleeding)
- Sexual dysfunction

Breasts

- Soreness, tenderness and their relation to menstrual cycle
- Redness, swelling, nipple discharge
- Change in contour, presence of masses
- Is client breast-feeding?

Lymphatic System

- Enlarged, painful nodes (in axilla, groin)

Vaginal Discharge

- Onset, color, odor, consistency, quantity
- Relation to menstrual period
- Associated symptoms (e.g., rectal or urethral discharge, vaginal itch or burning, urinary symptoms, malaise, abdominal pain, fever)
- Relation to medication use (e.g., antibiotics, steroids)
- History of previous vaginal or pelvic infections and their treatment

Pain

- Onset, location, radiation, character, severity
- Relation to menstruation
- Aggravating and relieving factors
- Use of analgesics and their effect
- Associated gastrointestinal, urinary or vaginal symptoms
- Are symptoms related to an encounter with a new sexual partner?

Other Associated Symptoms

- Ulcerations
- Persistent lesions
- Sense of pelvic relaxation (pelvic organs feel as though they are falling down or out)
- Infertility
- Pelvic infection

EXAMINATION OF THE FEMALE REPRODUCTIVE SYSTEM

GENERAL

- Apparent state of health
- Appearance of comfort or distress
- Color (e.g., flushed or pale)
- Nutritional status (obese or emaciated)
- Match between appearance and stated age

VITAL SIGNS

- Temperature
- Pulse
- Respiratory rate
- Blood pressure

BREASTS

- Inspect breasts with client in sitting and then in supine position
- Assess symmetry, contour, skin color, thickening, dimpling or retraction of overlying skin, veins, redness, streaking
- Examine nipples for symmetry, discharge, erosion, crusting, color
- Palpate breast and axilla for consistency, tenderness, masses

LYMPH NODES

Palpate the following areas and identify enlargement, tendemess, mobility and consistency:

- Upper extremity: supraclavicular area, infraclavicular area, axilla, epitrochlear nodes
- Lower extremity: inguinal nodes

EXTERNAL GENITALIA

- Distribution of hair
- Labia majora and labia minora: lesions, ulcerations, masses, induration, areas of different color
- Clitoris: size, lesions, ulcerations
- Urethra: discharge, lesions, ulcerations
- Skene's and Bartholin's glands: masses, discharge, tenderness
- Perineum: lesions, ulcerations, masses, induration, scars
- Anus: lesions, ulceratio ns, tenderness, fissures, hemorrhoids

VAGINA

- Inflammation
- Atrophy
- Discharge
- Lesions, ulcerations, excoriation
- Masses
- Induration or nodularity
- Relaxation of perineum (ask client to bear down and observe for any bulging of vaginal walls)

CERVIX

- Position, color, shape, size, consistency (*see below*)
- Discharge
- Erosions, ulcerations
- Cervical tenderness
- Bleeding after contact

Consistency of cervical tissue: normal cervix is pink and feels firm, like the tip of the nose; in pregnancy, the cervix is bluish and feels softer, like the lips of the mouth

UTERUS

- Position
- Size
- Contour
- Consistency of uterine tissue
- Mobility
- Pain on movement

ADNEXA

Ovaries cannot usually be felt unless the client is very thin or the ovaries are enlarged.

- Tenderness
- Masses
- Consistency
- Contour
- Mobility
- Adnexal pain on movement of cervix or uterus (Chandelier's sign)

COMMON WOMEN'S HEALTH ISSUES AND GYNECOLOGICAL PROBLEMS

ABNORMAL UTERINE BLEEDING

DEFINITION

Uterine bleeding that is abnormal in amount, duration or timing. The terms used to describe patterns of abnormal uterine bleeding are based on periodicity and quantity of flow (Tables 1 and 2).

Table 1: Terminology to Describe Abnormal Uterine Bleeding

Term	Definition
Menorrhagia	Prolonged or excessive bleeding at regular intervals
Metrorrhagia	Irregular, frequent uterine bleeding of varying amounts but not excessive
Menometrorrhagia	Prolonged or excessive bleeding at irregular intervals
Polymenorrhea	Regular bleeding at intervals of less than 21 days
Oligomenorrhea	Bleeding at intervals greater than every 35 days
Amenorrhea	No uterine bleeding for at least 6 months
Intermenstrual bleeding	Uterine bleeding between regular cycles

Table 2: Differential Diagnosis of Abnormal Uterine Bleeding

Type	Causes
Dysfunctional uterine bleeding (e.g., menorrhagia)	Anovulatory cycles
Breakthrough bleeding while on OCP	Missed OCP
	Inadequate OCP absorption
	OCP hormonal imbalance (see below)
	Insufficient OCP strength
	Pelvic infection
Breakthrough bleeding in first half of cycle on OCP	Inadequate estrogenic activity of OCP
Breakthrough bleeding in second half of cycle on OCP	Inadequate progestational activity of OCP
Postcoital bleeding	Cervical disease
	Endometrial cancer
Postmenopausal bleeding	Cervical or atrophic vaginitis
	Endometrial cancer
Bleeding related to cervical disorders	Erosion, polyp, cervicitis, dysplasia, cancer
Bleeding related to endometrial disorders	Polyp, dysfunctional uterine bleeding, uterine fibroid, cancer (in postmenopausal women)
Bleeding related to intrauterine devices	Irritation, infection
Bleeding related to infection	PID, cervicitis
Bleeding related to endocrine disorders	Hypothyroidism, hyperthyroidism, Cushing's disease, hyperprolactinemia, stress (emotional, excessive exercise), polycystic ovarian syndrome, adrenal dysfunction or tumor
Bleeding related to hematological disturbances	Anticoagulation, blood dyscrasias
Bleeding related to complications of pregnancy	Ectopic pregnancy, spontaneous abortion, hydatidiform molar pregnancy

OCP = oral contraceptive pill, PID = pelvic inflammatory disease.

DYSFUNCTIONAL UTERINE BLEEDING (DUB)

DEFINITION

Abnormal uterine bleeding not caused by pelvic pathology, medications, systemic disease or pregnancy. It is the most common cause (in 90% of cases) of abnormal uterine bleeding but is a diagnosis of exclusion.

CAUSES

Usually related to one of three hormonal-imbalance conditions: estrogen breakthrough bleeding, estrogen withdrawal bleeding and progesterone breakthrough bleeding.

Anovulatory Dysfunctional Uterine Bleeding

Anovulation is the most common cause of DUB in reproductive-age women. It is especially common in adolescents. Up to 80% of menstrual cycles are anovulatory in the first year after menarche. Cycles become ovulatory an average of 18–20 months after menarche.

Some women still have anovulatory cycles after the hypothalamic–pituitary axis matures. Weight loss, eating disorders, stress, chronic illness or excessive exercise may all cause hypothalamic anovulation.

Another cause of anovulation is polycystic ovarian disease. This unopposed estrogen state increases the risk of endometrial hyperplasia and cancer.

Some women with chronic anovulation do not fall into any of the above categories and are considered to have idiopathic chronic anovulation.

All causes of anovulation represent a progesterone-deficient state.

Ovulatory Dysfunctional Uterine Bleeding

Although less common than anovulatory bleeding, ovulatory DUB may also occur. DUB in women with ovulatory cycles occurs as regular, cyclic bleeding.

Menorrhagia may signify a bleeding disorder or a structural lesion, such as uterine leiomyomas, adenomyosis or endometrial polyps.

Up to 20% of adolescents who present with menorrhagia have a bleeding disorder such as von Willebrand's disease. Liver disease with resultant coagulation abnormalities and chronic renal failure may also cause menorrhagia.

Polymenorrhea is usually caused by an inadequate luteal phase or a short follicular phase.

Oligomenorrhea in an ovulating woman is usually caused by a prolonged follicular phase.

Intermenstrual bleeding may be caused by cervical disease or the presence of an intrauterine device.

Midcycle spotting may result from the rapid decline in estrogen levels before ovulation.

For other causes of abnormal uterine bleeding, *see Table 2, above, this chapter.*

HISTORY

- Age (e.g., reproductive age or menopausal)
- Amount, duration, frequency, interval of bleeding
- Try to determine if cycles are ovulatory or anovulatory (*see Table 3, this chapter*)
- Date of last normal menstrual period
- Any contraception use (type, whether used properly)
- Hormone replacement therapy if postmenopausal
- Possibility of pregnancy
- Signs of easy bleeding (e.g., gums) or bruising suggestive of coagulopathy
- Any pain associated with bleeding
- Past history of gynecological problems such as abnormal Papanicolaou (Pap) smear, fibroids, sexually transmitted diseases (STDs), gynecological malignancy, prior episodes of abnormal uterine bleeding
- Past history of thyroid, renal or hepatic disease
- History of strenuous physical exercise (which may cause DUB)
- History of eating disorder or significant emotional or psychological stress
- Date and result of most recent Pap smear
- Date and result of most recent mammography, if screening age (50–69 years)

PHYSICAL FINDINGS

DUB is a symptom, not a diagnosis. The findings are variable, depending upon underlying cause. The results of the examination may be deceptively normal or obviously abnormal.

A full gynecological examination, including determination of blood pressure and weight and examination of thyroid, breasts, abdomen and pelvic area (bimanual), should be performed.

The pelvic examination consists of careful inspection of the lower genital tract for lacerations, vulvar or vaginal pathology, and cervical lesions or polyps. Bimanual uterine examination may reveal enlargement from uterine fibroids, adenomyosis or endometrial carcinoma.

Table 3: Characteristics of Ovulatory and Anovulatory Menstrual Cycles

Feature	Ovulatory Cycle	Anovulatory Cycle
Cycle length	Regular	Unpredictable
Premenstrual symptoms	Present	None
Bleeding	Dysmenorrhea	Unpredictable bleeding pattern; frequent spotting; infrequent, heavy bleeding
Breasts	Tender	Non-tender
Basal temperature curve	Biphasic	Monophasic
Other	Change in cervical mucus Mittelschmerz	

DIFFERENTIAL DIAGNOSIS

See Table 2, in "Abnormal Uterine Bleeding," above, this chapter.

DIAGNOSTIC TESTS

- Urine pregnancy testing for all patients of reproductive age
- Complete blood count (to provide a measure of blood loss and adequacy of platelet count)
- Prothrombin time (PT) and partial thromboplastin time (PTT)
- Levels of thyroid-stimulating hormone (TSH) and prolactin
- Liver function tests (LFTs)
- Cervical and vaginal samples for culture
- Pap smear
- Pelvic ultrasonography if organic pathology is suspected

Endometrial biopsy should be considered early in the investigation of any woman who is > 35 years of age or who has a history of prolonged exposure to unopposed estrogen in whom there is no response to initial management strategies.

These tests would be ordered by a physician.

Endometrial biopsy and ultrasonography should be performed early in the investigation of bleeding in any postmenopausal woman.

MANAGEMENT

Goals of Treatment

- Rule out organic pathology
- Regulate menstrual cycles
- Prevent complications

Specific management depends on the underlying cause.

Premenopausal Women

If the reproductive-age woman is not pregnant, the results of the physical examination are normal, and all pathologic, structural and iatrogenic causes have been excluded, abnormal uterine bleeding is usually dysfunctional in nature and can be managed with hormonal therapy. *See Table 4, below, this chapter.*

Postmenopausal Women

The most serious concern in postmenopausal women with abnormal uterine bleeding is endometrial carcinoma. Of all postmenopausal women with bleeding, 5% to 10% are found to have endometrial carcinoma. Other potential causes of bleeding are cervical cancer, cervicitis, atrophic vaginitis, endometrial atrophy, submucous fibroids, endometrial hyperplasia and endometrial polyps.

Table 4: Pharmacologic Treatment for Dysfunctional Uterine Bleeding

Age Group	Treatment	Comments
Premenopausal	OCP (**B class drug** when used to treat DUB)	Low-dose (35 µg) monophasic or triphasic OCP can regulate cycles while providing contraception
	Medroxyprogesterone (**B class drug**), 10 mg/day PO for 10 days *or* Depo Provera (**B class drug**), 150 mg IM q3months	If contraception is not an issue, medroxyprogesterone can be used to regulate cycles; in a woman who has amenorrhea or oligomenorrhea, medroxyprogesterone every 3 months can protect against endometrial hyperplasia
Perimenopausal	Medroxyprogesterone (**B class drug**), 10 mg/day PO for 10 days	May be used monthly to regulate bleeding pattern
	OCP (**B class drug**)	Usually use 20-µg pills; OCP can be continued until the woman has finished menopause, then change to HRT (OCP may be relatively contraindicated in women > 35 years of age who smoke)
Postmenopausal (receiving HRT)	Cyclic HRT (**B class drugs**)	May consider increasing the progesterone dose if early withdrawal bleeding occurs; increase estrogen dose if intermenstrual bleeding is present
	Continuous combined HRT* (**B class drug**)	May increase the estrogen dose for 1–3 months to stabilize endometrium; may also try increasing the progesterone dose; if bleeding continues, consider changing regimen to cyclic HRT or using a different type of estrogen

OCP = oral contraceptive pill, DUB = dysfunctional uterine bleeding, HRT = hormone replacement therapy.

*With continuous combined HRT, up to 40% of women have irregular bleeding in the first 4–6 months of therapy (Rubin et al. 1996). Bleeding is more common when hormone therapy is started less than 12 months after menopause occurs.

Women Receiving Hormone Replacement Therapy

Women receiving hormone replacement therapy often present with abnormal bleeding and of these, 30% have uterine pathology. Other causes include cervical lesions, vaginal pathology or the hormone therapy itself.

Women receiving sequential hormone replacement therapy may experience midcycle breakthrough bleeding because of missed pills, medication interactions or malabsorption. If unscheduled bleeding occurs in two or more cycles, further evaluation is indicated.

Appropriate Consultation

Consult a physician before ordering diagnostic tests and for medication treatment options if urgent treatment is warranted.

Monitoring and Follow-Up

- Follow up monthly until cycles have become regular
- Monitor hemoglobin as needed if heavy bleeding continues despite therapy

Referral

- Refer electively any client (if she is stable) to a physician for thorough evaluation and treatment.

DYSMENORRHEA

DEFINITION

Painful menstruation.

CAUSES

- *Primary dysmenorrhea:* normal uterine contraction during menstruation
- *Secondary dysmenorrhea:* endometriosis, use of intrauterine device (IUD), pelvic inflammatory disease (PID)

HISTORY

Primary Dysmenorrhea

- Begins 6–12 months after menarche
- Pain in low abdomen and back
- Pain wavelike and cramping
- Lasts several hours to several days
- Begins before or at same time as menstrual flow
- Associated symptoms: nausea, diarrhea, headache, flushing, rarely syncope
- May increase in severity over several years
- Usually decreases in severity after birth of first child

Secondary Dysmenorrhea

- Begins several years after menarche (when woman is in late 20s to 40s)
- Development of moderate to severe pain
- May begin several days before onset of menses
- Pain may be constant or intermittent
- Aggravated by movement and straining at stool
- May be localized to one area or may radiate over lower abdomen
- Possible associated symptoms: nausea and vomiting, diarrhea or constipation, headache, painful intercourse, vaginal discharge, malaise
- Symptoms may be present throughout the cycle or may begin just before onset of menses and last throughout menstruation

PHYSICAL FINDINGS

- Results of physical examination usually normal
- Temperature may be elevated in secondary dysmenorrhea (infection)
- Identify presence of vaginal infection, presence of IUD strings
- Tenderness on movement of cervix and with palpation of uterus may be present
- Identify adnexal masses, enlargement of uterus, enlargement and tenderness of groin nodes

DIFFERENTIAL DIAGNOSIS

- PID
- Endometriosis
- IUD use
- Cervical stenosis
- Hemorrhagic ovarian cyst

COMPLICATIONS

- Absenteeism from work or school

DIAGNOSTIC TESTS

None.

MANAGEMENT

Goals of Treatment

- Differentiate primary from secondary dysmenorrhea
- Relieve symptoms
- Identify predisposing factors, underlying causes

Appropriate Consultation

If client is not responding to first-line therapies, arrange elective consultation with a physician.

Nonpharmacologic Interventions

In primary dysmenorrhea, reassure client that no pelvic disease exists and that the condition will likely resolve itself.

Client Education

- Help client to understand the physiology of the normal menstrual cycle and why pain may occur
- Counsel client about appropriate use of medications (dose, frequency, side effects)
- Teach client pelvic tilt exercises, which may help to alleviate discomfort and backache
- Suggest that client use hot water bottles or warm towels to relieve discomfort

In a client with an IUD, consider IUD malposition or infection. The IUD may have to be removed.

Pharmacologic Interventions

To manage mild symptoms of primary dysmenorrhea in the young, healthy client:

ibuprofen (Motrin) (**A class drug**), 200 mg, 1–2 tabs PO tid or qid prn

If client is young, healthy, sexually active and also requires birth control, start OCP (**A class drug**).

Refer to Tables 6–8 in this chapter for information about oral contraceptives.

Control moderate-to-severe symptoms with a nonsteroidal anti-inflammatory (NSAID) agent; for this menstrual cycle only, use the following:

naproxen (Naprosyn) (**C class drug**), 250-mg tab, 2 tabs PO stat, then 1 tab PO tid or qid prn for 1 or 2 days

or

mefenamic acid (Ponstan) (**C class drug**), 250-mg tab, 2 tabs PO stat, then 1 tab PO tid or qid prn for 1 or 2 days

In a woman with moderate or severe dysmenorrhea, starting NSAID preparations before the start of menstrual flow results in better pain control.

These preparations are contraindicated in clients with allergy to acetylsalicylic acid (ASA) or previous history of peptic ulcer disease.

Monitoring and Follow-Up

Review symptoms in 6 months.

Referral

Refer to a physician if there is a suspicion of a secondary cause of dysmenorrhea or if treatment fails to control symptoms.

BREAST LUMPS

DEFINITION

A mass or irregularity in breast. May be single or multiple.

CAUSES

- Fibrocystic breast changes
- Cyclic hormonal effects on normal breast tissue
- Benign breast disease
- Malignant disease
- Trauma (hematoma)
- Infection with duct obstruction

HISTORY

- Discovery of a lump in the breast
- Identify when in menstrual cycle lump was found (breasts may feel lumpy before or during menstruation)
- Identify previous history of breast lumps
- Inquire about pain, nipple discharge, redness of breast, skin changes, lactation
- Medication use (e.g., OCP)
- Past history of breast disease or family history (in first-degree female relatives) of breast disease
- Recent history of trauma to breast
- Presence of fever or systemic signs of illness

PHYSICAL FINDINGS

- Inspect breasts with client sitting up, first with arms at sides, then with arms raised above the head
- Repeat inspection with client lying down
- Assess asymmetry with respect to size, shape, contour
- Check for redness, dimpling or thickening of skin
- Look for nipple discharge or crusting
- Palpate breast and axilla with client sitting and lying down
- Identify lumps, tenderness, warmth, nodes
- Have client show you where she felt the lump
- Describe lump in terms of size, discreteness, consistency (e.g., hard, firm, soft, fluid-like), contour, mobility and position

DIFFERENTIAL DIAGNOSIS

- Carcinoma
- Benign breast disease
- Mastitis with or without abscess

DIAGNOSTIC TESTS

- Arrange mammography screening every 2 years from 50 to 69 years of age
- Screen more frequently if client is at higher risk
- Arrange breast ultrasonography if a lump is discovered

MANAGEMENT

Goals of Treatment

- Rule out serious pathology quickly

Appropriate Consultation

Consult a physician as soon as possible if a breast lump is discovered.

Nonpharmacologic Interventions

– Regular mammographic screening: encourage screening mammography every 2 years for women 50–69 years of age (earlier for women with risk factors)

Client Education

– Instruct client about proper breast self-examination
– Follow up benign breasts lumps at regular intervals and instruct client to return to clinic if changes noted
– Provide teaching and support before all investigative procedures

Referral

Arrange referral to surgeon as soon as possible for definitive diagnosis.

MASTITIS

DEFINITION

Inflammation and infection of the breast.

CAUSES

– Usually *Staphylococcus aureus*, occasionally *Streptococcus*

Risk Factors

– Lactation with blocked milk ducts
– Poor breast hygiene
– Cracked nipples

HISTORY

– Recent parturition (2 weeks or more before presentation)
– Affected breast(s) hard and red
– Intense pain in breast
– Associated fever and chills

PHYSICAL FINDINGS

– Temperature elevated
– Heart rate rapid
– Client in moderate distress
– Affected breast shows area of redness or streaking, as well as swelling
– Nipples may be excoriated, cracked or caked with milk
– Skin warm to touch
– Area of redness hard (indurated) and tender
– Fluctuance may be detected (which indicates an abscess)
– Axillary nodes enlarged and tender

COMPLICATIONS

– Abscess
– Cessation of breast-feeding because of pain, which may lead to further congestion of breast
– Sepsis

DIAGNOSTIC TESTS

– Obtain sample of milk for culture and sensitivity

MANAGEMENT

Goals of Treatment

– Eradicate infection
– Prevent condition (through education about proper breast care)

Nonpharmacologic Interventions

– Warm compresses qid for comfort
– Regular emptying of involved breast q6h by a combination of nursing and manual expression is important

Client Education

– Counsel client about appropriate use of medications (dose, frequency)
– Recommend that client continue breast-feeding or use a breast pump to relieve engorgement and prevent further stagnation of milk
– Counsel client about improving breast hygiene to prevent further infection and relieve cracked nipples
– Suggest application of nonscented lotion to heal cracked nipples and prevent future cracking
– Suggest use of properly fitting support bra to reduce pain

Pharmacologic Interventions

Mild-to-Moderate Mastitis

Oral antibiotics:

cloxacillin (Orbenin) (**A class drug**), 250–500 mg PO qid for 10 days

For clients with allergy to penicillin:

erythromycin (E-Mycin) (**A class drug**), 250 mg PO qid for 10 days

Antipyretics and analgesia for fever and pain:

acetaminophen (Tylenol) (**A class drug**), 325 or 500 mg, 1–2 tabs PO q4–6h prn

or (if pain moderate to severe)

acetaminophen with codeine (Tylenol #2) (**C class drug**), 1–2 tabs q4h prn (maximum 15 tabs)

Monitoring and Follow-Up

– Follow up in 24 and 48 hours
– Monitor for development of an abscess

MANAGEMENT OF SEVERE MASTITIS

For any patient who appears acutely ill, with fever and malaise, the following recommendations apply.

Adjuvant Therapy

Start IV therapy with normal saline to keep vein open.

Appropriate Consultation and Pharmacologic Interventions

Consult physician about IV antibiotics if possible; otherwise start IV antibiotics:

cloxacillin (Orbenin) (**D class drug**), 500–1000 mg IV q6h

For clients with allergy to penicillin:

erythromycin (Erythrocin) (**A class drug)**, 500–1000 mg IV q6h

Referral

Transfer to hospital, as surgical incision and drainage may be needed.

VULVOVAGINITIS

DEFINITION

Inflammation and irritation of the vaginal mucosa.

CAUSES

– Most common causes: infection with *Candida*, *Trichomonas* or *Gardnerella vaginalis* (bacterial vaginosis)
– Less commonly: other anaerobic vaginal bacteria
– Other causes: atrophy of vaginal mucosa in postmenopausal women, chemical irritants, foreign body

HISTORY

– Vaginal discharge
– Vaginal irritation, itching or burning
– Secondary vulvar irritation, itching, burning
– Superficial dyspareunia (pain at the introitus during intercourse)
– Symptoms may be recurrent
– Identify any association with recent antibiotic use
– Urinary symptoms may be present
– Vaginal spotting may be present
– Determine IUD use
– Also inquire about diabetes mellitus or symptoms associated with diabetes, steroid use, menopause or symptoms suggestive of menopause

PHYSICAL FINDINGS

The physical findings associated with vulvovaginitis (various causes) are presented in Table 5.

Speculum and bimanual examination may be mildly to moderately irritating, depending on severity of vaginitis.

LABORATORY FINDINGS

– Microscopic: live trichomonads, *Candida* yeast buds or hyphae may be observed on normal saline wet-mount hanging-drop test
– Clue cells, which may be seen on potassium hydroxide (KOH) wet-mount test, are associated with bacterial vaginosis

DIFFERENTIAL DIAGNOSIS

– Concurrent sexually transmitted diseases (STDs)
– Atrophic vaginitis in postmenopausal women
– Cystitis

Table 5: Physical Findings of Vulvovaginitis

Candidiasis	*Trichomonas* infection	Bacterial vaginosis	Atrophic vaginitis
External genitalia reddened; vaginal walls covered with adherent white exudate; when exudate is removed, underlying area may bleed	External genitalia reddened; copious frothy green, foul-smelling exudate; cervix excoriated and bleeds easily	Scant-to-moderate gray, foul-smelling ("fishy") discharge	Dry, thin, smooth, pale vaginal mucosa; tiny breaks in mucosal surface may be present

DIAGNOSTIC TESTS

- Obtain vaginal swab for routine culture and sensitivity and to test for gonorrhea and chlamydial infection
- Do wet-saline mount: look for trichomonads, yeast buds, hyphae
- Do KOH wet-mount: look for clue cells (bacterial vaginosis)
- Determine pH of discharge with pH strips, if available
- Obtain urine sample for routine microscopy and culture

MANAGEMENT

Goals of Treatment

- Differentiate between various causes of vaginitis
- Relieve symptoms
- Identify predisposing factors
- Prevent recurrence

Nonpharmacologic Interventions

Client Education

- Counsel client about appropriate use of medications (dose, frequency, importance of compliance)
- Recommend abstention from sexual intercourse (or use of condoms during sexual intercourse) until infection resolves
- Recommend abstention from alcohol if metronidazole preparations are used
- Recommend lubricants if atrophic vaginitis is present
- Recommend avoidance of tightly fitting synthetic underwear if *Candida* infections are recurrent
- Teach client proper perineal hygiene to prevent recurrence

For Suspected Candida *Infection*

Pharmacologic Interventions

clotrimazole (Canesten) (**A class drug**), 1% cream or ovule PV od, for 6 or 7 days

or

miconazole (Monistat) (**A class drug**), 2% vaginal cream or 200 mg ovule PV od, for 6 or 7 days

Monitoring and Follow-Up

- Follow up in 7–10 days, after completion of therapy
- Check blood glucose level if yeast vaginitis is recurrent
- In OCP users with frequent infections, the OCP may be a contributing factor
- For recurrent yeast vaginal infections of unknown cause, intravaginal plain yogurt may be of benefit to prevent recurrences (once course of cream or ovules is completed)
- *Candida balanitis* in the male sexual partner should be treated with a topical skin preparation of clotrimazole or miconazole

For Suspected Bacterial Vaginosis Infection

Pharmacologic Interventions

metronidazole (Flagyl) (**A class drug**), 500 mg PO bid for 7 days

Instruct client to abstain from alcohol while taking metronidazole because of the antabuse-like side effects of this drug.

Do not use metronidazole in pregnant or lactating women or those with chronic alcoholism. Instead use:

amoxicillin (Amoxil) (**A class drug**), 500 mg PO tid for 7 days

Monitoring and Follow-Up

- Follow up in 7–10 days, after completion of therapy
- Treatment of sexual partner is not usually indicated

For Suspected Trichomonas vaginalis *Infection*

Pharmacologic Interventions

metronidazole (Flagyl) (**A class drug**), 2.0 g PO stat in a single dose

or

metronidazole (Flagyl) (**A class drug**), 250 mg PO tid for 7 days

Instruct client to abstain from alcohol while taking metronidaxole because of the antabuse-like side effects of this drug.

Do not use metronidazole in pregnant or lactating women or those with chronic alcoholism. Instead use:

clotrimazole (Canesten) (**A class drug**), 100 mg PV for 7 nights

Instruct client to abstain from intercourse for 3–4 days.

Treat sexual partner:

metronidazole (Flagyl) (**A class drug**), 2.0 g PO stat in a single dose

Monitoring and Follow-Up

- Follow up in 7–10 days, after completion of therapy

HUMAN PAPILLOMAVIRUS (HPV) (GENITAL WARTS)

DEFINITION

The human papillomavirus (HPV) is a sexually transmitted organism. Condylomata acuminata, genital warts and venereal warts are other names for HPV.

CAUSES

HPV, a slow-growing DNA virus of the papovavirus family, is the causative organism. Over 70 strains of the virus have been identified. Warts may appear as early as 1–2 months after exposure, but most infections remain subclinical.

Risk Factors

- First coitus at young age
- Multiple sexual partners
- History of transmitted infections

HISTORY

- Painless genital "bumps" or warts
- Pruritus
- Bleeding during or after coitus
- Malodorous vaginal discharge
- Dysuria
- Wartlike growths on genital area that are elevated and rough or flat and smooth
- Lesions occurring singly or in clusters, from < 1 mm in diameter to cauliflower-like aggregates
- Papillomas that are pale pink in color

PHYSICAL FINDINGS

Wartlike growths on genital area that are elevated and rough or flat and smooth.

To examine vaginal walls and cervix for lesions, apply 3% acetic acid (vinegar); the vinegar whitens the lesions and makes them visible to the eye.

DIFFERENTIAL DIAGNOSIS

- Condylomata
- Molluscum contagiosum
- Carcinoma

DIAGNOSTIC TESTS

- Visual identification is adequate in most cases.
- Cytology: Pap smears are useful for screening; however Pap smear results of koilocytosis, dyskeratosis, keratinizing atypia, atypical inflammation and parakeratosis are all suggestive of HPV
- Histology: colposcopy with directed biopsy is diagnostic for subclinical lesions, dysplasia and malignancy

MANAGEMENT

Appropriate Consultation

Consult a physician for medication order to treat external warts.

Nonpharmacologic Interventions

Client Education

- Explain to client that therapy eliminates visible warts but does not eradicate the virus and that no therapy has been shown to be effective in eradicating HPV
- Stress that ablation of warts may decrease viral load and transmissibility
- Advise client to abstain from genital contact while lesions are present

Pharmacologic Interventions

- Therapy is not recommended for subclinical infections (absence of exophytic warts)
- Podophyllum resin (Podophyllin 25%) (**B class drug**) in tincture of benzoin compound is applied weekly to visible *external* warts by clinician until warts resolve
- Petroleum jelly may be applied to surrounding skin for protection of unaffected areas
- Advise patient to wash resin off after 4 hours
- If warts remain unresolved after six applications, consider other therapy

Monitoring and Follow-Up

- Short-term follow-up is not recommended if patient is asymptomatic after treatment
- Long-term follow-up should include annual Pap smears and pelvic exams
- Encourage patient to examine her own genitalia

There is a known association between HPV infection and later development of cancer of the cervix. Therefore, annual Pap smear screening is essential for women with HPV.

Referral

Consult or refer client to physician if lesions persist after six consecutive treatments or when cervical or rectal warts are diagnosed.

PELVIC INFLAMMATORY DISEASE (PID)

DEFINITION

Ascending infection of uterus and fallopian tubes. May be acute or chronic.

CAUSES

- Most common causes: *Neisseria gonorrhoeae*, *Chlamydia*
- Other causes: anaerobes, *Escherichia coli*, group B streptococci
- Cause is often polymicrobial

Risk Factors

- Multiple sexual partners
- Partner with multiple sexual partners
- Use of IUD
- Transcervical instrumentation (e.g., IUD insertion)

HISTORY

May present acutely or subacutely

- Usually younger, sexually active women
- Multiple sexual partners (fivefold increase)
- Client's partner has multiple sexual partners
- Use of IUD for birth control
- Lower abdominal pain of recent onset
- Fever and chills
- Vaginal discharge may be present
- Menstrual disturbance or painful intercourse may be present
- Nausea and vomiting
- Anorexia
- Urinary symptoms

PHYSICAL FINDINGS

- Temperature may be elevated
- Heart rate may be elevated
- Client in mild-to-severe distress
- Abdominal tenderness, with or without rebound
- Cervical discharge may be present
- Mild-to-severe tenderness on bimanual exam of cervix and uterus
- Cervical motion tenderness
- Adnexal tenderness
- Adnexal fullness, or a mass may be felt
- Signs of peritonitis may be present

DIFFERENTIAL DIAGNOSIS

- Cervicitis
- Ectopic pregnancy
- Adnexal mass with rupture or torsion (e.g. twisted ovarian cyst)
- Pyelonephritis
- Appendicitis
- Inflammatory bowel disease
- Diverticulitis

COMPLICATIONS

- Recurrent episodes (in 15% to 25% of cases)
- Tubo-ovarian abscess (in 15% of cases)
- Sepsis
- Infertility (prevalence of 12% after one episode)
- Chronic pelvic pain (in 20% of cases)
- Adhesions
- Increased risk of ectopic pregnancy (four- to eight-fold increase in risk)

DIAGNOSTIC TESTS

- Complete blood count
- Vaginal and cervical swabs for culture and sensitivity and to test for *N. gonorrhoeae* and *Chlamydia*
- Urine pregnancy test

MANAGEMENT

Goals of Treatment

- Relieve symptoms
- Prevent complications

Appropriate Consultation

- Consult a physician, because first-line drug therapy must be ordered by a physician
- PID can be treated with antibiotics on either an inpatient or outpatient basis

Nonpharmacologic Interventions

Client Education

- Explain disease course, expected outcome and future complications
- Counsel client about appropriate use of medications (dose, frequency, importance of compliance)
- Recommend extra rest during acute phase
- Teach client proper perineal hygiene
- Recommend avoidance of sexual intercourse and avoidance of tampon use
- Counsel client about safe sexual activity (e.g., use of condoms to prevent future episodes)
- Advise client to return to clinic if symptoms worsen or do not improve within 48–72 hours

Pharmacologic Interventions

Outpatient antibiotic therapy:

cefoxitin (Mefoxin) (**B class drug**), 2 g IM

and

probenecid (Benemid) (**D class drug**), 1 g PO stat

followed by

doxycycline (Vibramycin) (**A class drug**), 100 mg PO bid for 14 days

or

tetracycline (Tetracyn) (**A class drug**), 500 mg PO qid for 14 days

or

erythromycin (E-Mycin) (**A class drug**), 500 mg PO qid for 14 days

For clients with allergy to penicillin, use only doxycycline or tetracycline.

Analgesia and antipyretics for fever and pain:

acetaminophen (Tylenol) (**A class drug**), 500 mg, 1–2 tabs PO q4h prn

Monitoring and Follow-Up

- Arrange follow-up in 24–48 hours and again in 7–10 days
- Instruct client to return to clinic if symptoms progress despite therapy
- All sexual partners should be assessed for symptoms of STDs

MANAGEMENT OF PID IN HOSPITAL

Indications for Admission to Hospital

- Failure of outpatient therapy
- Nulliparity, especially in women < 20 years of age
- Pregnancy
- Presence of tubo-ovarian abscess
- Presence of gastrointestinal symptoms
- Presence of an IUD
- Client appears acutely ill
- Inability to rule out surgical emergencies as a cause (e.g., ectopic pregnancy or appendicitis)
- Unclear diagnosis
- Client intolerant of outpatient therapy
- Client unreliable, and noncompliance with therapy and follow-up is anticipated

Appropriate Consultation

Consult a physician for medication orders and to arrange transfer.

Adjuvant Therapy

- Bed rest
- Start an IV with normal saline to keep vein open
- Draw blood for culture (3 samples)

Pharmacologic Interventions

IV antibiotics:

cefoxitin (Mefoxin) (**B class drug**), 2.0 g IV q6h

and

doxycycline (Vibramycin) (**A class drug**), 100 mg PO q12h

For clients with allergy to doxycycline or tetracycline:

erythromycin (Erythrocin) (**A class drug**), 500 mg IV q6h

Do not use cefoxitin in clients who are allergic to penicillin, because of possible cross-reaction.

Pregnant women require special consideration: do not give doxycycline. Consult a physician concerning choice of antibiotics.

Monitoring and Follow-Up

Monitor vital signs and symptoms frequently

Referral

Medevac as soon as possible.

CONTRACEPTION

DEFINITION

Prevention of pregnancy.

COUNSELING ON CHOICE OF CONTRACEPTIVE METHOD

Barrier Methods

- Assess client's comfort, motivation and compliance with respect to these methods
- Explain proper use and application of condoms
- Explain proper filling and insertion of applicators with gel and foam
- If available and able, fit client with an appropriate-size diaphragm, or refer to physician for fitting
- Demonstrate insertion and ask client to give return demonstration
- Relative contraindications to diaphragm use: recurrent cystitis and previous history of toxic shock syndrome

Preventing Ovulation—Oral Contraceptive Pill

- Prevents pregnancy by preventing release of ovum and causing changes in cervical mucus, endometrial lining and tubal motility
- Pap smear testing should be done annually
- Demonstrate how to perform a monthly breast self-examination
- Teach client how to take the OCP (she should take the pill at the same time each day and should not miss any pills)
- Instruct client to return to clinic if headaches, leg pain or swelling, amenorrhea or breakthrough bleeding develop
- Instruct client about "back-up": if she forgets to take her OCP for 2 days or more in a row, or has vomiting or diarrhea, a barrier method of birth control will be required for the remainder of that cycle, in addition to the OC, to prevent pregnancy

Preventing Implantation—Intrauterine Device (IUD)

- Explain how IUD prevents pregnancy
- Absolute contraindications: past history of PID, active pelvic infection
- Usually contraindicated in nulliparous women
- Relative contraindications: history of repeated sexually transmitted infections, multiple partners, previous ectopic pregnancy, heavy periods and dysmenorrhea

Sterilization—Tubal Ligation and Vasectomy

- If this method is requested, both partners should be present for counseling if desired
- Clients must be absolutely certain that they do not desire any more children, as these procedures are, for all intents and purposes, irreversible
- Tubal ligation: with client under general anesthesia, air is pumped into the abdomen and fallopian tubes are cut and tied
- Vasectomy: vas deferens is cut and tied off (can be performed in the office)

Both procedures involve some discomfort and risks, which must be explained.

MANAGEMENT

See Table 6, below, for principles of OCP use.

Goals of Treatment

- Prevent pregnancy
- Prevent sexually transmitted diseases
- Identify and manage side effects

Nonpharmacologic Interventions

- Discuss all methods of contraception: barrier methods, spermicidal agents, diaphragm, IUD, OCP, Depo Provera injections
- Because smoking increases risk of serious OCP-related complications, client should be offered smoking cessation counseling if she wishes to use OCPs
- Encourage client to use condoms in addition to chosen method of contraception to prevent sexually transmitted diseases
- Depending upon level of experience, expertise and comfort, the nurse may fit a diaphragm or may refer client to physician for fitting on next station visit
- Method of choice in healthy teenagers and young women is OCP or Depo Provera injections

Prescribing Oral Contraceptives

Choice of OCP depends on a variety of factors:

- Contraindications to OCP use must be absent (refer to Table 7, below)
- Characteristics of usual menstrual flow (light, moderate or heavy) (refer to Table 8, below)
- Presence of dysmenorrhea
- Characteristics of skin (fair, oily, acne, hirsute)
- Body weight (slim, average or overweight)

Choose OCP according to client's profile.

Table 6: Principles of Oral Contraceptive Use

History and physical
Before OCP can be started, a thorough history and physical examination must be done
Obtain full medical, gynecological and obstetrical history (*See "Assessment of the Female Reproductive System," above, this chapter*)
In particular, identify chronic disease (e.g., cardiac disease, deep vein thrombosis, hypertension, migraines, pelvic disease, pelvic infection, pelvic surgery, epilepsy) or medications that might interfere with OCP
Review past use of birth control: methods, effectiveness, problems, reason for discontinuation, specific contraindications
Laboratory testing
Perform Pap smear and take swabs for *Chlamydia* and *N. gonorrhoeae* for any client who has had sexual intercourse
Perform urinalysis (to rule out pregnancy)
Initial dose
For typical healthy young women, start OCP with daily dose of 30–35 µg estrogen, combined with lowest possible dose of any given progestogen, to provide contraception and good cycle control
Medroxyprogesterone (Depo Provera) (**B class drug**), 150 mg IM q3months and any OCP containing 50 µg estrogen should not be started by the nurse
In older women
As long as client is menstruating, she may become pregnant
Client should continue using contraception until 1 year after clinical onset of menopause (i.e., periods absent for 1 year)
Low-estrogen (20 µg) combination OCPs are useful, provided the woman is a nonsmoker with no contraindications for OCP
Postpartum: client not breast-feeding
Clients who are not breast-feeding can expect menstruation to resume about 6 weeks postpartum
OCP may be restarted any time after delivery
Depo Provera should not be given until 72 hours after delivery if client is planning to breast-feed
OCP-enhanced thrombotic episodes are minimal at this time
Postpartum: client breast-feeding
Return of menstruation in women who are breast-feeding is highly variable
Ovulation may occur in the absence of menstruation
Lactating clients may be started on progesterone-only OCP (e.g., norethindrone [Micronor] or Depo Provera IM)
Special notes
It is unnecessary to give the client a "rest" from her OCP
OCPs may be taken (in the absence of untoward effects) until menopause, as long as any client over 35 who is taking OCP is a nonsmoker
After menopause, other methods of contraception should be considered
Client should continue using contraception until 1 year after clinical onset of menopause (periods absent for 1 year)

Table 7: Contraindications to Oral Contraceptive Use

Absolute Contraindications	Strong Relative Contraindications	Possible Relative Contraindications
Thrombophlebitis, thromboembolic disorders	Severe headaches, particularly vascular or migraine	Strong family history of diabetes mellitus
Cerebrovascular disorders	Hypertension (blood pressure 140/90 mm Hg or greater)	Previous cholestasis during pregnancy
Ischemic heart disease, coronary artery disease	Diabetes mellitus	Congenital hyperbilirubinemia (Gilbert's disease)
Known or suspected cancer of the breast	Active gallbladder disease	Impaired liver function at the time of presentation or within the past year
Known or suspected estrogen-dependent cancer	Infectious mononucleosis, acute phase	Known unreliability and low likelihood of taking the pill correctly
Known or suspected pregnancy	Sickle cell disease	
Benign or malignant liver tumor	Elective major surgery planned in the next 4 weeks or major surgery requiring immobilization	
Undiagnosed abnormal genital bleeding	Long-leg cast or major injury to lower leg	
	40 years of age or older	
	At least 35 years of age and currently a heavy smoker (>15 cigarettes/day)	

Table 8: Oral Contraceptive Choices

Client Characteristic	Initial OC
Light periods	Triphasil, Ortho 0.5/35, Brevicon 0.5/35, Demulen 30 (**A class drugs**)
Moderate periods	Triphasil, Demulen 30, Ortho 10/11, Demulen 30 (**A class drugs**)
Heavy periods	LoEstrin 1.5/30, MinOvral Ortho 1/35, Brevicon 1/35, Ortho 10/11 (**A class drugs**)
Abnormally heavy periods (anovulatory cycles)	Consult physician
Dysmenorrhea	LoEstrin 1.5/30, MinOvral Ortho 1/35, Brevicon 1/35, Ortho 10/11 (**A class drugs**)
Tendency toward oily skin, acne, weight gain or heavy hair growth	Demulen 30, Triphasil, Ortho 0.5/35, Brevicon 0.5/35 (**A class drugs**)

Situations in which Close Monitoring is Needed

- Client has depression
- Client has epilepsy
- Family history of hyperlipidemia
- Family history of death of a parent or sibling due to myocardial infarction before the age of 50 years

Consult a physician before starting OCP for clients who have "possible relative contraindications" (see Table 7) or for clients with any circumstance in which close monitoring is needed (see above). Do not start OCP for any client with any "strong relative contraindication" (see Table 7).

Monitoring and Follow-up

- First follow-up examination should be done at 3 months
- Examinations, including Pap smears, should then be done annually for well women
- Encourage and teach breast self-examination

Referral

Refer to the physician all clients requesting IUDs, Depo Provera or sterilization.

MENOPAUSE

DEFINITION

Cessation of menses for at least one full year in a previously menstruating female.

CAUSES

- Normal aging
- Premature ovarian failure (as in menopause before age 40)
- Surgery
- Chemical or medication
- Radiation

HISTORY

- Mean age at onset 51 years
- Usually occurs when a woman is between 45 and 55 years of age
- Irregular menstrual cycles
- Initially, cycles may be short, with occasional menorrhagia
- Later, cycles become longer and more spaced out, with scant menstrual flow
- Eventually, menstruation ceases altogether
- Hot flushes and night sweats may occur
- Vaginal dryness, irritation, itching may be present
- Painful intercourse may be present
- Urinary urgency, frequency and dysuria may be present (because of urethral atrophy)
- Mild-to-severe mood swings may be present
- Anxiety, nervousness
- Sleep disturbances
- Depression may occur

PHYSICAL FINDINGS

- Mood and affect: evidence of depression
- Breast atrophy
- Vaginal introitus smaller
- Vaginal walls smooth, thin, pale, dry
- Cervix small
- Uterus feels small
- Ovaries not palpable

DIFFERENTIAL DIAGNOSIS

- Abnormal vaginal bleeding
- Infectious cystitis
- Infectious vaginitis

COMPLICATIONS

- Difficulties in adjusting to this new stage of life
- Anxiety
- Depression
- Osteoporosis

DIAGNOSTIC TESTS

- Determine levels of follicle-stimulating hormone (FSH) and thyroid-stimulating hormone (TSH) (if diagnosis is unclear or if the client is less than 40 years of age)
- Bone density testing (initiated by physician)
- Screening mammography every 2 years

MANAGEMENT

Goals of Treatment

- Offer support and reassurance
- Prevent complications

Appropriate Consultation

Arrange elective consultation with a physician if symptoms are severe, complications are present, client is less than 40 years of age or client desires hormone replacement therapy (HRT).

Nonpharmacologic Interventions

Client Education

- Explain process as a normal part of aging
- Assess client's feelings about aging
- Provide a supportive environment rather than dismissing symptoms, as these symptoms are real to the client
- Discuss the risks and benefits of HRT
- Encourage balanced nutrition and regular physical activity for physical and mental well-being
- Advise client to return to clinic if vaginal bleeding occurs at any time after menopause
- Suggest use of lubricants before coitus if intercourse is painful

Pharmacologic Interventions

Herbs and Vitamins that May Be Useful in Menopause

Evening Primrose (Primrose Oil)

Active ingredients: gamma-linolenic acid (GLA) and linoleic acid

The seed oil is a good source of GLA, which is an essential fatty acid (a nutrient that the body cannot make but that is essential to good health). Evening primrose oil has been used for premenstrual syndrome (PMS) and mastalgia (sore breasts). There are no known contraindications or drug interactions.

Flaxseed Oil (Linseed Oil)

Active ingredients: fatty acids (palmitic, steric, oleic, linoleic and linolenic acids)

Flaxseed oil is a good source of essential fatty acids (a nutrient that the body cannot make but that is essential to good health). Flaxseed oil is rich in GLA and is used by many for PMS and breast tenderness. There are no reports of toxic effects when used at recommended doses.

Vitamin E (400–1200 IU/day)

Food sources: polyunsaturated vegetable oil, seeds and nuts

Vitamin E is an antioxidant. Studies done in the late 1940s showed that vitamin E relieved hot flashes and postmenopausal vaginal dryness, but more recent studies are lacking. There are other benefits. It is known from the Nurses Health Study that women who took vitamin E over a 2-year period reduced their risk of fatal heart attacks by 40%.

Vitamin E potentiates (causes a greater effect of) anticoagulant drugs such as coumadin and acetylsalicylic acid (ASA).

Vitamin B_6 (50 mg PO, once daily)

Food sources: whole grains, bananas, potatoes, nuts and seeds, cauliflower

Pyridoxine is involved in the production of brain hormones (neurotransmitters). More than 50 other chemical processes in the body depend on pyridoxine. Vitamin B_6 levels can be low in people with depression and in women taking estrogen in the form of birth control pills or hormone replacement therapy. It is safe to use when taken in recommended doses.

Calcium (500 mg PO, 1–3 times/day) and **vitamin D** (400–800 IU PO od) are recommended if diet is inadequate in calcium-rich foods.

Calcium may be contraindicated in patients with a history of renal stones.

Source: Canadian Consensus Conference on Menopause and Osteoporosis (Society of Obstetricians and Gynaecologists of Canada, 1998)

Hormone Replacement Therapy

HRT is always initiated by a physician. There are several regimens and several delivery methods (e.g., pills, patches, creams for conjugated estrogens). One example, for a postmenopausal woman with intact uterus:

conjugated estrogens (Premarin) (**B class drug**), 0.635 mg PO once daily

and

medroxyprogesterone (Provera) (**B class drug**), 10 mg PO once daily

Another example, for a postmenopausal woman without uterus:

conjugated estrogens (Premarin) (**B class drug**), 0.635 mg PO once daily

Hormone replacement therapy should be continued for 7–10 years for the most benefit in preventing loss of bone density and for its potential cardioprotective benefits.

Monitoring and Follow-Up

- Follow-up 1–2 months after beginning any therapy for menopause, then follow every 6 months
- Monitor for signs of osteoporosis, abnormal uterine bleeding

Referral

Usually unnecessary unless complications arise.

GYNECOLOGICAL EMERGENCIES

ACUTE PELVIC PAIN OF GYNECOLOGICAL ORIGIN

DEFINITION

Acute abdominal pain due to dsyfunction or disease of reproductive tract

CAUSES

- Unsuspected ectopic pregnancy
- Ruptured or twisted ovarian cyst
- Acute pelvic inflammatory disease
- Severe dysmenorrhea

HISTORY

- Abdominal pain of sudden or gradual onset
- Pain becoming increasingly severe
- Pain made worse with cough, straining at stool or urination
- Pain may be referred to the shoulder tip (e.g., in ectopic pregnancy)
- Abnormal vaginal bleeding may have occurred
- Fever, chills and vaginal discharge may be present
- Nausea and vomiting may be present
- Syncope may have occurred

PHYSICAL FINDINGS

- Temperature may be elevated
- Heart rate rapid
- Blood pressure may be normal, reduced or hypotensive
- Client appears in moderate-to-acute distress
- Client may walk slowly, bent over and holding abdomen
- Abdomen appears normal
- Pelvic examination may reveal pus from cervix or bleeding
- Bowel sounds may be reduced or absent
- Lower abdominal tenderness
- Signs of localized or generalized peritonitis may be present
- Bimanual pelvic examination reveals acute cervical motion tenderness
- Adnexal tenderness or mass may be present
- Pregnancy test may be positive

DIFFERENTIAL DIAGNOSIS

- Ectopic pregnancy
- Spontaneous abortion
- Pelvic inflammatory disease
- Bleeding corpus luteum cyst
- Adnexal torsion
- Mittelschmerz
- Endometriosis
- Dysmenorrhea
- Cystitis
- Pyelonephritis
- Ureteral stone
- Inflammatory bowel disease
- Irritable bowel
- Bowel obstruction

COMPLICATIONS

– Internal hemorrhage with hypovolemic shock
– Sepsis

DIAGNOSTIC TESTS

– Measure hemoglobin
– Take urine sample for urinalysis and culture; perform urine pregnancy test

MANAGEMENT

Goals of Treatment

– Relieve pain
– Prevent complications

If pelvic inflammatory disease is suspected, *see "Pelvic Inflammatory Disease," above, this chapter*.

If ectopic pregnancy is suspected, *see "Ectopic Pregnancy," in chapter 12, "Obstetrics"*

Appropriate Consultation

Consult a physician as soon as possible, unless the cause has been definitively identified and is minor (e.g., mittelschmerz or dysmenorrhea).

Nonpharmacologic Interventions

– Nothing by mouth
– Bed rest
– Consider inserting nasogastric tube if there are signs of peritonitis or bowel obstruction
– Consider inserting a Foley catheter if patient is hemodynamically unstable

Adjuvant Therapy

– Start large-bore IV (14- or 16-gauge) with normal saline
– Adjust rate according to age and state of hydration
– Oxygen 6–10 L/min by mask prn if client is in shock; keep oxygen saturation > 97% to 98 %

Pharmacologic Interventions

Analgesia for pain:

meperidine (Demerol) (**D class drug**), 50–100 mg IM

Monitoring and Follow-Up

Monitor ABC (airway, breathing and circulation), vital signs, and intake and output.

Referral

Medevac as soon as possible if diagnosis is uncertain.

CHAPTER 14 – GENERAL EMERGENCIES AND MAJOR TRAUMA

Table of Contents

EMERGENCY ASSESSMENT AND TREATMENT OF MAJOR TRAUMA

GENERAL PRINCIPLES

Mobilize resources quickly

- Designate one person to take charge of assessment
- Designate one person to begin resuscitation interventions
- Designate one person to make phone calls

Remember the ABCs of emergency assessment:

A for airway and cervical spine control

B for breathing

C for circulation and control of bleeding

D for neurologic deficit (loss of consciousness)

E for exposure

F for fractures

PRIMARY SURVEY

This assessment should proceed quickly, within 1–2 minutes of client's arrival. Nothing should interrupt this assessment except treatment of airway obstruction or cardiac arrest.

AIRWAY (AND CERVICAL SPINE)

- At this stage, make initial assessment of level of consciousness
- Ask client what happened; if the person can answer, you have valuable information about patency of the airway and level of consciousness
- Assess airway; ensure that it is patent
- Keep cervical spine in neutral position while managing airway
- Use chin lift or jaw thrust maneuvers to open airway
- Remove foreign bodies from mouth with a finger sweep or suction (or both)
- Ensure that the tongue does not fall back into pharynx and obstruct airway
- Insert an oropharyngeal airway if client is unconscious

BREATHING

- Check respiratory effort (look, listen and feel)
- Ensure that client is breathing effectively
- Assist ventilation if breathing is not effective (e.g., rate ≤ 8 breaths/min or respiration absent despite patent airway)
- Ventilate with oxygen using an Ambu bag and mask at 12 breaths/min
- If client is breathing effectively, improve oxygenation of vital tissues
- Have second rescuer start oxygen, but if you are alone do not interrupt primary survey to do this now
- Give oxygen at 10–12 L/min or more by mask; keep oxygen saturation > 97% to 98%

CIRCULATION (CENTRAL, PERIPHERAL)

Central circulation is initially assessed with three parameters: pulses, skin color and level of consciousness:

- Place hand on neck and check carotid artery
- Check radial pulse
- Do not count heart rate yet; just get a feel for presence and quality of pulse
- Look at skin (for color) and feel skin (for temperature of extremities)
- Determine level of consciousness

Traumatized clients who are cool and tachycardic should be considered as being in hypovolemic shock until proven otherwise.

A client in spinal shock may not be pale, sweaty or cold and will not have a rapid heart rate. Instead, he or she will have low blood pressure and paralysis.

NECK

- Look for deformities, contusions, abrasions, penetrations, burns, lacerations, swelling
- Look for and feel neck veins; note if they are flat or distended
- Look for and feel trachea; note if it is at the midline or deviated

CHEST

- Expose chest and look for deformities, contusions, abrasions, penetrations, burns, lacerations, swelling; feel for tenderness, instability (flail chest) and crepitations
- Identify open sucking chest wound, flail chest or tension pneumothorax, and undertake appropriate interventions as necessary
- Seal sucking chest wound with an occlusive dressing taped on three sides only, to create a flutter valve
- If a foreign body (e.g., knife) is protruding from the chest wall, do not remove it (leave in and tape in place)
- Stabilize flail chest with hand (*see "Flail Chest," below, this chapter*)
- Use needle to decompress tension pneumothorax (*see "Pneumothorax," in chapter 3, "Respiratory System"*)
- Use a stethoscope to listen briefly to the anterior chest, about the second interspace, on both sides
- Confirm that breath sounds are present and equal on both sides
- If breath sounds are unequal, quickly percuss down both sides of chest to determine if a tension pneumothorax or hemothorax is present

ABDOMEN, PELVIS AND EXTREMITIES

- Rapidly expose and observe abdomen for distension, contusions, abrasions, penetrations
- Feel all quadrants gently and quickly for tenderness, rigidity
- Quickly check pelvis: look for deformities, contusions, abrasions, penetrations, burns, lacerations and swelling, and feel for tenderness, instability and crepitations by pressing down on symphysis or squeezing in on iliac crests
- Assess both legs and arms: look for deformities, contusions, abrasions, penetrations, burns, lacerations and swelling, and feel for tenderness, instability and crepitations; check also for pulse, motor function and sensation

CONTROL OF BLEEDING

- Identify and control external bleeding, if not already done by a second rescuer
- Apply direct pressure and dressings

Tourniquets should not be used; they can produce anaerobic metabolism and may increase blood loss if applied incorrectly.

DECISION

Using the data you have obtained from the primary survey, decide if the situation is critical or if the client is stable.

If the situation is critical, move client to a spine board immediately. Perform only critical interventions before transfer from accident scene, as follows:

- Manage airway
- Control major external bleeding
- Seal a sucking chest wound
- Stabilize flail chest by hand
- Decompress tension pneumothorax
- Hyperventilate if major head injury is suspected
- Perform cardiopulmonary resuscitation (CPR)

Weigh the benefit of any procedure at the scene against the time it will take to perform it. Non-lifesaving measures such as bandaging and splinting must not delay transport. If the primary survey does not indicate a critical situation, transfer the victim to a spine board. Use log roll maneuver, and check the posterior areas of the client while making this transfer.

SECONDARY SURVEY

For a client in a critical situation, the secondary survey is performed during transport to or at a healthcare facility. For a client whose condition appears stable, the secondary survey can be done at the scene if feasible (although not more than 10 minutes should be spent on the secondary survey at the accident scene) or at the healthcare facility.

1. Record vital signs, including pulse oximetry (if available).

2. Obtain a history of the injury. If client is unconscious, ask bystanders and witnesses. Look for a medical alert tag for any unconscious client.

3. Obtain a SAMPLE history from a client who is conscious:

S for symptoms
A for allergies
M for medications
P for past medical history
L for last meal
E for events or environment related to the injury

4. Perform a detailed, head-to-toe physical examination. Use log roll maneuver with spine precautions to assess posterior chest wall, flanks, back and rectum. Do not remove a knife or other object impaled in client; instead, stabilize the object.

HEAD AND NECK

- Reassess ABC
- Inspect and palpate skull and face for deformities, contusions, abrasions, penetration, burns, lacerations and swelling
- Feel for tenderness, instability and crepitations
- Look for Battle's sign (bluish discoloration over mastoid process)
- Look for raccoon-like eyes (which could indicate basal skull fracture)
- Clear nasal discharge indicates cerebrospinal fluid (CSF) rhinorrhea
- Check ears for blood in canal or hemotympanum (bluish purple color behind ear drum, due to presence of blood; occurs with basal skull fracture)

NECK

- Check the neck again for deformities, contusions, abrasions, penetration, burns, lacerations and swelling
- Check carotid pulse again
- Inspect for distension of neck veins (indicating tension pneumothorax or cardiac tamponade), tracheal deviation
- Assume injury to the cervical spine if trauma has occurred above clavicle
- Ensure adequate immobilization of the neck
- Apply a cervical collar if not already done!

CHEST

Inspection

- Respiratory effort
- Equality of chest movement
- Deformity
- Bruising
- Lacerations
- Penetrating wounds

Palpation

- Equality of chest movement
- Position of trachea
- Crepitus, deformity
- Fractures of the lower ribs (splenic or kidney injury may also be present)

Percussion

- Area of dullness

Auscultation

- Air entry
- Quality of breath sounds
- Equality of breath sounds

CARDIOVASCULAR SYSTEM

- Auscultate heart for heart sounds: presence, quality, faintness of sounds

ABDOMEN

Inspection

- Penetrating wounds, blunt trauma, lacerations
- Bruising (anterior, sides)
- Bleeding
- Distension

Palpation

- Abdominal guarding, rigidity, rebound
- Tenderness
- Fractures of lower ribs (ruptured spleen, possible penetrating wound, bowel injury and intra-abdominal hemorrhage possible)

PELVIS AND GENITALIA

Inspection

- Blood coming from urethral meatus

Palpation

- Tenderness of iliac crest and symphysis pubis (indicating pelvic fracture)
- Distension of bladder

Remember that pelvic and femoral fractures can result in significant loss of blood.

EXTREMITIES

Inspection

- Bleeding, lacerations, bruising, swelling, deformity
- Leg position: unusual external rotation of a leg may indicate fracture of the femoral neck or the limb
- Movement of limbs

Palpation

- Sensation
- Tenderness, crepitus
- Muscle tone
- Distal pulses
- Reflexes: presence, quality

Remember that pelvic and femoral fractures can result in significant loss of blood.

BACK

Perform log roll maneuver with spine precautions to assess back and rectum.

Inspection

- Lacerations
- Bleeding
- Bruising: posterior chest wall, flanks, low back, buttocks
- Swelling

Palpation

- Tenderness
- Deformity
- Crepitus

NEUROLOGICAL SYSTEM

Do brief neurological assessment to evaluate client's presenting level of consciousness, pupillary size and reaction, lateralized limb weakness.

Describe level of consciousness according to AVPU method:

A for alert

V for response to vocal stimuli

P for response to painful stimuli

U for unresponsive

In addition, assess the following aspects:

- Pupil for abnormalities: position, equality, reactivity
- Motor function: voluntary movement of fingers and toes
- Sensation: can client feel it when you touch his or her fingers and toes?

Perform detailed neurological examination and assess client according to the Glasgow Coma Scale (*Table 1, in "Head Trauma," below, this chapter*) after initial evaluation is complete.

DEFINITIVE CARE

- Resuscitative measures initiated earlier should be continued (e.g., airway, IV therapy, oxygen)
- Identified conditions should be managed according to their priority
- Ensure airway is protected in unconscious client
- Apply suction as needed
- Administer supplemental oxygen, even if breathing appears adequate
- Treat hypotension aggressively with IV fluid replacement (*see "Shock," below, this chapter*)
- Insert nasogastric tube and apply suction unless client has facial fractures or a basal skull fracture is suspected. *If in doubt, don't insert. Consult physician first.*
- Insert Foley catheter (if no contraindications)
- Contraindications to catheterization: blood at urethral meatus, blood in scrotum, obvious pelvic fracture

BANDAGING AND SPLINTING

- If necessary, finish bandaging and splinting injuries
- Angulated fractures of the upper extremities are best splinted as found
- Fractures of the lower extremities should be gently straightened with traction splints (Thomas splints) or air splints (if available)

MONITORING AND FOLLOW-UP

- Monitor and reassess ABC frequently
- Monitor vital signs as frequently as possible until condition is stable
- Anytime the client's condition worsens, perform a reassessment survey
- Anytime you carry out an intervention, perform a reassessment survey
- Monitor hourly urine output (aim for urine output of about 50 mL/h)

Irritability or restlessness may be caused by hypoxia, bladder or gastric distension, fear, pain or head injury. However, do not assume head injury. Rule out correctable causes first.

Head injuries are never a cause of hypovolemic shock. Look for other sources of hemorrhage.

CHECKLIST

- Check airway tubes for patency
- Check oxygen rate
- Check IV lines for patency and rate of infusion
- Check for patency of decompression needle for tension pneumothorax, if inserted
- Check splints and dressings
- Check rate of hyperventilation of client with decreased level of consciousness
- Check position of pregnant clients; tilt spine board slightly to the left

CONSULTATION

Consult a physician at transfer facility as soon as able (e.g., when client's condition is stabilized).

REFERRAL

- Medevac as soon as possible. Make sure client's condition is as stable as possible before leaving health facility
- Pressure effects on certain injuries are accentuated in unpressurized aircraft; maximum flying altitudes are applicable (see *Patient Care in Flight Manual* [Medical Services Branch, 1985])

MAJOR TRAUMA SITUATIONS

HEAD TRAUMA

DEFINITION

Blunt, forceful injury to the soft tissues or bony structures of the scalp, skull or brain.

The initial response of the bruised brain is swelling. Bruising causes vasodilation through increased blood flow to the injured area; because there is no extra space within the skull, an accumulation of blood takes up space and exerts pressure on the surrounding brain tissue. This pressure results in deceased blood flow to uninjured areas of the brain. Cerebral edema does not occur immediately but develops over 24–48 hours. Early efforts to decrease the initial vasodilation in the injured area can save the person's life.

TYPES OF HEAD INJURIES

Scalp wounds (lacerations)

Skull injury (fracture)

Brain injuries:

- *Concussion*: no significant injury to brain, brief period of unconsciousness then return to normal; short-term retrograde amnesia, dizziness, headache, nausea, ringing in ears
- *Cerebral contusion:* prolonged unconsciousness or serious alteration in level of consciousness; may have focal neurological signs
- *Intracranial hemorrhage:* bleeding into brain tissue
- *Acute epidural hematoma:* bleeding between the dura and the skull
- *Acute subdural hemorrhage:* bleeding between the dura and arachnoid associated with underlying brain injury

HISTORY AND PHYSICAL FINDINGS

Low-Risk Injuries

- Criteria: Minor trauma, scalp wounds, no signs of intracranial injury, no loss of consciousness
- Treatment: Observation for any sign or symptom of brain injury; must discharge to a reliable observer who will continue observation at home

Moderate-Risk Injuries

- Criteria: Symptoms consistent with intracranial injury, including vomiting, transient loss of consciousness, severe headache, post-traumatic seizures, amnesia, evidence of basilar skull fracture (CSF rhinorrhea, Battle's sign, raccoon eyes, hemotympanum, non-focal neurologic signs)

High-Risk Injuries

- Criteria: Depressed level of consciousness, focal neurologic signs, penetrating injury of skull or palpable, depressed skull fractures

Other Aspects

The initial neurological assessment is critical as a baseline.

- Head injury is frequently associated with other severe trauma
- Hypotension in adults is never caused by an isolated head injury, except if the client is near death; look for other injuries, including spinal cord injuries
- Physical examination should include a complete neurologic exam, as well as inspection for evidence of basilar skull fracture (e.g., CSF rhinorrhea, Battle's sign, raccoon eyes, hemotympanum)
- Assume injury to the cervical spine in all cases of head trauma
- Remember that multiple trauma may be present

In cases of head injury, the clinical picture will evolve. The client is either improving or deteriorating over time; frequent reassessment is therefore critical.

GLASGOW COMA SCALE

The Glasgow Coma Scale (Table 1, below) is used to assess the severity of coma.

- Assess client frequently
- Monitor for a drop in the score
- Any drop in the score is a danger sign

Interpretation of Score

- Score < 9: severe head injury
- Score 9–12: moderate head injury
- Score 13–15: minor head injury

Glasgow coma scale is useful only in a general sense, but 18% of those with a score of 15 have abnormalities on CT scan, and 5% of those with a score of 15 require neurosurgical intervention. The score is especially unreliable in children.

Coma by definition has no eye-opening, no ability to follow commands and no word verbalization.

COMPLICATIONS

- Seizures
- Vomiting
- Shock

DIAGNOSTIC TESTS

None.

MANAGEMENT

Minor Head Trauma

- Characteristics: No signs of intracranial injury, no loss of consciousness
- Treatment: Observe for 12–24 hours for any sign or symptom of brain injury; discharge to a reliable observer who will continue observations at home

Major Head Trauma

There is not a lot you can do for a client with major head trauma in the pre-hospital setting. Apply the principles of assessment and management for trauma (*see "Primary Survey" and "Secondary Survey," above, this chapter*)

Remember, ABC takes priority: saving only the head will not save the patient.

Step 1

- Secure the airway and provide supplemental oxygen at 10–12 L/min
- Hyperventilate the client at 24 breaths/min
- These measures maintain adequate oxygenation and reduce intracranial pressure

Step 2

- Stabilize client on a spine board
- The neck should be immobilized in a semi-rigid collar and a padded head immobilization device
- Nurse in head-up position unless contraindicated (e.g., in cases of shock or back injury)
- Avoid tight cervical collar (any pressure on the external jugular veins will increase the intracranical pressure)

Step 3

- Record baseline observations
- Record blood pressure, respirations, PERRLA (pupils equal, round, reactive to light; accommodation normal), sensation and voluntary motor activity

Step 4

- Do serial Glasgow coma scale assessments

Step 5

- Monitor and record the above observations frequently

Step 6

- Start IV therapy to keep vein open, unless client is hypotensive
- Fluids are generally restricted in clients with closed-head trauma
- Maintain normal cardiac output
- If hypotensive, suspect hemorrhage or spinal injury (*see "Shock," below, this chapter*)

Step 7

- Insert Foley catheter if client is unconscious
- Monitor urine output hourly

Step 8

- Consult a physician as soon as able

Step 9

- Medevac as quickly as possible
- Review recommended precautions for flight for a person with head injury (see *Patient Care in Flight Manual* [Medical Services Branch, 1985])

Increased Intracranial Pressure

- Elevate head of bed by 30°
- Hyperventilate, as above
- Diuretics such as mannitol may be given (on physician's order) to reduce brain edema in cases of severe brain injury

  mannitol (**B class drug**), 1 g/kg IV over 20 minutes to induce osmotic diuresis (controversial if client not herniating)

Table 1: Scoring for the Glasgow Coma Score*

Eye-Opening		Best Motor Response		Best Verbal Response	
Response	Score	Response	Score	Response	Score
		Obeys	6		
		Localizes to pain	5	Oriented	5
Spontaneous	4	Flexion withdrawal	4	Confused	4
To voice	3	Abnormal flexion	3	Response is inappropriate	3
To pain	2	Extension	2	Sounds only	2
None	1	None	1	None	1

*Score is obtained by determining the score for each of the three criteria (eye-opening, best motor response, best verbal response) and summing them.

CERVICAL SPINE AND SPINAL CORD TRAUMA

DESCRIPTION

Cervical Spine Injury

Cervical spine injury occurs in up to 3% of trauma patients; this proportion increases to 10% among patients with significant head injury.

Initial care of the client who may have spinal injury is based on the suspicion of injury, stabilization of the spine and prevention of further neurological injury.

Spinal Cord Injury

Look for paralysis and other signs of cord injury, including priaprism, urinary retention, fecal incontinence, paralytic ileus, immediate loss of all sensation and reflex activity below the level of the injury.

CAUSES

- Motor vehicle crash
- Falls
- Sports
- Acts of violence

HISTORY

Potential Clues

- Blunt trauma above the clavicles
- Diving accident
- Motor vehicle or bicycle crash
- Fall
- Stabbing or impalement near the spinal column
- Shooting or blast injury to the torso
- Symptoms of neck or back pain, numbness or tingling in the limbs, weakness or paralysis of the limbs

PHYSICAL FINDINGS

- Tachycardia
- Tachypnea
- Blood pressure may be low if in shock
- Pulse oximetry may be desaturating if in shock
- Tenderness on palpation or movement of the spinal column
- Obvious deformity of the back or spinal column
- Loss of sensation
- Weakness or flaccidity of muscle groups
- Loss of bladder or bowel control
- Priaprism (sustained penile erection)
- Spinal neurogenic shock leads to vasomotor instability from loss of autonomic tone and may lead to hypotension or temperature instability
- Client may have hypoxia or hypoventilation if fracture or compression occurs above C5

"Spinal shock" is a separate neurologic entity occurring as a result of cord injury; it presents with flaccid paralysis and the client usually recovers in hours to weeks. It frequently occurs in children without associated cervical spine fractures.

COMPLICATIONS

- Permanent paralysis
- Respiratory arrest
- Spinal shock
- Death

DIAGNOSTIC TESTS

None.

MANAGEMENT

Goals of Treatment

- Stabilize spine
- Prevent further damage
- Prevent complications

Initial Treatment

- Assess and stabilize ABC
- Life-threatening injuries associated with spinal injuries must be addressed first, but the spine must not be put at risk during these maneuvers
- If there is penetrating neck trauma, do not remove foreign body
- Immobilize neck in neutral position and restrain chest to properly immobilize the cervical spine (sand bags are not a good tool for this purpose, because if you later want to move the client onto a spine board, the bags may fall against the neck and cause further injury; instead, use soft rolled supports at the sides of the head, e.g., rolled blankets)

Stabilization of Cervical Spine

- All multitrauma clients should be placed on a spine board with cervical spine immobilization
- There is as yet no consensus on the best method for immobilizing the cervical spine: soft collars limit neck movement by a maximum of 30% and are of no use to the trauma patient, whereas hard collars provide at best 80% restriction of movement
- There is no perfect cervical collar, but whatever collar is used should be light, easily applied and able to provide firm cervical immobilization; in addition, it should provide rapid access to the anterior neck if surgical access to the airway becomes necessary
- The best collar is useless if it does not fit the patient, so any collar must be sized correctly
- To complete immobilization of the cervical spine, the client must be fixed as a "package" to the spine board; tape should be placed from board to forehead and back to the other side of the board
- It is important not to use the head alone as a fixation point, as this allows the cervical spine to act as a fulcrum for movement; restraints should therefore also be placed across the client's shoulders
- Taping across the chin forces the mandible posteriorly and may obstruct the airway
- Consider the relationship of the axial skeleton to the spine board: in adults, the head is relatively smaller anteroposteriorly than the body, and the cervical spine may be in extension without some form of occipital padding
- Adults and older children may require 1–2 inches (2.5–5 cm) of padding under the head to approximate a neutral position

Prolonged immobilization (even < 30 minutes) on a spine board will cause occipital headache and lumbosacral pain in most people, regardless of underlying trauma.

Adjuvant Therapy

- Give oxygen 10–12 L/min by mask; keep oxygen saturation > 97% to 98%
- Start IV therapy with normal saline to keep vein open, unless there is evidence of shock (in which case, *see "Shock," below, this chapter*)

Nonpharmacologic Interventions

- Nothing by mouth
- Insert nasogastric tube unless there is suspicion of associated basilar skull fracture or facial trauma
- Insert Foley catheter

Pharmacologic Interventions

None.

Monitoring and Follow-Up

Monitor ABC, vital signs, oxygen saturation (if available), level of consciousness, respiratory status and sensory motor deficits frequently.

Appropriate Consultation

Consult a physician as soon as possible, when client's condition has stabilized.

Referral

Medevac as soon as possible.

FLAIL CHEST

DEFINITION

Unstable segment of the bony chest wall.

CAUSE

Chest wall trauma with fracture of three or more adjacent ribs in at least two places. The result is a segment of the chest wall that is not in continuity with the thorax. Lateral flail chest or anterior flail chest (sternal separation) may occur. The flail segment moves with paradoxical motion relative to the rest of the chest wall.

The force necessary to produce this injury also bruises the underlying lung tissue, and this contusion will contribute to hypoxia. The client is at great risk for pneumothorax or hemothorax (or both) and may be in marked respiratory distress. Also consider the possibility of cardiac contusion and tamponade if there has been trauma to the anterior chest wall.

HISTORY

- Multiple trauma (motor vehicle or other accident)
- Severe chest wall pain
- Pain aggravated by movement and respiration
- Shortness of breath

PHYSICAL FINDINGS

The physical findings depend on the severity of damage to the underlying lung tissue and the presence of associated injuries.

- Perform primary survey (*see "Primary Survey," above, this chapter*)
- Carry out emergency interventions as necessary
- Perform secondary survey (*see "Secondary Survey, above, this chapter*)

Vital Signs

- Heart rate elevated
- Respirations rapid, shallow
- Blood pressure decreased or normal
- Oxygen saturation, if available

Inspection

- Acute respiratory distress
- Sweating
- Cyanosis may be present
- Chest wall bruising
- Abnormal chest wall motion (paradoxical movement of chest wall) easily seen in unconscious client, less apparent in conscious client

Palpation

- Tenderness in injured area
- Crepitus may be felt
- Abnormal movement of chest wall may be palpable

Percussion

- Hyper-resonance (if pneumothorax present)
- Dull (if hemothorax, pulmonary contusion present)

Auscultation

- Air entry reduced in injured area
- Crackles may be present

DIFFERENTIAL DIAGNOSIS

- Chest wall contusion
- Simple rib fractures

COMPLICATIONS

- Poor ventilation
- Hypoxia
- Hypovolemia
- Pneumothorax
- Hemothorax
- Pulmonary contusion
- Myocardial contusion
- Cardiac tamponade

MANAGEMENT

Goals of Treatment

- Ensure patency of airway
- Improve oxygenation
- Replace blood loss
- Identify and treat associated injuries

Appropriate Consultation

Consult a physician as soon as client's condition is safely stabilized.

Nonpharmacologic Interventions

Priority is ABC.

- Control airway
- Ensure adequate ventilation
- Protect cervical spine
- Control pain by gently splinting chest with a pillow
- Do not splint aggressively

In the traumatized client with an injury above the clavicle, assume fracture of the cervical spine.

Adjuvant Therapy

- Give oxygen 10–12 L/min by mask
- Start two large-bore IV lines (16-gauge or larger) with normal saline
- Replace blood losses
- Adjust IV rate according to heart rate, blood pressure and clinical response

See "Shock," below, this chapter, for further details.

Monitoring and Follow-Up

- Monitor mental status, vital signs, pulse oximetry, and heart and lung sounds frequently
- Confusion, agitation may be signs of hypoxia

Referral

Medevac as soon as possible.

PELVIC FRACTURE

DEFINITION

Disruption of the bony structure of the pelvis.

CAUSES

Such a fracture generally requires substantial force, such as a motor vehicle collision or a fall from a significant height.

- Motor vehicle crashes: 50% to 60% of cases
- Pedestrian versus car: 10% to 20% of cases
- Falls: 8% to 10%
- Crush injuries: 3% to 6%

The pelvis consists of the ilium (or iliac wings), the ischium and the pubis, which form an anatomic ring with the sacrum. Disruption of this ring requires significant force. Because of the forces involved, pelvic fractures frequently involve injury to the organs contained within the bony pelvis. In addition, the pelvis is supplied with a rich venous plexus, as well as major arteries; therefore, fractures in this area may produce significant bleeding.

The rate of complications related to injury to the underlying organs and bleeding is significant. Because of the tremendous force necessary to cause most pelvic fractures, concomitant severe injuries are common and are associated with high morbidity and mortality rates.

For cases in which hypotension is present on presentation, the mortality rate approaches 50%. For cases in which the fracture is open, the mortality rate reaches 30%.

The overall mortality rate in adults is approximately 10% and in children, 5%. Pelvic hemorrhage is the direct cause of death in less than half of patients with pelvic fractures who die. Retroperitoneal hemorrhage and secondary infection are the main causes of death.

HISTORY

A basic mechanism of significant blunt trauma should prompt consideration of a pelvic fracture.

- Pain
- Loss of function
- Symptoms of shock

Be aware that the amount of force necessary to cause a pelvic fracture is likely to have caused other significant injuries. Investigate for associated intra-abdominal and intra-pelvic injuries.

PHYSICAL FINDINGS

- Tenderness over the pelvis that can be appreciated with pelvic springing,which involves applying alternating gentle compression and distraction over the iliac wings
- Palpable instability of the pelvis on bimanual compression or distraction of the iliac wings (it is important to be very gentle when pelvic tenderness is appreciated; do not rock or apply great force until skeletally unstable pelvic fractures have been excluded by x-ray, since an overly aggressive exam can unnecessarily increase hemorrhage)
- Instability on hip adduction (pain on any hip motion suggests the possibility of an acetabular fracture, in addition to a possible hip fracture)
- Signs of urethral injury in the male, such as scrotal hematoma or blood at the urethral meatus
- Vaginal bleeding in a female
- Hematuria
- Rectal bleeding or Earle's sign, the appreciation of a large hematoma or a palpable fracture line on (careful) rectal exam
- Destot's sign, a hematoma above the inguinal ligament, on the proximal thigh or over the perineum
- Grey–Turner's sign, a flank ecchymosis (associated with retroperitoneal bleeding)
- Roux's sign, in which the distance measured from the greater trochanter to the pubic spine is less on one side than the other (indicating an overriding fracture of the anterior pelvic ring)
- Neurovascular deficits of the lower extremities

DIFFERENTIAL DIAGNOSIS

- Hip dislocation or fracture
- Femur fracture

COMPLICATIONS

- Continued bleeding from the fracture or injury to the pelvic vasculature
- Shock
- Genitourinary problems from bladder, urethral, prostate or vaginal injuries
- Infections from disruption of the bowel or urinary system
- Deep vein thrombosis
- Death

A woman in the later stages of pregnancy is at increased risk of complications from pelvic fracture, and there is great risk of placental abruption and uterine rupture

DIAGNOSTIC TESTS

– Obtain sample for urinalysis (look for gross or microscopic hematuria)

MANAGEMENT

Goals of Treatment

– Stabilize fracture
– Prevent and treat complications

Appropriate Consultation

Consult a physician as soon as possible when a pelvic fracture is suspected or diagnosed. Hemodynamically unstable clients (*with* unstable pelvic fractures) require emergent orthopedic consultation for consideration of external fixation.

Nonpharmacologic Interventions

– Priority is to assess and stabilize ABC (*see "Emergency Assessment and Treatment of Major Trauma," above, this chapter*)
– Address acute, life-threatening conditions
– Avoid excessive movement of the pelvis

Do not insert a urinary catheter until you have confirmed that there is no urethral injury (by physical exam).

Adjuvant Therapy

– Obtain large-bore IV access and administer normal saline as needed (*see "Shock," above, this chapter*)
– Give oxygen at 10–12 L/min by mask; keep oxygen saturation > 97% to 98%

Pharmacologic Interventions

Treat pain with narcotic analgesics:

meperidine (Demerol) (**D class drug**), 75–100 mg IM

Monitoring and Follow-Up

– Closely monitor vital signs and pulse oximetry
– Monitor the client for signs of ongoing blood loss and signs of infection
– Monitor for development of neurovascular problems in the lower extremities

Referral

– Medevac
– Achieve hemodynamic stabilization and transfer on a spine board

GENERAL EMERGENCY SITUATIONS

ANAPHYLAXIS

DEFINITION

Rare and potentially life-threatening allergic reaction. The symptoms develop over several minutes, may involve multiple body systems (e.g., skin, respiratory system, circulatory system) and may progress to unconsciousness only as a late event in severe cases. Rarely is unconsciousness the sole manifestation of anaphylaxis.

Anaphylaxis must be distinguished from fainting (vasovagal syncope), which is a more common and benign occurrence. Rapidity of onset is a key difference. When a person faints, the change from a normal to an unconscious state occurs within seconds. Fainting is managed simply by placing the patient in a recumbent position. Fainting is sometimes accompanied by brief clonic seizure activity, but this generally requires no specific treatment or investigation.

CAUSES

– Vaccines
– Injectable drugs
– Insect sting (e.g., bee)
– Medication (e.g., penicillin)
– Food substance
– Latex rubber

HISTORY

Anaphylaxis usually begins a few minutes after injection or ingestion of the offending substance and is usually evident within 15 minutes. The symptoms may include the following:

– Sneezing
– Coughing
– Itching
– "Pins-and-needles" sensation of the skin
– Flushing of the skin
– Facial edema (perioral, oral or periorbital urticaria)
– Anxiety
– Nausea, vomiting
– Early respiratory difficulties (e.g., wheezing, dyspnea, tightness of the chest)
– Palpitations
– Hypotension, which may progress to shock and collapse

Cardiovascular collapse can occur without respiratory symptoms.

Severe Reaction

- Severe respiratory distress (lower respiratory obstruction characterized by high-pitched wheezing, upper airway obstruction characterized by stridor)
- Difficulty speaking
- Difficulty swallowing
- Agitation
- Shock
- Loss of consciousness

PHYSICAL FINDINGS

- Tachycardia
- Tachypnea, labored respiration
- Blood pressure low-normal (client hypotensive if in shock)
- Pulse oximetry may show hypoxia
- Client in moderate-to-severe distress
- Use of accessory muscles of respiration
- Chest: air entry reduced, mild-to-severe wheezing
- Client flushed and diaphoretic
- Generalized urticaria (hives)
- Facial edema
- Diminished level of consciousness
- Skin feels cool and clammy

DIFFERENTIAL DIAGNOSIS

- Asthma
- Foreign-body aspiration
- Angioedema
- Pulmonary embolism
- Vasovagal syncope (fainting)

COMPLICATIONS

- Hypoxia
- Shock
- Airway obstruction due to edema of upper airway
- Convulsions
- Aspiration
- Death

DIAGNOSTIC TESTS

None.

MANAGEMENT

Goals of Treatment

- Improve oxygenation
- Alleviate symptoms
- Prevent complications
- Prevent recurrence

Early recognition and treatment of anaphylaxis is vital.

Nonpharmacologic Interventions

- Place the client in a recumbent position (elevating the feet if possible)
- Establish an oral airway if necessary
- If anaphylaxis was caused by injected substance, place a tourniquet (when possible) above the site of injection; release for 1 minute every 3 minutes

Adjuvant Therapy

Severe Anaphylaxis

- Give oxygen by mask, 6–10 L/min or more; keep oxygen saturations > 97% to 98%
- Start IV therapy with normal saline to keep vein open, unless severe anaphylaxis and signs of shock are evident (*refer to "Shock," below, this chapter, for details of fluid resuscitation in shock*)

Pharmacologic Interventions

Promptly administer:

> aqueous epinephrine (**D class drug**), 1:1000, 0.01 mL/kg (maximum dose 0.5 mL) SC or IM (in the limb opposite that in which the original injection was given, if anaphylaxis was caused by injected substance)

SC epinephrine injection is appropriate for mild cases or those treated early. A single SC injection is usually sufficient for mild or early anaphylaxis.

In severe cases, an IM injection should be given because this route leads more quickly to generalized distribution of the drug.

Epinephrine can be repeated twice at 20-minute intervals, if necessary. In severe reactions it may be necessary to give these repeat doses at shorter intervals (10–15 minutes).

If anaphylaxis was caused by a vaccine given subcutaneously, an additional dose of 0.005 mL/kg (maximum dose 0.3 mL) of aqueous epinephrine (1:1000) can be injected at the vaccination site to slow absorption of the vaccine. However, if the vaccine was given intramuscularly, local injection of epinephrine at the vaccination site is contraindicated because it will dilate the vessels and *speed* absorption.

Speedy intervention is of paramount importance. Failure to use epinephrine promptly is more dangerous than using it quickly but improperly.

Epinephrine Dose

The epinephrine dose should be carefully determined. Calculations based on body weight are preferred when weight is known. When body weight is not known, the dose of epinephrine (1:1000) can be approximated from the subject's age (Table 2).

Excessive doses of epinephrine can compound a subject's distress by causing palpitations, tachycardia, flushing and headache. Although unpleasant, such side effects pose little danger. Cardiac dysrhythmias may occur in older adults but are rare in otherwise healthy children and young adults.

Table 2: Epinephrine Dose on the Basis of Age

Age	Dose
2–6 months*	0.07 mL (0.07 mg)
12 months*	0.1 mL (0.1 mg)
18 months* to 4 years	0.15 mL (0.15 mg)
5 years	0.2 mL (0.2 mg)
6–9 years	0.3 mL (0.3 mg)
10–13 years	0.4 mL (0.4 mg)
≥14 years	0.5 mL (0.5 mg)

*Doses for children between 6 and 12 months of age and between 12 and 18 months of age are approximated (intermediate between the values shown or increased to the next larger dose, depending on practicability).

Source: *Canadian Immunization Guide*, 5th ed. (Health Canada, 1998).

Severe Anaphylaxis

In addition to the epinephrine, give the following:

diphenhydramine hydrochloride (Benadryl) (**A class drug**)

This drug should be reserved for clients who are not responding well to epinephrine or may be used to maintain symptom control in those who have responded (since epinephrine is a short-acting agent), especially if transfer to an acute care facility cannot be effected within 30 minutes.

Oral administration of diphenhydramine is preferred for conscious clients who are not seriously ill, because pain results when the drug is given intramuscularly. This drug has a high safety margin, which means that precise dosing is less important.

The approximate doses of diphenhydramine for injection (50 mg/mL solution) are shown in Table 3.

For Bronchospasm

salbutamol (Ventolin) (**D class drug**), 4–8 puffs q15–20min (three times) via metered dose inhaler (MDI) (maximum 20 puffs; otherwise, intolerable side effects will develop)

Monitoring and Follow-up

Severe Anaphylaxis

Monitor airway, breathing and circulation (ABC), vital signs and cardiorespiratory status frequently.

Appropriate Consultation

Severe Anaphylaxis

Consult a physician as soon as client's condition stabilizes; discuss use of IV steroids.

Referral

Medevac as soon as possible. In all but the mildest cases, clients with anaphylaxis should be hospitalized overnight or monitored for at least 12 hours.

Because anaphylaxis is rare, epinephrine vials and other emergency supplies should be checked regularly and should be replaced if outdated.

Table 3: Diphenhydramine Dose on the Basis of Age

Age	Dose
<2 years	0.25 mL (12.5 mg)
2–4 years	0.5 mL (25 mg)
5–11 years	1.0 mL (50 mg)
≥12 years	2.0 mL (100 mg)

Source: *Canadian Immunization Guide*, 5th ed. (Health Canada, 1998).

SHOCK

DEFINITION

A condition that occurs when perfusion of tissue with oxygen becomes inadequate. As a result, the cells of the body undergo shock, and grave cellular changes occur. Eventually cell death follows.

Shock is categorized in many ways, for example, according to the state of physiologic progression that has occurred:

- *Compensated shock:* vital organ perfusion is maintained by endogenous compensatory mechanisms
- *Uncompensated shock:* compensatory mechanisms have failed; associated with hypotension and impairment of tissue perfusion
- *Irreversible shock:* multiple end-stage organ failure and death occur, despite occasional return of spontaneous cardiorespiratory function

Arterial blood pressure is often preserved by compensatory vasoconstrictive mechanisms until very late in shock. An over-reliance on arterial blood pressure readings can delay recognition and timely treatment of shock.

TYPES OF SHOCK

- *Hypovolemic shock:* inadequate perfusion of vital organs because of reduced circulating blood volume
- *Cardiogenic shock:* due to the inability of the heart to pump blood to tissues (decreased cardiac output), as in congestive heart failure
- *Distributive shock:* due to massive vasodilation from interference with sympathetic nervous system or effects of histamine or toxins such as in anaphylaxis, septic shock, neurologic injury, spinal cord injury, intoxication with some drugs (e.g., tricyclic antidepressants, iron)
- *Obstructive (mechanical) shock:* obstruction of cardiac filling such as that caused by pericardial tamponade or tension pneumothorax
- *Dissociative shock:* oxygen is not released from hemoglobin to the cells (as in carbon monoxide poisoning)
- *Hypoxemic shock:* caused by respiratory failure from lung injury or obstruction or disruption of the airways
- *Low-volume shock (absolute hypovolemia):* caused by hemorrhage or other major loss of body fluid
- *High-space shock (relative hypovolemia):* caused by spinal injury, syncope, severe head injury, vasomotor injury from hypoxia

HISTORY

- Nausea
- Lightheadedness, faintness
- Thirst
- Loss of consciousness

Other symptoms depend upon underlying cause.

PHYSICAL FINDINGS

Remember: "ABCs" (airway, breathing and circulation) are the priority.

Physical findings depend on whether the client is in early or late shock.

Early Shock

Loss of approximately 15% to 25% of blood volume is enough to stimulate early shock.

- Tachycardia (slight to moderate)
- Blood pressure normal
- Postural blood pressure drop present
- Narrowed pulse pressure
- Pallor
- Thirst
- Diaphoresis
- Delayed capillary refill possible
- Anxiousness, restlessness

Late Shock

Caused by loss of 30% to 45% of blood volume.

- Hypotension
- Tachycardia more pronounced
- Pulse weak and thready
- Oxygen saturation decreased

Tachycardia is one of the early indicators of volume depletion. It may not be as apparent in elderly clients as in younger ones. Tachycardia may be mild if the client is taking certain medications (e.g., β-blockers, calcium-channel blockers).

DIFFERENTIAL DIAGNOSIS

- Sepsis
- Myocardial infarction
- Pulmonary embolism
- Anaphylaxis
- Status asthmaticus

COMPLICATIONS

- Angina
- Myocardial ischemia or infarction
- Renal failure
- Death

DIAGNOSTIC TESTS

- Pulse oximetry (oxygen saturation)

MANAGEMENT

Remember: "ABCs" (airway, breathing and circulation) are the priority.

Goals of Treatment

- Restore circulating blood volume
- Improve oxygenation of vital tissues
- Prevent ongoing volume losses

Nonpharmacologic Interventions

- Assess and stabilize ABC
- Ensure that airway is patent and ventilation is adequate
- Insert oral airway and ventilate with Ambu bag (using oxygen), as needed
- Control any external bleeding; use direct pressure to control bleeding from external wounds
- Put in head-down position

Adjuvant Therapy

- Give oxygen at 10–12 L/min or more by mask; keep oxygen saturation > 97% to 98%
- Start 2 large-bore IV lines (14- or 16-gauge or greater) with normal saline
- Give 20 mL/kg IV fluid rapidly as a bolus over 15 minutes
- Reassess for signs of continuing shock
- If shock persists, continue to administer fluid in 20 mL/kg boluses and reassess after each bolus
- Adjust IV rate according to clinical response
- Ongoing IV therapy is based on response to initial fluid resuscitation, continuing losses and underlying cause
- Aim for heart rate < l00 bpm, systolic blood pressure > 90 mm Hg

The amount of fluid required for resuscitation is difficult to predict on initial assessment.

Caution in Cases of Internal Hemorrhage

The use of large amounts of IV fluids in a client with uncontrolled internal hemorrhage from blunt or penetrating trauma may increase the internal bleeding and ultimately lead to death. Administration of IV fluids while increasing blood pressure will also dilute clotting factors and cause more hemorrhage. Use fluids judiciously to maintain peripheral perfusion. Early blood transfusion and surgical intervention to achieve homeostasis is very important in this situation.

After Initial Resuscitation

- Insert indwelling urinary catheter
- Insert a nasogastric tube prn

Monitoring and Follow-Up

- Monitor ABC, vital signs (including pulse oximetry) and level of consciousness as often as possible until condition is stable
- Frequent reassessment for continuing blood loss is important
- Monitor hourly intake and urine output
- Identify and manage underlying cause of hypovolemia
- Assess stability of pre-existing medical problems (e.g., diabetes mellitus)

Referral

Medevac as soon as possible.

COMA (NOT YET DIAGNOSED)

DEFINITION

Altered level of consciousness indicating diffuse or bilateral cortical impairment of cerebral function, failure of brainstem-activating mechanisms (or both).

CAUSES

Coma can be caused only by:

- Bilateral cortical disease
- Compromise of reticular-activating system

See "Differential Diagnosis," below.

INITIAL APPROACH TO CLIENT WITH COMA OF UNKNOWN ORIGIN

Perform primary survey (*see "Primary Survey," above, this chapter*)

Nonpharmacologic Interventions

- Assess and stabilize ABC
- Insert oral airway
- Place in recovery position, unless there are contraindications
- Check finger-stick glucose

Adjuvant Therapy

- Give oxygen (10–12 L/min) by mask; keep oxygen saturation > 97% to 98%
- Start IV therapy with normal saline to keep vein open, unless there is evidence of shock (*see "Shock," above, this chapter*)

Pharmacologic Interventions

Rapidly administer:

thiamine (Betaxin) (**D class drug**), 100 mg IV (to prevent Wernicke–Korsakoff encephalopathy)

and

dextrose 50% (**D class drug**), 25–50 mL preloaded IV (to treat hypoglycemia)

Do not withhold dextrose if thiamine is not available. A single dose of dextrose will not induce Wernicke–Korsakoff encephalopathy.

Also give:

naloxone (Narcan) (**D class drug**), 0.4–2.0 mg IV, SC or IM to treat narcotic overdose (start with 2 mg; if no response in 3–5 minutes, give an additional 4 mg)

Make sure to restrain the client if you suspect that the naloxone will precipitate narcotic withdrawal. Recently, the routine use of naloxone for patients without evidence of narcotic intoxication has been questioned. However, it should be considered for use in all clients. If you are unsure, discuss with a physician before administering.

Once the immediate life-threatening concerns have been addressed, the secondary survey can be carried out (*see "Secondary Survey," above, this chapter*)

- Monitor vital signs, including pulse oximetry (if available)
- Obtain abbreviated, targeted history
- In particular, determine if person has had any recent illness, antecedent fever, rash, vomiting or trauma or has any chronic illnesses; explore recent exposure to infection, medication or intoxicants

Past medical history and family history should be obtained when time permits.

Observations in the secondary survey should attempt to uncover signs of occult infection, trauma, or toxic or metabolic derangements. Signs suggestive of specific toxidromes should be sought (*see "Overdoses, Poisonings and Toxidromes," below, this chapter*).

PHYSICAL FINDINGS

Level of Consciousness

- Assess level of consciousness using the Glasgow coma scale (*see Table 1, in "Head Trauma," above, this chapter*).

Respiratory Pattern

- Control of breathing is centered in the brain, lower pons and medulla and is modulated by the cortical centers in the forebrain
- Respiratory abnormalities signify either metabolic derangement or neurological insult
- Several patterns exist (e.g., Cheyne–Stokes respiration, apneustic breathing, post-ventilation apnea)

Eye Findings

Pupillary Signs

- Pupils generally resistant to metabolic insult
- Remember that dilatation of pupils may be secondary to topical or systemic drugs
- Dilatation of pupils in an alert person is not likely attributable to increased intracranial pressure and herniation
- Dilatation of pupils in an unconscious patient may herald imminent uncal herniation
- Small reactive pupils generally indicate metabolic problem or diencephalic lesion
- Unilateral, dilated, fixed pupils indicate lesion of third nerve or uncal lesion
- Bilateral pinpoint pupils indicate pontine lesion
- Pupils fixed in midposition indicate midbrain lesion
- Bilateral large, fixed pupils indicate tectal lesion

With cerebral lesions, the eyes will deviate toward the side of the lesion, whereas with brain-stem lesions, the eyes deviate away from the lesion.

About 5% of the normal population has anisocoria (asymmetric pupils).

A brief funduscopic exam may reveal papilledema or retinal hemorrhage.

Motor Examination

- Try to elicit motor response to verbal or physical stimuli
- Assess muscle tone, strength and reflexes for normality and symmetry
- Ability of client to localize, as well as absence or presence of abnormal posture, helps in assessment of severity of involvement
- Decorticate posturing (flexion of the upper extremities with extension of the lower extremities) suggests involvement of the cerebral cortex and subcortical white matter
- Decerebrate posturing (rigid extension of the arms and legs) usually represents added brain-stem involvement at the level of the pons

DIFFERENTIAL DIAGNOSIS

Coma with no localizing central nervous system signs may be caused by:

- Metabolic insult, including hypoglycemia, uremia, Addision's disease, diabetic ketoacidosis, hypothyroidism, liver disease
- Children and young adults will often experience hypoglycemia and may present with coma after ingesting alcohol, including mouthwash
- Respiratory problems, including hypoxia, hypercapnia
- Intoxication, including that caused by barbiturates, alcohol, opiates, carbon monoxide, benzodiazepines
- Infections (severe, systemic), including sepsis, pneumonia, typhoid fever
- Shock, including hypovolemic, cardiogenic, septic, anaphylactic
- Epilepsy
- Hypertensive encephalopathy
- Hyperthermia (heat stroke), hypothermia

Coma with meningeal irritation but without localizing signs may be caused by:

- Meningitis
- Subarachnoid hemorrhage from ruptured aneurysm, arteriovenous malformation

Coma with focal brain-stem or lateralizing signs may be caused by:

- Pontine hemorrhage
- Stroke (cerebrovascular accivent [CVA])
- Brain abscess
- Subdural or epidural hemorrhage

Coma in which client appears awake but is unresponsive may be caused by:

- Abulic state: frontal lobe function depressed, so client may take several minutes to answer a question
- Locked-in syndrome: destruction of pontine motor tracts; is able to look upward
- Psychogenic state: unresponsive

DIAGNOSTIC TESTS

- Determine blood glucose level

MANAGEMENT

Nonpharmacologic Interventions

- Nothing by mouth
- Insert nasogastric tube unless there is suspicion of associated basilar skull fracture or facial trauma
- Insert Foley catheter

Pharmacologic Interventions

If you suspect meningitis, do not withhold antibiotics. Antibiotics should be started before the client goes to the hospital. Discuss with physician, if possible. Otherwise, give:

ampicillin (Ampicin) (**D class drug**), 1–2 g IV stat

or

ceftriaxone (Rocephin) (**D class drug**), 1–2 g IV stat

Monitoring and Follow-Up

Monitor ABC, vital signs, pulse oximetry, level of consciousness, respiratory status and sensory motor deficits frequently.

Appropriate Consultation

Consult a physician as soon as possible, once the client's condition has stabilized.

Referral

Medevac as soon as possible.

OVERDOSES, POISONINGS AND TOXIDROMES

DEFINITION

Ingestion of a substance in sufficient quantity to induce symptom complexes associated with toxic effects.

SPECIFIC POISONINGS AND CLINICAL TOXIDROMES

Opiates

- Examples: heroin, morphine, clonidine, codeine, diphenoxylate (Lomotil)
- Toxidrome characterized by sedation, hypotension, bradycardia, respiratory depression, usually pinpoint pupils (may not be present with mixed overdose)

Petroleum Distillates

- Examples: gasoline, fuel oil, model airplane glue
- Main toxic effect: pulmonary (from inhalation)

Tricyclic Antidepressants

- Main toxic effects: cardiac arrhythmias, anticholinergic effects (see toxidrome for opiate poisoning, above), vomiting, hypotension, confusion and seizures
- Cardiac complications: prolonged QRS and QT intervals, other arrhythmias
- Neurologic complications: agitation, seizures
- Hypotension: Treat initially with IV fluids (*see "Shock," above, this chapter*)

The client may appear fine and then rapidly deteriorate. He or she will need to be admitted to a monitored unit. *Be prepared to manage the client's airway.* Even if the client is asymptomatic 6 hours after ingestion, he or she must be admitted to hospital for psychiatric examination.

Salicylates (e.g., Aspirin)

- Main toxic effects: tinnitus, nausea, vomiting, hyperventilation (primary respiratory alkalosis), metabolic acidosis, fever, hypokale mia, hypoglycemia, seizures and coma

Many patients are misdiagnosed on initial presentation as having sepsis or gastroenteritis (because of fever, acidosis, vomiting and other symptoms). This misdiagnosis is particularly common in the elderly.

Acetaminophen (Tylenol)

- Main toxic effects: hepatic, occurring 24–72 hours after ingestion
- Client may also have nausea and vomiting

Caustic Agents

- Examples: alkaline (drain cleaner), bleach and battery acid (household bleach is usually not a problem, except for superficial burns)
- Main toxic effects: local tissue necrosis of the esophagus with alkali and of the stomach with acids, as well as respiratory distress; obvious facial or oral burns and emesis; hoarseness and stridor reflecting epiglottic edema (especially with acids)

Carbon Monoxide

- Main toxic effects: central nervous system effects, including confusion, coma, seizures, headache, fatigue and nausea; arrhythmias or cardiac ischemia possible
- Diagnosis: clinical background (e.g., exposure to furnace or car exhaust [especially in children who have been riding in the back of pick-up trucks]); level of carboxyhemoglobin needed to confirm

Arterial oxygen saturation as measured by pulse oximetry is frequently normal in cases of carbon monoxide poisoning.

Cocaine

- Main toxic effects: seizures, hypertension, tachycardia, paranoid behavior or other alterations in mentation, rhabdomyolysis, myocardial infarction and stroke (CVA)

ASSESSMENT AND MANAGEMENT: GENERAL APPROACH

Remember: your first priority is ABC

- Remember to decontaminate gut (see procedure below), clothing, skin and environment
- If client is unconscious, *see "Coma (Not Yet Diagnosed)," above, this chapter*
- Determine to the best of your ability what was ingested
- For any client with overdose, draw blood sample for determination of serum acetaminophen level (*see "Acetaminophen (Tylenol)," above, this section*)
- Contact the nearest poison control center for further information about the toxin in question

Appropriate Consultation

Consult a physician as soon as you are able after the initial assessment and stabilization of ABC.

Gut Decontamination

Activated Charcoal

- Treatment of choice in most overdoses involving ingestion
- May be indicated for overdose with theophylline, tricyclic antidepressants, phenobarbital, phenytoin, digoxin
- Does not work for metals such as iron or lithium
- Administer 10–25 g for children, 50–100 g for adults (1 g/kg)
- A sorbitol mixture reduces transit time but should be used only with the first dose if multiple doses of charcoal will be used
- If client will drink the mixture, this mode of administration is acceptable; otherwise, administer by nasogastric tube
- 30% of clients will vomit after administration of charcoal; in this case, charcoal can be administered again
- Use of multiple-dose charcoal is still controversial

Ipecac

Ipecac is not very useful. It is only partially effective in emptying gastric contents and may propel pills beyond the pylorus. Because of the risk of aspiration, ipecac is contraindicated in obtunded patients and those unable to protect the airway, in cases of ingestion of caustic materials or petroleum distillates, and in cases of overdose with tricyclic antidepressants, theophylline or any agent that might cause a change in mental status.

Ipecac inhibits retention of charcoal and thus delays administration of charcoal.

The dose is 30 mL for an adult, followed with water.

Gastric Lavage

- May remove more stomach contents than ipecac
- Not effective beyond 1.5 hours after ingestion, but you may want to try it in severely ill clients
- Use largest nasogastric tube available or orogastric tube
- Most effective if charcoal is given 20–30 minutes before lavage; repeat charcoal when lavage is finished
- Airway protection is recommended (client should be fully conscious)
- Instill 300-mL aliquots of saline, then remove until saline is clear on removal or until 5 L of fluid has been used for irrigation
- Lavage alone is not adequate for gastric emptying and delays administration of charcoal

MANAGEMENT OF SPECIFIC OVERDOSES AND TOXIDROMES

Opiates

Use the following drug with caution in those who are narcotic addicts, as it may precipitate acute opiate withdrawal. If this is a concern, the client's airway must be supported until the narcotic wears off.

Always observe the client until there is no chance of further respiratory depression. This is especially important with naloxone, which has a relatively short half-life.

naloxone (Narcan) (**D class drug**), 5 µg/kg IV (usually start with 0.4–2 mg in adults); dose may be repeated if needed, up to a maximum of 10 mg

This is a short-acting drug (half-life 1.1 hours).

Client may have recurrent narcotization when naloxone wears off.

Petroleum Distillates

- Do not perform lavage or induce vomiting if swallowed
- If no symptoms within 6 hours, no need for further observation

Tricyclic Antidepressants

- Avoid emesis (client may aspirate)
- Charcoal and lavage are mainstays of treatment (*see "Gut Decontamination," above, this section*)
- Client may appear fine and then rapidly deteriorate
- Client should be admitted to a monitored unit
- Be prepared to manage client's airway
- If client is asymptomatic 6 hours after ingestion, he or she should still be admitted to hospital for psychiatric evaluation and care
- Cardiac complications: prolonged QRS, QT interval, other arrhythmias
- Neurologic complications: agitation, seizures
- Seizures usually brief and self-limited; treat as outlined in *"Status Epilepticus (Acute Grand Mal Seizure)," in chapter 8, "Central Nervous System"*
- Avoid phenytoin
- If hypotension occurs, treat initially with IV fluids (*see "Shock," above, this chapter*)

Salicylates (e.g., Aspirin)

- Toxic dose: 150 mg/kg (300 mg/kg is highly toxic)
- IV administration of normal saline to maintain blood pressure (*see "Shock," above, this chapter*)
- Urine alkalinization (to promote excretion of salicylates)

Acetaminophen (Tylenol)

- Toxic dose: 140 mg/kg or >10 g in adults (in alcoholic clients, the toxic dose is often much less if the client is taking acetaminophen regularly, even as little as 4 g/day)
- If client is vomiting and unable to keep down charcoal, consider metoclopramide (Maxeran) (**B class drug**)
- If ingestion is in toxic range, treat with:

  N-acetylcysteine (Mucomyst) (**D class drug**), 20%, 140 mg/kg PO or IV and then 70 mg/kg every 4 hours for 17 doses; repeat any doses vomited within 1 hour of administration

- Do not withhold *N*-acetylcysteine even if 24–26 hours after ingestion; late administration, though not as effective as early administration, still reduces mortality
- Charcoal use is acceptable in acetaminophen overdose and only minimally interferes with *N*-acetylcysteine; charcoal should be given early and *N*-acetylcysteine at least 4 hours later

Caustic Materials

- Do not induce emesis or perform lavage
- Charcoal is not indicated
- If the client has visible burns, he or she has a 50% chance of lower burns of significance; however, absence of visible lesions does not rule out significant injury (10% to 30% will have burns beyond the mucosa)

Carbon Monoxide

- Administration of 100% oxygen (to displace carbon monoxide from hemoglobin)
- Even if client seems well when seen or is recovering from the CNS insult, hyperbaric oxygen has been shown to reduce long-term sequelae; therefore transfer client to hospital

Cocaine

- Cocaine has a relatively short half-life, so most symptoms are self-limited
- For coronary vasospasm, hypertension or tachycardia, observation is probably adequate, because of the short half-life
- For other cases, treat as for myocardial infarction
- Myocardial infarction and CVA may occur up to 72 hours after cocaine use
- Concurrent use of alcohol increases the likelihood of cardiac vasospasm

Not all chest pain represents myocardial infarction (e.g., pneumomediastinum in crack use, bronchospasm).

- Seizures are generally self-limited but will respond to normal seizure treatment (*see "Status Epilepticus (Acute Grand Mal Seizure)," in chapter 8, "Central Nervous System"*)
- CNS symptoms such as agitation and paranoia can be treated with diazepam (Valium) or lorazepam (Ativan)

Monitoring and Follow-Up

Monitor ABC, level of consciousness, vital signs, oxygen saturation, intake and urine output frequently until the client is stable.

Referral

Medevac as soon as possible.

HYPOTHERMIA

DEFINITION

Core temperature of ≤ 35°C (95°F).

RISK FACTORS

- Endocrine or metabolic derangements (e.g., hypoglycemia)
- Infection (e.g., meningitis, sepsis)
- Intoxication
- Intracranial pathology (e.g., head trauma)
- Submersion
- Environmental exposure
- Major burns
- Iatrogenic (cold IV fluids, exposure during treatment)

HISTORY

The evaluation and treatment of hypothermia is essentially the same whether the client is wet or dry, on land or in water.

- One or more of above risk factors
- The hypothermic client should be assessed carefully for coexisting injury or illness
- Signs and symptoms of hypothermia may be mimicked by alcohol, diabetes mellitus, altitude sickness, overdose and other conditions; therefore, thorough assessment is imperative
- Associated significant illness or injury may exacerbate hypothermia

The hypothermic client may appear "beyond help" because of skin color, pupil dilatation and depression of vital signs. However, people with severe hypothermia have been resuscitated. Therefore, be cautious about assuming that the client cannot be resuscitated. It is also wise to be cautious about what you say during the resuscitation. Seemingly unconscious patients frequently remember what is said and done.

PHYSICAL FINDINGS

In the cold client, rectal temperature is one of the vital signs.

In terms of the "ABCs," think A, B, C and D for hypothermic clients:

A for airway

B for breathing

C for circulation

D for degrees (body-core temperature)

In the cold client, body-core temperature is an important sign. Although obtaining the body-core temperature is useful for assessing and treating hypothermia, there is tremendous variability in individual physiologic responses at specific temperatures.

Assessment of Temperature

Axillary and oral measurements are poor measures of core temperature. Rectal temperature more closely approximates the core temperature and is a practical method for use in the field.

For clients with cold skin, rectal temperature should be determined with a low-reading thermometer (i.e., capable of measuring temperatures as low as 21°C).

Core Temperature 35°C to 36°C

– Client feels cold, is shivering

Core Temperature 32°C to 35°C

– Slowing of mental faculties
– Slurred speech
– Mild incoordination
– Muscle stiffness
– Inappropriate judgment
– Irritability
– Shivering apparent

Core Temperature 32°C

– Shivering stops

Core Temperature ≤ 31°C

– Semi-comatose
– Progressive decrease in level of consciousness
– Coma likely at temperatures ≤ 30°C
– Cyanosis
– Tissue edema

Core Temperature 29°C

– Respiratory activity slow, may be difficult to detect
– Heart rate slow; pulse may be difficult to palpate

Core Temperature ≤ 28°C

– Vital signs absent
– Pupils dilated and unresponsive
– Respiratory arrest
– Ventricular fibrillation

MANAGEMENT

Goals of Treatment

– Rewarm core
– Prevent or manage complications

General Principles

The client with severe hypothermia must be handled very gently. The cold heart is highly prone to cardiac arrest, and even cautious movement of the client may induce cardiac arrest.

– Ensure that any items, oxygen or fluids (both oral and IV) coming into contact with the client are warmed beforehand
– Oxygen should be heated to 105°F to 108°F (40.5°C to 42.2°C) and humidified, if possible
– Because cold skin is easily injured, avoid direct application of hot objects or excessive pressure (e.g., uninsulated hot water bottles)
– The inside of a vehicle and any rooms where hypothermic clients are treated should be warm enough to prevent further heat loss (ideally above 80°F [26.7°C])
– Splinting should be performed, when indicated and with caution, to prevent additional injuries to frostbitten tissues
– Do not give caffeine or alcohol

Cardiopulmonary resuscitation (CPR) has no significant effect on survival of hypothermic clients in the following situations and should *not* be initiated:

– Cold-water submersion for > 1 hour
– Core temperature < 15.5°C (60°F)
– Obvious fatal injuries
– Client frozen (e.g., formation of ice in airway)
– Chest wall so stiff that compression is impossible
– Rescuers are exhausted or in danger

Rise in core temperature may lag behind change in skin temperature and may continue to drop, so monitor rectal temperature frequently.

Basic Treatment for All Cases of Hypothermia

Prevent further heat loss: insulate from the ground, protect from the wind, eliminate evaporative heat loss by removing wet clothing or by covering client with a vapor barrier (such as a plastic garbage bag), cover the head and neck, and move the client to a warm environment; consider covering client's mouth and nose with light fabric to reduce heat loss through respiration.

Mild Hypothermia

Rewarm passively and gradually:

Step 1: Place client in as warm an environment as possible

Step 2: Increase heat production through exercise (without sweating) and fluid replacement with high-calorie, warm, sweet fluid; this method of adding heat is particularly important when emergency care is not readily available, as in remote or prolonged-transport environment

Step 3: Rewarm passively through application of insulated heat packs to high heat transfer–loss areas such as the head, neck, underarms, sides of the chest wall and groin; apply heavy insulation to the same areas to prevent further heat loss (goal is to increase temperature by 1°C to 2°C per hour)

Step 4: Consider warm shower or bath if the client is alert

Do not leave client alone.

Severe Hypothermia with Signs of Life (e.g., Pulse and Respiration)

Treat the client as outlined in steps 2 and 3 above, with the following exceptions:

- Do not put a severely hypothermic client in a shower or bath
- Do not give a client fluids by mouth unless he or she is capable of swallowing and protecting the airway
- Treat hypothermic clients very gently (do not rub or manipulate or apply direct heat to extremities)

In addition, the following measures should be taken:

- Reassess ABC and vital signs frequently
- Give warm, humidified oxygen at 10–12 L/min or more
- Administer warmed (to 37°C) normal saline by IV
- Clients with moderate-to-severe hypothermia may have a large amount of fluid sequestration and may need aggressive fluid resuscitation; an initial bolus of 20 mL/kg is indicated; repeat as necessary, but do not overload with IV fluids

Severe Hypothermia with No Signs of Life

- If no pulse (after checking for up to 45 seconds), no respiration and no contraindications, start CPR unless contraindicated
- Ventilate with Ambu bag with 50% warm, humidified oxygen; aim for 12–15 ventilations and 80–100 compressions; continue as long as you can
- Administer warmed (to 37°C) normal saline by IV
- Clients with moderate-to-severe hypothermia may have large amount of fluid sequestration and may need aggressive fluid resuscitation; an initial bolus of 20 mL/kg is indicated; repeat as necessary
- Rewarm passively as outlined above

No drugs are used in resuscitation unless core temperature > 32°C and drugs are ordered by a physician.

Consultation

If resuscitation has been provided in conjunction with rewarming techniques for more than 60 minutes without the return of spontaneous pulse or respiration, continue efforts but contact the physician for recommendations.

Referral

Medevac as soon as possible.

CHAPTER 15 — MENTAL HEALTH

Table of Contents

FOREWORD

This chapter was originally written for Medical Services Branch by J.P. Kehoe, Director, Mental Health Services, Yukon Region. This 2000 revision was prepared by Dr. S. Callaghan and C. Sargo, RN(EC), Nurse Practitioner.

GENERAL INFORMATION

DEFINITIONS

MENTAL HEALTH

Mental health is a difficult concept to define. There is, however, some agreement in the literature that mental health is evident in the following personal characteristics:

- self-awareness and accurate self-perception
- self-actualization (realizing one's full potential)
- autonomy (independence in thought and action)
- accurate perception of reality
- commitment
- possession of "mastery" skills (social and occupational ability to deal with the environment)
- openness and flexibility.

MENTAL ILLNESS

Mental illness refers to the behavior of a person who displays some or all of the following characteristics:

- social maladjustment
- impaired reasoning or intellectual functioning
- disorders of thinking, memory or orientation
- delusions or disorders of perception
- exaggerated, inappropriate or otherwise impaired emotional responsiveness
- impaired judgment or impulse control
- unrealistic self-appraisal.

Unlike the diagnosis of most physical disorders, diagnosis of a mental illness does not often imply a specific cause.

CULTURAL ROOTS OF MENTAL ILLNESS AND MENTAL HEALTH

CONCEPTS OF ABNORMALITY

Beliefs about mental illness are intimately linked with concepts of religion, social values, norms and ideals of human relationships. This is true of any culture.

These shared beliefs determine the nature of traditional medicine and provide the framework for interpreting symptoms and guiding action in response to them. "Western" medicine and psychiatry are premised on the belief that mental illness is caused by biological and experiential events; many other cultures ascribe a metaphysical or spiritual cause as well.

Members of a culture rarely have insight into their own culturally learned ideas and values regarding normal and abnormal behavior; typically these values are seen as correct and proper for everyone (ethnocentrism).

The expression of mental illness is heavily determined by culture. Symptoms of a disorder that are prominent in one culture may be insignificant or absent in another and may even be interpreted as normal in a third.

Some disorders may be exotic and specific to a particular culture (e.g., Windigo among the Cree and Ojibwa; Pibloktog among the Inuit). Attempts have been made to reconcile these disorders with the scientific classifications of mental disorders, with the unusual symptoms being attributed to cultural determinations and the underlying process thought to be the same across cultures.

Some disorders may fit neither classification system and may be a recent development in response to cultural change. The "totally discouraged" syndrome (depression, alcoholism, lack of social responsibility, neglect of family, suicidal behavior) described for the Sioux may be such a disorder.

The "labeling process" (diagnosis and interpretation) provides a language for both the patient and the therapist by which they each can conceptualize the distress. This process gives reassurance, dictates treatment and assigns meaning. Where the two do not share the same "world view" (concept of normal and abnormal behavior, concepts of cause and effect in interpersonal behavior, ideas and appropriate treatment), the treatment is likely to fail or to be less than maximally effective. The intervention must be culturally relevant.

PREVALENCE AND EXPRESSION OF MENTAL ILLNESS

Rates of specific disorders appear to vary from culture to culture and are influenced by cultural variations in stress inducers, cultural differences in defining abnormality and cultural variations in personality (i.e., certain personality patterns may be more or less resistant to stress by virtue of temperamental type, cognitive styles and physiological coping patterns).

Culturally related stresses that have been identified include the following:

- *Value conflict*: conflicts causing uncertainty and confusion with no stable frame of reference
- *Social change*: habitual forms of adaptation are challenged
- *Acculturation stress*: social change set in motion by different cultures coming into contact
- *Life events*: the greater the number of life adjustments (e.g., deaths in the family, financial stress, trouble with the law, marital problems) and the greater their impact, the greater the stress
- Goal-*striving discrepancy*: rising expectations with little hope of their being realized
- *Role discrimination*: stress applied especially to certain social strata (e.g. age group, gender), which causes feelings of inadequacy and lack of self-worth
- *Role conflict*: being required to switch back and forth from one role to another

The manifestation of mental health disorders varies across cultures, but there is a fair degree of agreement that some behaviors, such as extreme sadness, motor retardation and agitation, are signs of mental disturbance.

VALUES AND ETHICS OF A CULTURE

Ethics refers to the rules of behavior—what is customary or expected in a society. To understand a client, it is necessary to have a basic understanding of that person's values and his or her expectations of self and others.

Failing to understand these often subtle differences in behavioral norms can easily lead to major misunderstandings, loss of credibility, anger and frustration on both sides.

Because values and ideals vary from culture to culture, it is impossible to enumerate all the possible differences. Mainly for purposes of illustration, some commonly cited values of First Nations and Inuit people are given below.

It must be emphasized that these values do not necessarily hold true for all First Nations and Inuit, but they do alert the healthcare practitioner to the kinds of differences that can exist and to the possible consequences, for both understanding the client and providing a mental health service, if these differences are not recognized.

Non-Interference

A high degree of respect for a person's independence leads to the view that giving instructions, coercing or even persuading another person, including a child, is inappropriate. This ethic may be perceived by another culture as apathy, neglect, indifference, lack of social responsibility or evasiveness.

Anger

Displays of anger could jeopardize the voluntary cooperation essential to survival of a close-knit group. Hostility must be suppressed. It has been suggested that this practice may lead to a particular vulnerability to depression.

Time

Time is a personal, flexible concept and is not related to the clock so much as to feeling ready to act.

Sharing

Group survival is more important than personal prosperity. Sharing assures the survival of the group.

Cooperation

Competition can interfere with group cohesiveness. Cooperation increases the sense of solidarity and pools effort, talent and resources.

Excellence

Gratitude is rarely shown or verbalized because each individual is expected to behave at a "normal" (i.e., excellent) level.

Teaching and Learning

Teaching is based on modeling rather than deliberate instruction. Practice and observation occur spontaneously in the learner who is ready to learn.

A CULTURAL ACCOMMODATION APPROACH

The scientifically trained professional is often best cast in the role of consultant rather than primary therapist. The consultant then provides his or her expertise though more natural and mutually acceptable resources, usually those within the client's own culture.

The mental health service should be integrated as completely as possible into the helping systems currently accepted by the culture.

An attempt should be made to learn:

- what the culture considers normal and abnormal
- what the sociocultural causes of disorders are assumed to be
- what the sociocultural responses are to the disorder, including traditional or folk healing practices and networks
- what the community expects of you and your agency.

This assessment process may be informal or formal and should include consultation with "culture-brokers," those who are able to operate in both cultures.

Ideally, culture-specific profiles of disordered behavior should be developed, along with a description of how the behavior is perceived to relate to various sociopsychological factors.

Be aware that in some cultures and with some disorders, the individual is not held responsible, and the family and community provide support. In others, particularly when the person has been violent or has caused others to suffer, the disruption to community well-being may lead to rejection, including subtle forms of banishment. In such cases, the individual may assume a "sick role," and the prognosis is less favorable.

Look at the helping network and learn how the means of social influence usually employed bring about resocialization to community norms and goals.

Members of any culture have expectations about techniques of healing. These expectations should be tapped and included in treatment or management plans.

Some members of a community will have a sanctioned role as folk healer, shaman, "doctor" or wise elder. These and other people who have special relationships with the client may be the primary agents for dealing with the client.

The particular role of an indigenous healer or therapist as either direct therapist or consultant must be carefully considered in each case. Firm guidelines cannot be provided, but the following should be evaluated in establishing the respective role of the indigenous healer and the professional:

- the type of illness (disorders in which the cause is assumed to have a large sociocultural component are probably more responsive to the indigenous healer)
- the need for chemotherapy or other physical therapy and the need for surveillance of the response to medications
- degree of risk to the client, the healer and the community presented by each option, and community expectations regarding responsibility for care of the client
- acceptability of each alternative to the client
- potential for harm from the expected choice of techniques of the indigenous healer
- ability of the indigenous healer and the medical staff to work together

Traditional and folk healing techniques as applied to mental illness should be respected even though they appear to be at variance with scientifically based practices. Non-specific factors in the healing process may be operative in any approach and may have a significant effect, especially if the client identifies the treatment as appropriate.

Unless the "scientific" technique is demonstrably more effective, and more effective in the cross-cultural context specifically, the indigenous healer should be a significant part of the treatment plan, given that such practice has cultural support and is desired by the client.

Notwithstanding the above cautionary note, collaboration with native or folk healers does provide an opportunity for exchange of knowledge and perceptions, which may work both ways. All forms of healing are dynamic and changing, including the scientific approach, and this is particularly true in mental health.

Assume that the client has competencies and resources for "self-righting" during difficulties (i.e., do not be paternalistic or encourage dependency).

Be aware of your own values and expectations and any points of conflict with the other culture.

Other individuals in relationships with the client may also be able to supply social influence to the benefit of the client.

Involve the target population or members of the community generally in development of programs and services. Community ownership of services increases their acceptability and appropriateness.

COMMUNICATION

In communication with someone of another culture, it can be expected that there will be numerous sources of misunderstanding, even if the two parties are speaking the same language. Cultural training, and perhaps even language itself (Whorfian hypothesis), structures one's perception of reality.

In mental health services, it is especially important to communicate effectively for the following reasons:

- A clear understanding of the client's symptoms, circumstances and perception of the problem is necessary.
- Many mental disorders are diagnosed by disturbances of thinking and perception, which can only be determined verbally and must be differentiated from culturally normal ideas.
- To the extent that verbal techniques are used in treatment, communication must be effective.

The following are some of the considerations that should routinely be taken into account in communicating and counseling in a cross-cultural situation.

- Words, even in the same language, can have different cultural meanings. Paraphrase and question the client to be sure of mutual understanding.
- Gauge the level of the client's vocabulary and respond accordingly.
- Be alert to non-verbal cues and to the fact that gestures can have different meanings in different cultures.
- Some emotional subjects are taboo and must be handled tactfully or indirectly.
- Some questions may be inappropriate and offensive for certain groups of people, such as pubescent girls, elderly people or married women. This factor may depend also on the age and gender of the inquirer.
- Cultures vary widely in terms of appropriate distances between speakers (personal space), depending upon their relationship and the topic and purpose of the conversation. Standing or approaching too close might be perceived as being "pushy" or aggressive; someone standing too distant may be interpreted as cold, impersonal or anxious.
- An interpreter is obviously necessary when a different language is spoken, but he or she can also be helpful in providing a "cultural" interpretation, clarifying and explaining for both parties (*see "Use of an Interpreter," below, this chapter*).
- The communication "style" varies from culture to culture (e.g., opening exchanges, getting to the point, directness, bluntness, self-disclosure by the interviewer).
- It may be advisable for the counselor (interviewer, therapist, nurse) to explain his or her point of view, values and assumptions.
- The degree to which each client identifies with his or her culture must be assessed.
- The client's environment should be kept as the focus of the interview; attempt to address the problem and understand it from the client's perspective.
- The interviewer must be prepared to be flexible to meet the client's expectations of where the interview should lead.
- Interest and genuineness are traits of the interviewer that can be recognized readily by clients of almost any culture.

Some of these items require an in-depth knowledge of the culture. Consult experienced healthcare and social service professionals and para-professionals, elders, cross-cultural workers, interpreters and other members of the community itself. Firsthand experience and knowledge are best, but do not overlook the anthropological and historical literature on your area and its people.

USE OF AN INTERPRETER

Communication is most effective when the participants share a common tongue and culture, so that verbal and nonverbal messages are congruent and cultural meanings are clear. The following guidelines can be expected to compensate only partially for the degrees of difference between speakers.

- Be respectful and polite. Maintain eye contact if it does not appear to make the interpreter uncomfortable. Use the person's name (remember that self-esteem is in part tied to one's name). Speak slowly, but do not shout. Volume does not compensate for difficulty with vocabulary or syntax.
- Discuss confidentiality. Be sure that you understand the interpreter's relationship to the client and that it does not pose a problem.
- Ask the interpreter for feedback at each step to be sure that communication takes place. As appropriate, ask for brief summaries to ensure that all three parties have a mutual understanding of what has been discussed.
- Explain to the interpreter that impressions of feelings and emotions should be described, in addition to the client's verbalizations.

- If appropriate, ask the client for a summary of what has been discussed.
- Be alert for incongruence between verbal and non-verbal communication, and ask the interpreter to check out any suspected problems.
- Have the interpreter choose the appropriate words for possibly sensitive or taboo subjects, such as sex, and indicate to him or her that you are not expecting a literal translation. Ask for a translation of what was said to be sure that the translator's interpretation was close enough to the intended meaning.
- Ask the interpreter about correct protocol (dress, handshakes, type of questions that may be asked, "personal space," use of first names, presence of the interpreter).
- The interpreter is a professional and should be acknowledged appropriately for the service provided.

MENTAL ILLNESS PREVENTION AND MENTAL HEALTH PROMOTION

GENERAL

To lessen the incidence of mental disorders and to promote the achievement of self-actualization, competency and well-being are the two sides of the prevention–promotion coin.

Mental illness prevention attempts to set the stage for the realization of mental health by tackling the predisposing and precipitating factors of mental ill health. It addresses both the high-risk populations (predisposing factors) and the high-risk situations (precipitating factors, such as stress).

Mental health promotion seeks to stimulate and encourage the development of skills and attitudes conducive to positive mental health, and is thus more than just the avoidance of mental illness.

Widespread disorders affecting large numbers of people are practically never brought under control by attempts to treat each individual afflicted. Prevention and health promotion are theoretically much more cost-effective, although the results are not always as quickly apparent as in one-to-one treatment. Such approaches also often require social and environmental change that is not so readily accepted (e.g., changing child-rearing practices; providing sex education; eliminating poverty, discrimination, poor housing and unemployment; and "humanizing" social institutions).

Prevention in mental health cannot be as disease-specific as in physical health, with a few exceptions (*see "Preventable Psychiatric Disorders," below, this chapter*).

Certain conditions do not inevitably lead to specific mental disorders, except in the few cases noted. Prevention is often a "shot in the dark" in this sense. Health promotion, on the other hand, has a more tangible and identifiable target, namely the improvement or development of observable skills and behaviors identified as mentally healthy.

General strategies applied in preventing mental illness:

- case-finding through surveys, routine medical or developmental assessments, or other agency referral
- early psychosocial intervention
- prompt diagnosis and referral for treatment
- examination of the social and environmental correlates of mental illnesses and the psychosocial stressors
- provision of services and promotion of social and environmental change.

Both the prevention and health-promotion strategies of healthcare call for a change in caregiver attitudes concerning causation, away from an individualistic and individual pathology model and toward a more socially and community-oriented approach to causation and intervention.

Prevention and mental health promotion are best achieved by a coordinated network of services and agencies. Responsibility for mental health is ultimately diffused throughout the community, and the tasks of mental health workers are to convey this message to the community and to activate its members.

A caution should be observed in initiating any community program. No matter how apparently benign, any intervention that is powerful or comprehensive enough to produce beneficial outcomes may also produce undesirable side effects. Smaller, less ambitious interventions are perhaps safer if for no other reason than that their potential for harm is less.

PREVENTABLE PSYCHIATRIC DISORDERS

Genuine disease-specific prevention of mental disorders is recognized as possible in about five categories of disease, and this is true in part only because the causes are known in these instances.

Acute and Chronic Poisoning

- Acute poisoning: intentional or accidental ingestion of drugs, inhalants or solvents
- Chronic poisoning: prolonged exposure to industrial toxins or prolonged use of medications or addicting drugs
- Fetal poisoning by maternal use of alcohol or drugs

Preventive Measures

- Change in environment
- Change in lifestyle
- Change in healthcare system (storage of drugs; prescribing and dispensing practices)
- Reduction in exposure to industrial poisons
- Better safety standards and monitoring
- Better labeling of household and industrial poisons
- Establishment of poison control centers
- Public health education

Infections Damaging to Central Nervous System (CNS)

- Infection during fetal period (e.g., rubella, syphilis, toxoplasmosis)
- Infectious diseases during childhood (e.g., pertussis, influenza, measles, meningitis, mumps, tuberculosis)

Preventive Measures

- Good prenatal care
- Treatment of maternal infections
- Immunization

Genetically Transmitted Disorders

- Tay-Sachs disease
- Phenylketonuria
- Galactosemia
- Tuberous sclerosis
- Huntington's chorea

Preventive Measures

- Genetic counseling
- Screening and early detection
- Special diet (for phenylketonuria and galactosemia)

Nutritional Deficiencies

- Wernicke's encephalopathy
- Beriberi
- Kwashiorkor
- Pellagra
- Anorexia
- General nutritional deficiencies

Preventive Measures

- Dietary supplementation
- Nutritional education

Injuries and Systemic Disorders Affecting the CNS

- Injuries (e.g., falls, gunshot wounds, motor vehicle crashes)
- General systemic disorders (e.g., erythroblastosis fetalis, hyperthyroidism, cretinism, intracranial masses, toxemia of pregnancy, prematurity)

Preventive Measures

- Legislation affecting legal driving age, use of protective equipment (e.g., helmets), use of seatbelts, highway speed limits
- Improvements to industrial safety
- Legislation affecting gun control
- Public education promoting safe practices
- Early diagnosis and treatment (e.g., hyperthyroidism and intracranial masses)
- Good prenatal care

MENTAL HEALTH PROMOTION

General

Promoting mental health means enhancing the competencies and well-being of individuals, groups and communities. This concept differs from the traditional public health model of prevention, which distinguishes three spheres of intervention: primary and secondary prevention, which are designed to reduce the prevalence of a disorder, and tertiary prevention, which is aimed at reducing the severity of chronic disorders. Although this model has been effective in preventing a range of communicable and nutritional diseases, it has not been as successful in preventing mental and behavioral disorders.

The mental health promotion model is based on the premise that psychosocial stressors increase susceptibility to mental ill health but do not inevitably lead to a specific disorder.

Therefore, the goal of mental health promotion interventions is to improve the well-being and personal strengths of both at-risk and normal populations and to modify the social and environmental factors that impair mental health and well-being.

The target for an intervention may be individuals, groups or even systems.

Strategies for Promoting Mental Health

Promoting Natural Social Support Systems

Social support systems (relatives, friends) are effective buffers protecting the individual from the effects of external stressors, including personal loss, psychosocial transitions or crises. Their impact can be strengthened by systematic reinforcement through the following steps:

- Identify the high-risk populations (e.g., young mothers, unemployed men, recently divorced women, children of divorce and mentally handicapped children).
- Assess the informal or natural social resources potentially available.
- Identify the natural helpers: those who have or could learn the skill or competency and who have access to the at-risk population.
- Give them the necessary assistance, training and consultation support and continue to do so as long as necessary.

Enhancing Caregiver Competence

Increasing the skills and knowledge of professional and para-professional caregivers increases the probability that those individuals will positively affect the mental health of the broader population. This goal can be achieved through a variety of strategies, including case conferencing, inter-agency workshops, conferences, in-service training programs, sharing of audiovisual materials, study groups, "think-tanks," task forces and joint sponsorship of consultation or training sessions by experts.

Building Community Networks

The "competent community" is analogous to the competent, mentally healthy individual. There exists a sense of autonomy, control and self-worth. Insofar as mental health is concerned, this state is promoted through the development of community networks, which foster inter-agency cooperation, coordination of effort and community involvement in matters related to mental health.

Providing Mental Health Education

Mental health education seeks to assist the public and professionals to acquire the knowledge, skills and attitudes that will contribute directly to their own mental health and the mental health of others. It makes them more knowledgeable consumers of mental health (and related) services, as well as increasing their ability to provide care and support and to recognize mental health problems. It ultimately influences public policies that affect the mental health of individuals and groups in the community.

Program Consultation

Informed consultation, especially to human services agencies, can help create a more responsive system for addressing mental health problems and for promoting mental health. Schools, the courts, social welfare agencies, day-care services, senior citizen homes and the media are just some of the agencies that can have a powerful impact on an individual's immediate or eventual mental health. Consultation may be aimed at:

- increasing awareness of mental health concerns
- improving access to services
- encouraging mental health promotion activities within the agency (e.g., mental health programs in the schools)
- changing the system to meet the needs of the population served.

Insights into mental health problems gained from the health services perspective should be shared with other agencies, either formally or informally.

STRATEGIES FOR PREVENTION AND MENTAL HEALTH PROMOTION

Pre-School Child and Maternal Mental Health

Prenatal and postnatal care programs have been shown to significantly improve the health of both mother and child and to reduce the risk of a variety of mentally impairing disorders linked to the physical dimension of health (e.g., phenylketonuria and conditions affecting the brain), but such programs are also valuable for psychological phenomena such as bonding and postnatal maternal depression.

It is important to identify and intervene with children who are at risk or vulnerable because of a living situation that is hazardous to mental health, such as parental neglect, inadequate housing, lack of stimulation, or abusive parents or siblings.

Day care and "Moms' Groups" provide relief for mothers from child-care pressures and responsibilities and permit a natural exchange of mutual support and parenting skills between mothers.

Routine developmental assessment aims to identify children who are not maturing at a normal level (a variety of developmental spheres are examined, so that appropriate medical and other attention can be provided).

Children should have facilities and resources available for exercising their bodies, their creativity and their minds and for learning social skills.

Mental Health in the School

A number of affective and social education kits are available for teaching awareness, acceptance of feelings, attitudes, values and development of social and interpersonal skills.

Social and interpersonal problem-solving can be taught as a curriculum item. Numerous programs are available for the entire range of grades from kindergarten to high school. Children can be taught to:

- analyze interpersonal problems
- generate solutions for consideration
- determine suitable means of implementing a solution or achieving a goal
- recognize the consequences of the various alternative solutions.

There is often a correlation between academic problems and mental and behavioral disorders. Early identification and remediation of learning disabilities would help to prevent later development of problems related to low self-esteem, lack of confidence, and social or vocational deficiencies.

Programs can be developed specifically for high-risk students, who are often identifiable in the early school years.

Preventive programs may be child-focused, formal curriculum courses or may be implemented informally as opportunity presents. In either case, there is a need for programs of teacher training in affective education and social skills.

Parent–teacher study groups, teacher "think-tanks," peer tutoring and student self-help groups are innovative approaches that have been used for mental health promotion within the school.

Although their long-term effectiveness is yet to be solidly demonstrated, family life education, sex education, and alcohol and drug abuse programs in the school are presumed to have a preventive function.

Life Change and Crisis

Bereavement counseling aims at giving support, particularly to high-risk groups, such as parents who have experienced the death of a child and anyone whose spouse or parent has died. The latter situations (death of a spouse or parent) have been identified as factors increasing the risk of suicide either immediately, in the case of death of a spouse, or in later life, in the case of death of a parent.

Planning for retirement assists the individual to adjust to the many changes that take place upon retirement. Counseling themes include finances in retirement, use of leisure time, changing health, accommodations and changing relationships.

Divorce is a stressful time for the separating adults and the children involved. Children of divorce are known to have more mental health problems than children in intact marriages. Counseling to facilitate divorce and to support the children affected are both identified as valuable preventive programs.

Premarital and marriage enhancement courses or counseling prepare couples for stresses in marriage and encourage constructive problem-solving and mutual support.

Parenting courses are available in a number of forms and focus on various age groups of children. Parent support and self-help groups serve a similar function. In some programs, observation nurseries have been used to teach parents of preschoolers in a more immediate and practical fashion.

Programs aimed at preventing the sexual abuse of children have been developed for use in a variety of settings, including the school.

Single-parent counseling and self-help groups support the parent who must play usual roles while providing for his or her children.

Programs are available for children facing hospitalization and surgery. These programs reduce the stress of separation and the uncertainties and fears associated with entering hospital.

Distress phone-in lines or counseling services for people in acute crisis, such as suicidal or distraught individuals, prevent further breakdown of the person's ability to cope. Whether or not such services actually prevent suicide is uncertain; thus, suicide prevention should probably not be their main purpose.

Violence can be prevented through a number of strategies, beginning with intervention and services to the victims and offenders. These services include support, legal counseling, protection for victims and treatment for the offender. At another level, preventive efforts might address the inappropriate socialization that some children receive, the prosecution of offenders to underline society's disapproval, and the media, institutional, and public attitudes that support and encourage violence in general.

General Population

Stress management courses are often available through employers or community agencies and are purely preventive in intent.

Assertion training provides an opportunity to learn a social skill that significantly reduces stress and anxiety in interpersonal relations.

Mental health education raises the level of consciousness and helps the community and individuals to identify the mental health problems in their environments.

Community development programs mobilize the community itself, focus attention on services or mental health promotion, and often directly involve those who are at risk in the solution to what is or could be their problem.

MENTAL HEALTH ASSESSMENT

CLINICAL ASSESSMENT AND MANAGEMENT

GENERAL

The purpose of mental health assessment is to provide specific information about a client's behavior, thoughts and feelings and the relation of these factors to the client's background, experiences and present circumstances. It provides the database for describing, diagnosing and eventually treating problems. The information may be gathered from direct interviews with the client or fro m material provided by relatives or referring agencies.

HISTORY

Client Profile

General description of the client:

- Age
- Sex
- Ethnic origin
- Marital status
- Number and age of siblings or children
- Spouse or parents
- Living arrangements
- Occupation
- Education

History of Presenting Problem

Client's perception of problems in daily living.

Difficulties or changes in:

- relationships
- usual level of functioning
- behavior
- perceptions
- cognitive abilities

Increase in feelings of:

- depression, helplessness
- anxiety
- being overwhelmed
- suspiciousness
- confusion

Somatic changes:

- gastrointestinal
- insomnia
- lethargy, fatigue
- weight loss or gain, loss of appetite (anorexia)
- palpitations
- nausea, vomiting
- headaches

Integrative patterns and client's relations to:

- others
- self
- things and ideas
- present situation
- reality

Relevant History

Personal—Sketch of Life History

- Stays in hospital and illnesses
- Education
- Occupational background
- Social adjustment
- Sexual history
- Interests, hobbies, recreation
- Substance abuse
- Outstanding life events
- Suicidal, homicidal or violent behavior

Familial—Sketch of Family and Placement within Family

- Birth order
- Relationships with siblings
- Integrity of family unit
- Mental health of family members
- Perceived place within family
- Relationship with parents

CLINICAL EXAMINATION

Mental and Emotional Status

Appearance

- Physical condition and general health
- Dress
- Eye contact
- Posture
- Relatedness to interviewer

Behavior

- Motor activity
- General level
- Gait
- Gestures and mannerisms
- Awareness of environment

Speech

- Sound and volume
- Rate
- Barriers to communication

Mood

- Appropriateness
- Overall impression (e.g., depressed, anxious, angry, apprehensive, apathetic)
- Affect (and its appropriateness)
- Emotionality (dominant emotion, range of emotions, liability)

Thought Processes

- Quality
- Appropriate
- Tangential
- Concrete or abstract
- Flight of ideas (stereotypic)
- "Word salad," confusion
- Neologisms (words created by client)
- Confabulation (fabrication of events or facts due to memory impairment; not lying)
- Idiosyncratic or unusual word usage
- Cognitive ability: concept formation, level of intelligence, articulateness (precision, vocabulary level)
- General characteristics: speed of thought, spontaneity, flexibility or rigidity, distractibility, continuity, alertness, blocking (interruptions in train of thought), attention and retention

Thought Content

- Central themes
- Self-concept
- Insight and awareness
- Judgment
- Suicidal or homicidal ideation

Special Preoccupations

- Hallucinations (any modality)
- Delusions
- Illusions
- Depersonalization (one's reality is lost)
- Derealization (things do not seem real)
- Hypochondriacal
- Obsessions
- Rituals or compulsions
- Fears and phobias
- Sense of grandiosity or worthlessness
- Nihilism (the order of things has disappeared)
- Morbid thought
- Religiosity

Reality Orientation

- Knowledge of time, place, month and year
- Remote and recent memory
- Ability to distinguish between internal and external stimuli

Suicidal or Homicidal Risk

See "Suicidal Behavior," below, this chapter.

Evaluation and Interpretation

Determine need for emergency actions:

- Overt homicidal or violent impulses
- Potential suicide
- Inability to function

Identify strengths.

Make provisional diagnosis.

POSSIBLE GOALS OF TREATMENT

- Remove symptoms (e.g., reduce anxiety)
- Change attitude
- Change behavior (e.g., cessation of compulsive hand-washing, habit change, self-control)
- Develop insight (e.g., an understanding of one's motivation, the reasons for emotional response or the causes of disordered behavior)
- Improve interpersonal relationships (e.g., getting along with one's family, overcoming social anxiety or shyness, controlling anger)
- Improve personal efficiency (e.g., increase ability to accept responsibility, be productive)
- Improve social efficiency (e.g., improve ability to function socially within the community)
- Prevent and educate (e.g., increase ability to adapt and cope in the future)

TREATMENT METHODS

General

Apart from the physical and medical treatments provided to mental health clients, there are a number of psychological means by which medical and health personnel can influence a client's behavior in a therapeutic manner. The goal of this psychosocial influence may be to:

- directly affect emotional response in the client (e.g., relaxation training, reassurance, confrontation)
- change the client's self-perceptions (e.g., by challenging unrealistic beliefs or faulty reasoning or through vocational counseling)
- provide an opportunity for learning new coping or self-enhancing (confidence-building) skills (e.g., vocational rehabilitation, assertiveness training, social skills training) or parenting skills
- directly teach new behaviors to replace or counter the maladaptive ones (e.g., systematic desensitization for phobias, training in anger management or other forms of self-control).

Means of Influence

Providing "Expert" Testimony

Communications from an individual recognized by the client as having special knowledge or expertise:

- "naming" the disorder
- providing feedback
- assisting the client to reflect on, interpret and confront the problem(s)
- evaluating the situation

Providing "Expert" Directions

Getting the client to do something through one or more of the following means:

- verbal instructions
- orders
- recommendations
- suggestions
- limit -setting
- policy statements
- permission

Expert "Placebo Effect"

Persuasion and influence through personal qualities of the helper:

- caring and compassion
- manner
- confidence
- warmth
- genuineness
- empathy

Modeling

Providing an appropriate example or model of the desired behavior. This may require guided practice by the patient under optimal, non-threatening conditions (e.g., as in treatment of phobias, social anxiety or lack of assertiveness).

Basic Learning Principles

Systematic use of positive reinforcement, extinction, punishment and other learning principles to increase or decrease behaviors.

Prior Practicing

Role playing and rehearsal of desired behavior.

Environmental Restructuring

Establishing or altering either the physical or the social environment so as to permit or encourage a desired change in behavior.

Human Services and Resources Coordination

Referring clients to other professionals or bringing them into contact with a wider variety of resources.

Mobilizing the Client's Own Resources

Creating internal states that are conducive to behavior change (e.g., sleep, rest, deep muscle relaxation, nutrition, fitness).

Patient Evacuation

See "Hospitalization and Medical Evacuation," under "Psychotic Disorders," below, this chapter.

Involuntary Admission

See "Involuntary Admission," under "Psychotic Disorders," below, this chapter.

RECORDS AND CONFIDENTIALITY

General

Medical records and information about medical and psychosocial interventions for mental health problems require the utmost care to ensure confidentiality. In many cases these records contain personal information of the same degree of sensitivity as pertains to such medicosocial problems as abortion, venereal disease, unplanned births, addictions and forensic examinations.

These records should be treated with great care. Medical and psychiatric information should not be shared with family (including spouse or children), friends or other healthcare professionals unless the client has provided informed consent, preferably in writing (Form 14 for mental health information).

There are a number of respects in which breaching the confidentiality of mental health records can be particularly damaging.

- Clients presenting with mental health problems are more vulnerable to public embarrassment and to the prejudices and biases of others, including employers.
- Because of the personal and social nature of mental health problems, disclosure may have an impact on others besides the client involved.
- Legal issues may be involved, and the client may be compromised.
- Disclosure would undermine public confidence in the service, the personnel and the agency.
- Some clients, because of personality disorders or mental illness, are more likely to try to gain access to information or to misuse anything learned.

Guidelines

Doctor–client or nurse–client "privileged communication" does not exist in Canada. All medical personnel are required by law to give evidence if subpoenaed for that purpose.

There is no clear statement in common law with regard to breach of confidentiality, which means that each case would be contested on the basis of principles other than common law precedent.

Confidentiality of a client's medical records or the purpose and content of any medical intervention (even the fact that the client has been seen) is guaranteed under the *Privacy Act of Canada*. If any voluntary disclosure is made without the client's consent, such as reporting a criminal offence, the Commissioner of the Privacy Act must be notified in writing and the Commissioner may choose to disclose the informant's name to the client.

There is no requirement under the law to report the commission of an offence or the intent to commit an offence. Such a decision must be based on ethical and moral principles, such as the safety of individuals, including the client, especially where the potential exists for homicide, suicide or physical assault. It is advisable to get a second opinion in such cases by consulting an experienced professional, discussing the alternatives and clarifying the facts and principles that will guide your decision.

The *Access to Information Act* permits clients to have copies of their medical records, but the director of an institution or program may refuse to disclose the records if it is deemed to be not in the best interest of the individual.

No written or verbal information regarding a client should be given to any individual, including the police, without either the written consent of the client or presentation of a subpoena.

Information requested by human services agencies having legal guardianship of a child may be granted without consent of the natural parents.

All material in client records is the permanent property of First Nations and Inuit Branch, Health Canada. Requests by a client for copies of or access to such records should be in writing and should be directed to the responsible managerial level.

Deliberate or unwarranted violation of patient confidentiality is subject to disciplinary action up to and including summary dismissal for cause.

In many jurisdictions, legislation requires disclosure of certain offences or suspected offences. For example, child abuse must be reported in all of the provinces and territories.

Age of Consent

Minors are those under the legal age to give consent for treatment. The age at which consent can be legally given varies from province to province and is usually between 16 and 20 years. It is advisable for the nurse to review the relevant age-of-consent legislation for the province or territory of employment.

The issue of age of consent is of concern in the delivery of mental health services because, technically, it can affect the availability of confidential mental health consultation and treatment to someone deemed not medically competent. For example, must the parent or guardian of a minor be advised of the request for service? Should the parent or guardian have access to records or information pertaining to the contact? Is parental consent required to accept a minor for counseling or treatment?

In the absence of firm guidelines, general principles might be taken from a statement on age of consent for use by physicians:

- Clients ≥ 16 years of age should be entitled to consent to their own surgical, medical or dental treatment.
- Clients < 16 years of age should be able to consent to their own treatment only if the physician has ascertained that the client is able to understand and appreciate the nature and consequences of the proposed procedure.
- In cases in which physicians have decided that a client < 16 years of age has the maturity and ability to understand the consequences of the proposed procedure, and thus may give consent to his or her own treatment, the physicians are advised to prepare written notes to substantiate this decision.
- Special protection must be provided for minors, regardless of whether they have reached 16 years of age, whose physical or mental disability precludes their having the capacity to consent to treatment.

A decision about ability to give consent is also based on the providers' assessment of the client's competence to understand the issues and implications of the illness or situation and the consequences of treating or not treating.

Maintaining Confidentiality

As with all medical records, vigilance must be exercised to ensure that confidentiality is not breached, whether deliberately or accidentally.

Medical charts should be in secure storage when not in use.

Care should be taken that documents of any sort that could identify a client as having a mental health problem, or any information related to that fact, are not within view of the public, other clients or staff not directly concerned with the client in question. Even appointment calendars can be inadvertently disclosing.

Anyone who inquires about a mental health client should be politely refused any information, unless disclosure of the information is authorized by the client.

Telephone conversations with respect to a client should be conducted where they will not be heard. Similarly, client interviews or consultations should be held in private.

When some risk exists to a client (or to others) and the family is providing for the safety and security of the client, the facts necessary to reduce the risk should be disclosed. No more information than is necessary should be volunteered without the client's knowledge.

COMMON MENTAL HEALTH AND PSYCHIATRIC PROBLEMS

VIOLENT OR ACUTELY AGITATED PSYCHIATRIC CLIENTS

Most psychiatric clients are not particularly dangerous or violent. However, clients with the following conditions may demonstrate violent behavior:

- Personality disorders
- Substance abuse
- Organic brain disorders or states with impaired impulse control
- Acute-phase manic disorders
- Paranoid psychotic disorders
- Organic functional disorders in which delusions or hallucinations are present

When clients behave violently, the behavior is often unpredictable and irrational, since it is a product of the client's psychopathology. The true source of anger may not be apparent and actions may be illogical, as in the case of persecutory delusions, or actions may be abrupt and unexpected, as in hallucinatory states.

CAUSES

The causes of violence in mentally ill clients are the same as in those without mental illness:

- Fear
- Frustration
- Disappointment
- Feelings of inferiority
- Invasion of personal space
- Loss of self-esteem
- Feelings of humiliation
- Defense against a perceived threat (real or imaginary)

DIFFERENTIAL DIAGNOSIS OF POTENTIAL UNDERLYING DISORDERS

Functional Psychoses

Functional psychoses may be related to:

- Bipolar disorder
- Schizophrenic disorder
- Brief reaction psychoses

Toxic Psychoses

- Alcohol intoxication
- Stimulant intoxication
- Hallucinogenic intoxication
- PCP (phencyclidine) intoxication

Withdrawal Delirium

- Alcohol
- Other chemical substance

Personality Disorders

- Borderline
- Paranoid
- Histrionic
- Antisocial

Disorders of Impulse

- Explosive disorder
- Control

Organic Disorders

- Acute brain syndrome
- Chronic brain syndrome
- Dementia
- Delirium

MANAGEMENT

These guidelines for the management of violence assume that the violent person is a bona fide psychiatric or medical patient. In some cases, the individual may have a personality disorder for which emergency treatment is not possible or appropriate. In this situation, the violence is best viewed as a matter for the police.

Ultimately, you must use your own judgment to determine if and when to intervene with a potentially violent patient. Trust your feelings and judgment. If you feel threatened, act accordingly.

Goals of Treatment

In order of priority:

- Protect yourself, others and the client
- Avoid or minimize an outburst of physical violence
- Recognize and reduce anxiety and fear in the client

Appropriate Consultation

Whenever possible, medical consultation and assistance should be sought in dealing with violent clients. When circumstances make this impossible at the critical moment, the physician should be consulted as soon as possible afterward to discuss the action taken and the choice and dosage of any medication given. The correct diagnosis is very important in the case of the violent client, and a consultation is an essential part of the management procedure.

Nonpharmacologic Interventions

Prevention

Consider creating a crisis protocol in advance:

- If circumstances permit, call for assistance before becoming involved with the client.
- Know how to use approved physical interventions to restrain the client or defend yourself.
- Be familiar with escape routes that you might need.
- Keep potential weapons (e.g., scissors, scalpels, letter openers) out of reach of clients.

Whenever possible, try to predict and prepare for the disturbed behavior by noting the following:

- Changes in the client's personality
- Indicators such as increasing verbal aggression, postural tension, facial expression, tone of voice and belligerence
- Any previous history of violence, assaultive, homicidal or suicidal behavior, or threats to kill or injure self or others
- State of intoxication or impairment by drugs or history of substance abuse
- Extreme agitation, fearfulness or pacing
- Any record of interventions or actions that have been effective for managing the client in the past

Anticipating and preventing violent behavior is always the best strategy.

Acute Situation: General Guidelines for Management

If you are concerned, try not to see the client alone and avoid standing too close to the client, as this may be perceived as a violation of personal space and add to the problem. Keep the door open and ensure that both you and the client have an unobstructed path to the door, so that either of you can escape from the room if the situation is perceived as dangerous.

Do not see the client if he or she has a weapon of any sort. Call for assistance.

Do not hesitate to call the police if the client becomes too threatening.

Do not argue with or otherwise threaten the client's self-esteem.

Do not threaten to use force unless it is immediately available.

Approach the client calmly and quietly, in a professional, confident and friendly manner. Be as relaxed and reassuring as possible.

Use non-verbal methods to control the client as much as possible, for example, through careful use of "personal space" boundaries, firmness, tone of voice and eye contact. Care must be exercised to observe and judge the effects of these actions, since what may be psychologically subduing or calming to one client may be provocative to another. Attempts to "talk a client down" may even increase some clients' agitation.

Show interest in the client's complaint, fear or suspicion. Acknowledge it, but do not agree or disagree. Indicate that your purpose is to try to help the client deal with the problem.

Attempt to determine the reason for the anger or violence and respond accordingly. Watch for signs of organic brain disorder, substance abuse, suicide attempts (e.g., scars on wrists) or fighting and for evidence of a weapon.

Do not respond to anger with anger: approach the situation with a non-threatening, non-punitive and non-judgmental attitude. Do not take personally or respond to insults or abusive language.

Physical Restraints

Involuntary restraint and involuntary hospitalization are covered under the respective ordinances of the province and territories. These pieces of legislation should be referred to and their implications clearly understood. To restrain someone or to force them to involuntarily undergo treatment in ways other than provided for by legislation can lead to civil litigation and criminal assault charges.

If medication is contraindicated, inappropriate or insufficient, and physical restraints are deemed necessary:

- Use restraints as a last resort when a client cannot be controlled by verbal or non-verbal communication and is a threat to himself or herself or others or is destructive of property.
- Inform the client of your intentions, explaining that the restraints will be applied because the client is unable to control himself or herself.
- To ensure your safety and the safety of the client, three or more people are needed. The mere *show* of force may prove sufficient to allow the client to calm down without the *use* of force.
- Explain the procedure in advance and continue talking reassuringly to the client throughout.
- Have a clear plan of action. Decide who will do what and, if possible, assign at least one person to each limb.

- Remove glasses, watches, jewelry or anything else that might be used as a weapon or could cause accidental injury.
- If the client is armed with a potential weapon, defend yourself with objects (e.g., hold a mattress in front of you or throw a blanket over the client).
- Place the client face down, if possible, as the range of motion is limited in this position; otherwise, keep the client off balance.
- Do not count on your own strength equaling that of the client. A disturbed, violent person can be surprisingly strong.
- Place one limb at a time into restraints.
- Ensure that the restraints are snug enough to hold the client, but not so tight as to cause injury or cut off circulation.
- Beware of being bitten.
- Remain aware of your own feelings throughout. Violent psychiatric clients may not know who you are or where they are. They may be terrified and have no definite target for their rage. Above all, do not respond with anger or take personally what the unstable person may do or say to you. Remember as well that the unstable person is quite likely to remember what was said during an outburst of this sort. Unprofessional language or conduct is inappropriate at any time.

Types of Restraints and Their Application

Leather wrist and ankle restraints are preferred to body restraint with a Posey jacket because of the danger of strangulation with the latter. Leather wrist and ankle restraints:

- are easy to apply
- require three or more people to place them
- should be applied with the client in a face-down position.

Restrain the client's arms at his or her sides and secure the tie-ends to the stretcher or bed. Restrain the legs straight out, and beware of being kicked.

Pharmacologic Interventions

If it is deemed in the client's best interest because he or she is at risk of injuring self, others or property, or is likely to leave the premises before adequate treatment, chemical sedation should be considered. *If possible, consult a physician first. Otherwise, give*:

lorazepam (Ativan) (**D class drug**), 1 mg PO or 1–2 mg IM

Do not use benzodiazepines such as lorazepam in a person acutely intoxicated with alcohol, as these drugs are additive for respiratory depression.

Monitoring of a Client Who is Medicated or Restrained

After Restraints Are Applied

- Check distal circulation frequently.
- Remove any remaining potentially dangerous items from the client, including jewelry, glasses, belt, shoes, matches and contents of pockets.
- Examine client for weapons concealed in the hands (e.g., small, sharp objects such as broken glass, which may have been grabbed during application of the restraints).
- Evaluate regularly the need for hydration, nutrition and elimination.
- Provide assistance with personal hygiene and grooming.

Other Aspects of Monitoring

Watch for side effects of psychotropic medications and explain them to the client.

Evaluate the client's self-control and capacity for appropriate behavior on a continuing basis.

Remove restraints when the person is sedated or calmed.

Remove the restraints one limb at a time, using the same precautions as when they were applied.

Watch for flare-ups of violent behavior.

If a secure room is used for confining a violent person after removal of restraints:

- Exit the room with the same care as you would use in approaching the client.
- Do not let the client get between you and the door.
- Never enter alone.
- Visit frequently to provide human contact and reality testing.
- Always announce your intentions when you enter the room.
- Be cautious with utensils and hot liquids when serving meals.
- Do not leave potentially dangerous items in the room.

Referral: Hospitalization and Medical Evacuation

The decision as to whether to admit to a local hospital, treat on an outpatient basis or evacuate to a psychiatric hospital depends on several factors and should, of course, be made in consultation with the best qualified available physician, preferably a psychiatrist.

ALCOHOL WITHDRAWAL

DEFINITION

Syndrome experienced after cessation of or reduction in alcohol ingestion by a person who has been drinking for several days or longer. Most alcohol-dependent individuals experience their first withdrawal symptoms after 10–15 years of alcohol abuse. Symptoms begin within 3–6 hours after cessation or reduction in drinking and may last 2–3 days. Malnutrition, fatigue, depression or physical illness may aggravate the symptoms.

Symptoms include coarse tremor of hands, tongue and eyelids and at least one of the following:

- Nausea and vomiting
- Malaise or weakness
- Autonomic hyperactivity (tachycardia, sweating, elevated blood pressure)
- Anxiety
- Depressed mood or irritability
- Orthostatic hypotension

ASSOCIATED SYMPTOMS

- Headache and dry mouth
- Complexion often puffy and blotchy
- May have mild peripheral edema
- Gastritis
- Fitful sleep
- Misperceptions and illusions
- Brief, poorly formed hallucinations (in any modality) may be experienced

Major motor seizures occur in 5% to 10% of cases of alcohol withdrawal (usually one or two grand mal seizures in the first 48 hours).

People with a history of epilepsy are likely to experience withdrawal seizures.

The symptoms of alcohol withdrawal may progress to delirium tremens (*see "Alcohol Withdrawal Delirium," next section, this chapter*)

MANAGEMENT

Consultation

If possible, consult a physician before instituting medications.

Nonpharmacologic Interventions

- Increased rest
- Hydration and nutrition: high-protein, high-carbohydrate diet and adequate fluid intake
- For client with moderate-to-severe symptoms, IV therapy with normal saline may be necessary, depending on the severity of symptoms and dehydration; adjust rate appropriately to correct or prevent dehydration (*for details, see "Dehydration (Hypovolemia)," in chapter 5, "Gastrointestinal System")*

Psychological Support for Client with Moderate-to-Severe Symptoms

- Calm, firm direction in response to demanding or volatile patient (*see "Violent or Acutely Agitated Psychiatric Clients," previous section, this chapter*)
- Presence of a supportive person helps to decrease anxiety and agitation and increase safety
- Diversionary activities and conversation help to direct attention away from symptoms
- Quiet, calm environment decreases irritability and promotes rest
- Respond to hallucinations and misperceptions by reassuring the client of reality and identifying misperceptions as symptoms of withdrawal; avoid arguing with or validating misperceptions

Pharmacologic Interventions

Mild Symptoms

Sedation as needed:

chlordiazepoxide (Librium) (**D class drug**), 10 mg PO

or

lorazepam (Ativan) (**D class drug**), 1 mg SL

Moderate-to-Severe Symptoms

Treatment with medication on an outpatient basis is complicated by the danger of the alcohol abuser mixing alcohol with the medication or indiscriminately "sharing" the drugs with other community members. Discretion should be used unless the client can be closely monitored.

chlordiazepoxide (Librium) (**D class drug**), 25 mg PO (three doses on average)

thiamine (Betaxin) (**D class drug**), 100 mg IM od for 3 days

Monitoring and Follow-Up

Monitor for seizure activity.

Referral

Medevac. Detoxification should take place in a supervised setting to monitor medication use (if medication is used), maximize safety and observe for signs of withdrawal seizures or delirium tremens (*see "Alcohol Withdrawal Delirium," next section, this chapter*).

ALCOHOL WITHDRAWAL DELIRIUM

Alcohol withdrawal delirium is also known as "delirium tremens" or "the DTs."

This condition can be differentiated from alcohol withdrawal by the presence of symptoms of delirium (*see also "Alcohol Withdrawal," previous section, this chapter*).

This condition should be regarded as a medical emergency.

DEFINITION

An acute, potentially life-threatening, organic, psychotic reaction involving delirium. The cause involves the cumulative toxic effects of excessive alcohol intake and chronic nutritional deficiencies over an extended period (5–15 years). The most common precipitating factor is cessation or reduction in drinking, although the condition may also result from acute infection or injury, dehydration or emotional trauma in a person who continues to drink.

COURSE

Onset usually occurs the second or third day after cessation or reduction in drinking, although it occasionally occurs earlier.

Clinical features develop over a short period and fluctuate over the course of a day. Exacerbations often occur at night.

The condition usually runs its course in 2–5 days but may persist for several weeks depending on premorbid personality, physical condition, severity of complications, and promptness and thoroughness of treatment.

SIGNS AND SYMPTOMS

- Autonomic hyperactivity: tachycardia, sweating and elevated blood pressure
- Fever may be present

Delirium

- Clouded consciousness (reduced awareness of environment), disorientation, confusion, distractibility
- Memory disturbances, amnesia for period of DTs
- Perceptual disturbances: illusions, delusions and hallucinations, usually of a disturbing nature
- Hallucinations are usually visual but may involve any of the senses; often suggestible (e.g., client may accept imaginary drinks)
- Restlessness, agitation, irritability, anxiety; may reach state of panic (or may exhibit opposite extreme, with psychomotor retardation)
- Speech disjointed and incoherent at times; speech may be pressured or retarded
- Sleep–wakefulness cycle disrupted
- Coarse, irregular tremor, especially of hands
- Emotional disturbances: fear, anxiety, depression, anger, euphoria and emotional lability
- May become self-destructive
- Seizures (grand mal): always *precede* the development of delirium

MANAGEMENT

Assess and stabilize ABC (airway, breathing and circulation) and treat presenting seizures first, as necessary (*see "Status Epilepticus (Acute Grand Mal Seizure)," in chapter 8, "Central Nervous System"*)

Appropriate Consultation

Consult a physician as soon as you are able to do so.

Nonpharmacologic Interventions

Hydration and Nutrition

- Encourage high fluid intake if client is alert and airway and gag refle x are patent.
- Start IV therapy with normal saline, if necessary.
- Adjust rate according to level of hydration.
- Give high-protein, high-carbohydrate, low-fat diet (in frequent small meals).

Encourage Orientation

- Keep room well lighted to avoid misinterpretation of shadows (use a night light after dark).
- Explain to client where he or she is and what is happening.
- The presence of a familiar environment or person is often helpful.

Decrease Anxiety

- Speak in a calm, firm manner.
- Allow the client some control over environment by permitting movement and actions within safe limits.
- Offer gentle reassurances and direction; give advance warning of any nursing intervention.
- Minimize stimulation in environment (the area should be quiet and uncluttered, away from outside activities).

Hallucinations, Delusions, Illusions

- Avoid arguing about misperceptions, but also avoid validating or supporting them.
- Gently reassure client of your reality, but don't expect acceptance of this.
- Forewarn client before touching him or her; the client may be startled and frightened by your touch and may lash out to protect himself or herself.
- Be aware that the client will respond to delusions and hallucinations as if they were real.
- Avoid low-voiced conversations within earshot of the client, as he or she may misinterpret them in a paranoid way. If you are frightened by the client, seek assistance, as clients are often sensitive to your fears and anxieties.

Rest

- Provide a calm, quiet environment.
- Sedate early; avoid allowing agitation to reach crisis level.
- Prohibit visitors other than calming friends or family members.
- Sponging and back rubs can be used to induce relaxation.

Safety

- Continuous supervision.
- Restrain physically only when absolutely necessary (*see information about use of physical restraints in "Violent or Acutely Agitated Psychiatric Clients," above, this chapter*).
- Remove dangerous objects.
- Use a calm, firm approach.
- Seek assistance if problems arise; even when delirious, the client will often respond to a show of strength.

Pharmacologic Interventions

Sedatives:

chlordiazepoxide (Librium) (**D class drug**), 25 mg PO

or

diazepam (Valium) (**D class drug**), 5–10 mg IV

or

diazepam (Valium) (**B class drug**), oral administration (after consultation with physician)

For hallucinations and delusions, consult physician for:

haloperidol (Haldol) (**B class drug**), 2–5 mg IM q4–8h prn

and

thiamine (Betaxin) (**D class drug**), 100 mg IM od for 3 days

Monitoring and Follow-Up

- Client is often in poor physical condition and may require treatment of concomitant health problems
- Maintain record of vital signs q15min until stable
- Monitor hourly intake and output; care must be taken not to overload the system
- Keep client under careful observation—*see "Violent or Acutely Agitated Psychiatric Clients," above, this chapter*
- The client is at risk of impulsive destructive behavior because of anxiety, impaired judgment and disorientation

Referral

Medevac. Hospitalization is recommended to ensure safety and supervision, full medical management and avoidance of further alcohol consumption.

AFFECTIVE DISORDERS

DEFINITION

A disturbance of moods, usually recurrent, in which either a full or partial manic episode or a major depressive syndrome (not due to other physical or mental disorder) is present.

TYPES

Bipolar disorder: the full characteristic syndrome, either mania or depression, is present

Major depression

Other and atypical affective disorders: the syndrome is only partially present or is atypical in terms of severity or duration

- Schizoaffective disorder
- Dysthymic disorder (depressive neurosis)

CRITERIA FOR MANIC EPISODE

One or more periods of predominantly elevated, expansive or irritable mood (the so-called "high"), lasting at least 1 week.

Presence of three or more of the following signs and symptoms:

- Hyperactivity, restlessness, excessive participation in multiple activities, increased activity (work, social, sexual)
- Pressure of speech (unusually talkative and apparently unable to control it); speech loud, rapid and difficult to interpret
- Flight of ideas (thoughts racing and changing quickly, loose associations)
- Inflated self-esteem, grandiosity (may be delusional)
- Decreased need for sleep; excessive energy
- Distractibility (evident in speech or activity)
- Poor judgment (e.g., buying sprees, sexual indiscretions, reckless investment, behavior that is out of character)

Neither bizarre behavior nor delusions or hallucinations are present in the premorbid condition or after remission.

The disorder is not due to any organic mental disorder, such as substance intoxication or multiple sclerosis.

CRITERIA FOR MAJOR DEPRESSION

At least one episode of dysphoric mood and/or loss of interest or pleasure in all or almost all usual activities and pastimes, sufficient to disturb normal function or to cause distress. Dysphoric mood is characterized by depression, sadness, hopelessness and irritability. The mood disturbance must be prominent, pervasive and relatively persistent.

At least five of the following symptoms present nearly every day for a period of at least 2 weeks:

- Change in appetite or weight (increase or decrease)
- Insomnia at any stage of sleep but especially in morning
- Increased sleeping (hypersomnia)
- Psychomotor agitation (inability to sit still, pacing, hand-wringing) or retardation (slowed speech, long pauses before answering, low or monotonous speech, slowed body movements, decreased amount of speech)
- Loss of interest or pleasure in sex, decrease in libido
- Loss of energy
- Fatigue
- Feelings of worthlessness, self-reproach, or excessive or inappropriate guilt (may be of delusional nature and proportions)
- Complaints or evidence of diminished ability to think or concentrate (slowed thinking, indecisiveness) and recurrent thoughts of death, suicidal ideation, wishes to be dead or suicide attempt

Absence of bizarre behavior and inappropriate mood (mood inconsistent with content of delusions or hallucinations).

Not due to or superimposed on schizophrenia, paranoid disorders, organic mental disorder, uncomplicated bereavement, infectious disease, hypothyroidism, substances such as reserpine, alcohol dependence or other chronic mental disorder.

Severity and duration must be sufficient to warrant label of "major" depression, as distinct from more chronic, less severe, periodic mood disorders (*see "Dysthymic Disorder (Depressive Neurosis)," below, this section*).

Age Considerations in Depression

Prepubertal Children

- Mood disorder may be inferred from behavior (withdrawn posture, facial expression)
- Mood should have persisted for 3–4 weeks
- Child may fail to gain expected weight rather than losing weight
- Psychomotor retardation may appear as hypoactivity (underactive)
- Mood change may appear as apathy, loneliness, sullenness, irritability, crying

Adolescent Children

- Negativistic or frankly antisocial behavior may appear as an equivalent of mood disorder
- Sulkiness, withdrawal from family and social activities, and retreat to his or her room are frequent
- Loss of self-confidence, loss of interest, somatic complaints, and expression of unhappiness or hopelessness are common in both adults and adolescents
- School difficulties are common
- May be particularly sensitive to rejection

Elderly Adults

- Disorientation, memory loss, distractibility, apathy and difficulty in concentrating may be signs of dementia or major depression
- In doubtful cases, treat as depression and consider failure to respond as further evidence of the alternative diagnosis

BIPOLAR DISORDERS

A bipolar disorder is a major effective disorder that may present as predominantly manic, predominantly depressed or mixed.

Prevalence

- Bipolar disorder occurs in less than 2% of the general population
- The sex distribution is equal for bipolar disorder
- The course of bipolar major affective disorders is variable
- Episodes may be separated by many years of normal functioning
- Episodes may occur in clusters
- In 20% to 35% of cases there is chronic impairment of social and occupational functioning
- Episodes frequently follow a psychosocial stressor

History

- Client has had one or more manic episodes
- Current condition, if depressed, meets criteria for a major depressive episode

Age at Onset

- First manic episode usually occurs before age 30, second episodes cluster around age 50
- Major depression may occur at any age, including childhood

Course of Manic Episodes

- Episodes typically begin suddenly
- Rapid escalation over a few days
- Duration from a few days to months
- Most individuals experiencing manic episodes will eventually have a major depressive episode
- Initial episode in bipolar disorder is often manic

Course of Depressive Episodes

- Onset is variable
- Symptoms develop over a period of days to weeks but may occur suddenly
- Prodromal symptoms (anxiety, phobias, mild depression) may occur over a longer period
- Approximately half of all individuals experiencing a major depressive episode will have a recurrence

DYSTHYMIC DISORDER (DEPRESSIVE NEUROSIS)

Definition

Chronic disturbance of mood involving either depressed mood or loss of interest or pleasure; not of sufficient severity or duration to meet criteria for a major depressive episode.

Prevalence

- Common, perhaps affecting up to 25% of general population at some time in their lives to a degree warranting clinical aid
- In adult population, more common in females; sex ratio equal in children and adolescents

Criteria for Dysthymic Disorder

Presence of depressed mood more often than not, with symptoms characteristic of depression syndrome but not as severe as major depressive episode.

Duration of 2 years, relatively persistent or intermittent, and may be separated by normal periods lasting up to a few weeks but not more than a few months at a time.

In children and adolescents, duration of 1 year.

During the periods of depression, at least two of the following symptoms are present:

- Insomnia or hypersomnia
- Low energy level or chronic tiredness
- Feelings of inadequacy, loss of self-esteem or self-depreciation
- Decreased effectiveness or productivity at school, work or home
- Difficulty with concentration or difficulty in thinking clearly
- Social withdrawal
- Loss of interest in or enjoyment of pleasurable activities
- Irritability or excessive anger
- Inability to respond with pleasure to praise or rewards
- Less active than usual; pessimistic, brooding, feeling sorry for self
- Fearfulness or crying
- Recurrent thoughts of death or suicide

Absence of psychotic features, such as delusions, hallucination, incoherence or loosening of thought associations.

The depressed mood is clearly distinguishable from the individual's usual mood by virtue of its intensity or effect on functioning.

May be superimposed upon or secondary to chronic mental disorder, personality disorder or organic mental disorder.

History

Age at Onset

- Usually begins in early adult life
- May begin at any age
- May follow an episode of major depression

Course of Dysthymic Disorder

- Usually no clear onset
- Has a chronic course

OTHER DISORDERS IN WHICH DEPRESSION IS PRESENT

Unhappiness, fearfulness and hopelessness can appear as symptoms in a number of mental disorders, as well as in healthy people undergoing periods of stress. Whether the symptoms constitute a genuine mental disorder is in part determined by the severity, duration and resulting degree of impairment.

Uncomplicated Bereavement

- Signs and symptoms of a full depressive syndrome may be present
- Guilt, if present, is chiefly about things done or not done by the survivor
- The survivor may wish that he or she had died with the deceased
- The survivor regards the depressed mood as normal
- The reaction may be delayed but rarely occurs later than the first 2 or 3 months after the death
- The duration of "normal" bereavement varies considerably among different cultural and subcultural groups; abnormally long, intense or debilitating bereavement is viewed as such by others of the same group
- Morbid preoccupation with worthlessness, prolonged and marked functional impairment, and marked psychomotor retardation suggest major depression rather than single bereavement

Management

Describe for the bereaved the frequently observed or expected stages of bereavement: anger, despair, guilt, depression, acceptance.

Allow time to grieve and do not force acceptance of the death, which may take 1 or 2 years to be fully achieved. The person should be permitted and even encouraged to talk about the death and feelings related to it.

Members of the family can be expected to go through the grieving process at different rates, and will have certain reactions to that fact. They may be upset by each other or may attempt to protect each other from the unhappy feeling. Some members may feel guilt with regard to loving or enjoying other people or having fun while other members of the family are still grieving.

The person may be experiencing guilt over a number of things, including past unresolved issues, being a survivor or experiencing enjoyment. Similarly, anger is a common reaction, because life goes on for others.

There is a tendency to idealize the deceased person, which may create problems for other family members, particularly the surviving parent, who may be unfavorably compared with the deceased.

The bereaved person often becomes suddenly aware of his or her own mortality, which heightens any sense of insecurity.

The bereaved person could be forewarned of the "anniversary phenomenon," in which the loss is re-experienced 1 year later. This is a normal experience and can be used to deal with unresolved grief in a constructive way.

The belief systems of the person with respect to life after death should not be challenged, nor should the person be persuaded toward any particular belief. The person should simply be supported in his or her beliefs if they provide comfort and support.

Adjustment Disorder with Depressed Mood

- Identifiable psychosocial stressor occurred within 3 months of onset of disorder
- Maladaptive reaction consists of impairment of social or occupational functioning or symptoms in excess of the normal and expected reaction to the stressor
- Disturbance is not part of a pattern of such disturbances
- Disturbance eventually remits after the stressor ceases

Management

Supportive counseling, including:

- Explanation of the reaction for the individual, stressing its transient nature
- Mobilization of natural supports (family, friends)
- Encouragement of a realistic sense of competency
- Mobilization of the individual's personal resources and strengths

Evaluation of suicide potential (*see "Suicidal Behavior," below, this chapter*)

MANAGEMENT OF AFFECTIVE DISORDERS

Manic Phase (Bipolar Disorder)

Nonpharmacologic Interventions

Management of clients in the manic phase of an affective disorder is usually difficult, trying and stressful for everyone involved: the client, the family and the helping professional. Manic clients seldom have insight into the mood disturbance and feel better than ever. They resent the idea that they need treatment, particularly any treatment that includes bringing them down from the "high" and placing external controls on their movements.

The manic client is usually coerced into attending a healthcare professional by family or police officers and is usually hostile, agitated and perhaps belligerent. The client will attempt to tone down the feelings of excitement and grandiosity in order to appear normal and will rationalize or deny symptomatic behavior. The history presented by family or others should be given considerable weight in making a diagnosis and deciding about treatment and management.

The basis of management is sensitivity and firmness. The helping person should be sensitive to the fact that the client is frightened and will do almost anything to defend against attacks, whether real or imagined, on his or her self-esteem.

Avoid reacting to the client's defensive assaults. The professional should recognize the source of the client's anger, be concerned and respond calmly. Such a response will reassure the client that there is no need to fear counterattack by the professional.

The professional's firmness indicates to the client that external controls will be used if the client is unable to exercise restraint or is overwhelmed by impulses. The client may respond by testing the professional's determination.

In the initial stages of management, it is often necessary to employ the services of other staff or police officers, who would be capable of subduing and restraining the client. Do not hesitate to call for reinforcements. (*See "Violent or Acutely Agitated Psychiatric Clients," above, this chapter*.)

Appropriate Consultation

If possible, consult a physician before giving any medication.

Pharmacologic Interventions

Medication is essential to control the disordered behavior, to alleviate stress and to treat the underlying disorder. Initial treatment is with a major tranquilizer:

lorazepam (Ativan) (**D class drug**), 1 mg SL or 2–4 mg IM

In severe cases, neuroleptic tranquilizers may be necessary (*but you must consult with a physician first*):

haloperidol (Haldol) (**B class drug**), 0.5–5.0 mg PO bid to tid prn or 2–5 mg IM q4–8h prn

An antiparkinsonian agent may have to be added to counteract extrapyramidal side effects caused by the haloperidol.

Treatment with lithium carbonate may also be instituted, but the therapeutic effects of this agent do not begin to take hold until after a week or more of treatment. *You must consult a physician, as this is also a B class drug.*

Consideration might be given to long-term lithium maintenance therapy, as this medication is of great benefit in preventing or dampening future manic attacks.

Before lithium therapy is started, the following baseline diagnostic tests should be done: blood samples should drawn for complete blood count, measurement of electrolytes, and determination of renal, liver and thyroid function. Electrocardiography (ECG) should be done, if available.

Occasionally, high doses of medication fail to settle a highly agitated manic client, and the client is in danger of physical collapse or poses a danger to staff or other patients.

Monitoring and Follow-Up

- Follow up weekly until the client is stable, then monthly (as symptoms abate, medication doses can be tapered, often to the point of discontinuation)
- Follow-up with regular, widely spaced appointments allows for working through certain psychological issues, such as the client's vulnerability to future episodes and the need for medication
- If the client is on long-term lithium therapy, blood samples should be taken every 6 months for complete blood count, electrolyte levels, and renal, liver and thyroid function; similarly, ECG, if available, should be done every 6 months for these clients
- Both the client and the family should be educated with regard to bipolar disorder, and the early signals of manic relapse and the course to take should be fully discussed

Referral

- Most manic clients are best treated in the relatively controlled and safe environment of the hospital
- Outpatient treatment runs risks arising from the client's impaired judgment and erratic, unpredictable moods and behavior
- Involuntary hospitalization may have to be considered (through the justice of the peace, a police officer or a physician, if available, for a "Form 1" admission) and may in fact be the best course because of the client's unpredictability and the likelihood of a change of mind after voluntary admission

Depressive Phase (Bipolar Disorder and Major Depressive Disorder)

Appropriate Consultation

Consult a physician for all depressed clients.

Nonpharmacologic Interventions

The depressed client usually seeks help of his or her own accord, perhaps with some coaxing from family or friends. The client will usually be cooperative with those in a position to offer relief and escape from misery. Be sensitive to the possibility that the client may, nonetheless, find the experience of needing help quite humbling. Adolescents are usually especially reluctant because of fear of what their peers might think or the possibility that they are "crazy." Such fears should be dealt with directly and realistically.

Milder depressive episodes and "situation" or "reactive" depression can often be treated without medication. Treatment of these cases involves providing support (professional or otherwise), working through conflicts, altering relationships and developing counter-depressive attitudes and skills.

Pharmacologic Interventions

The more depressed client may be unable to engage in useful therapeutic work with the treating professional; in this case, medication is indicated. Treatment usually begins with selective serotonin re-uptake inhibitors (SSRI) antidepressants (e.g., paroxetine [Paxil], fluvoxamine maleate [Luvox] or sertraline [Zoloft]), to which 70% to 80% of clients will have a favorable response. *Consult a physician to order these medications.*

The antidepressant effects of these medications often take 3 weeks or longer to become apparent. These drugs may cause troublesome side effects such as nausea, headache and diarrhea. They are the safest of the antidepressants if taken as an overdose.

Sleep medications are rarely indicated, except for short-term use, as insomnia secondary to depression usually responds to nighttime antidepressant medication.

Monitoring and Follow-Up

It is customary to continue the prescription of antidepressants for some 6–9 months after the depressive episode has remitted. Medication doses are then tapered gradually, and the medication can be discontinued, provided there are no signs of relapse.

Some depressive episodes do not remit completely and the residual milder depressive symptoms can be treated with longer-term antidepressant therapy.

Patients with a high rate of relapse may be given longer-term antidepressant treatment.

Lithium maintenance therapy is effective in many patients with recurrent depressive disorders.

The prescription of medication always occurs in the context of a working alliance between the client and the professional. It does not obviate the need for support, the resolving of psychological and interpersonal difficulties, and education about the nature of the affective disorders.

Referral

Most depressed patients can be managed on an outpatient basis. The decision to hospitalize will hinge on a variety of factors, including the following:

- Suicidal tendencies (*see "Suicidal Behavior," below, this chapter*)
- Degree of functional impairment
- Intensity of suffering
- Availability of family and community supports
- The nature of the hospital program
- The wishes of the client

Dysthymic Disorder

Treatment is often lengthy and the results mixed.

Nonpharmacologic Interventions

The thrust of treatment will be psychotherapeutic. Insight-oriented, psycho-educative, supportive and behavioral approaches are most frequently used.

The client should be encouraged to look at self-defeating, depressogenic patterns of behavior and the anxieties, guilt and anger associated with them.

Clients may be taught to be assertive rather than controlling in passive ways and to confront rather than avoid frightening or personally threatening situations. The sense of mastery and the experience of positive feelings and gratification counter the depressive feelings.

Self-help groups may be useful for dysthymic clients for learning how to cope and for the support provided by other members.

Behavioral treatment is usually aimed at the specific behavioral variables affecting depressive symptoms, particularly the behaviors that are currently punished (e.g., ignored or coercively controlled) and those that are reinforced or encouraged (e.g., well-meaning attention inadvertently supporting depressive symptoms).

Some possible causes for depression and examples of behavioral treatment responses are given in Table 1 to illustrate some of the possibilities of outpatient treatment of depression.

Table 1: Causes of Depression and Behavioral Treatment in Dysthymic Disorder

Problem	Treatment
Inability or reluctance to express one's opinions or to initiate suggestion	Assertiveness training
Indecision, poor planning, poor coping strategies	Decision-making and problem-solving skills
Unrewarding social interactions, anxiety about social contact, social withdrawal	Social skills training, relaxation training
Marital problems, coercive control by spouse	Marital counseling, communication skills training, assertiveness training
Rumination over past events, negative self-evaluation, worry	Cognitive self-control, "thought-stopping" techniques
Feeling of helplessness, that there is no use trying	Retraining in mastery and personal effectiveness strategies
Lack of enjoyment, gradual loss of interest	"Reinforcement sampling," re-exposure to potentially rewarding activities, increasing pleasant activities
Loss of behavioral productivity	Performance of graduated tasks, planning or rewards for successful performance

Pharmacologic Interventions

Dysthymic clients may respond to antidepressant medication (especially SSRIs, as outlined above), but the response is less predictable and less complete than in major depressive disorder. If symptoms intensify, a trial of medication may be indicated.

Minor tranquilizers (e.g., lorazepam [Ativan]) may be prescribed *by the physician* for very brief periods (7–10 days) from time to time to counter associated anxiety, panic or phobic symptoms and the avoidance and withdrawal that they engender.

A considerable proportion of dysthymic clients become psychologically dependent on their medications. Thus, medications should be used judiciously, and efforts should be made periodically to discontinue them.

Monitoring and Follow-Up

Regular follow-up is important, to monitor progress in behavioral changes and to offer encouragement and support.

Referral

Refer to a physician for follow-up as needed, especially if the client is on medication or there is no response to treatment after a reasonable trial.

PSYCHOTIC DISORDERS

GENERAL

Psychosis can present as delusions, hallucinations, disorganized speech, bizarre behavior, catatonia, withdrawal and downward social drift.

The psychotic episode may be an accompanying symptom of underlying psychiatric illness of which mania, depression and schizophrenia are the most common.

Other psychotic disorders include delusional disorder, brief psychotic disorder and schizoaffective disorder.

SCHIZOPHRENIA

Schizophrenia is the most common chronic psychotic disorder, with a lifetime prevalence of 0.5% to 1%, occurring equally among men and women. Onset is usually in adolescence or young adulthood. A higher prevalence is noted among family members of people with schizophrenia, and there is a higher concordance rate in monozygotic than dizygotic twins. Although genetic factors are involved, nongenetic factors are thought to be important.

The condition may present with insidious onset, or onset may seem sudden, with an acute psychotic break; however, prodromal symptoms are often identified retrospectively.

Essential Features

- Presence of certain psychotic features with characteristic symptoms involving multiple psychological processes
- Deterioration from a previous level of functioning
- Onset before age 45
- Duration of at least 6 months

Types of Schizophrenic Disorders

Schizophrenic disorders with overt psychotic features are currently differentiated into several types based on the predominant symptoms. Of these, three are most distinctive and are classically described:

- Disorganized type (also know as hebephrenic type)
- Catatonic type
- Paranoid type

History and Physical Findings

The typical client will present in an excited, agitated state, often with fearfulness or hostility, hallucinations and delusions, confusion and disorganization, vigilance and over-activity. Mood is often labile and behavior unpredictable.

First, assess for medical conditions that might account for the symptoms and any accompanying delirium or dementia.

Ascertain the role of any substance use (intoxication or withdrawal) or medication.

Characteristic Symptoms

Content of Thought (Delusions and Preoccupation)

- Persecutory: beliefs that others are spying on, plotting against or spreading rumors about the person
- Delusions of reference: events or objects are given peculiar and unusual significance, such as believing that the radio announcer is directing comments to the individual personally
- Thought broadcasting: belief that one's thoughts are broadcast to the external world
- Thought insertion: belief that thoughts that are not one's own are being inserted into one's head
- Delusions of being controlled: belief that one's feelings, impulses or actions are being imposed from external sources
- Other somatic, grandiose, religious or nihilistic delusions; markedly illogical thinking; or preoccupation with certain ideas

Form of Thought (Formal Thought Disorder)

- Loosening of associations: ideas shift from one unrelated thought to another
- Speech may be incoherent and incomprehensible
- Speech may be vague, overly abstract, overly concrete, repetitive or stereotyped
- New words (neologisms) may be created, ideas may be repeated as if the person is stuck on one track (perseveration), train of speech may be interrupted (blocking) or sounds rather than meaningful concepts may govern word choice, which results in meaningless rhyming or punning ("clanging").

Perception

- Auditory hallucinations: the most common form; usually of voices speaking directly to the individual and occasionally giving commands, which may create danger for the individual or others
- Tactile hallucinations: typically involve electrical, tingling or burning sensations
- Somatic hallucination: sensation of snakes or insects crawling inside the abdomen or other bizarre internal sensations
- Visual, gustatory and olfactory hallucination: such hallucinations may occur in schizophrenia, but in the absence of auditory hallucinations, they raise the possibility of organic mental disorder

Affect

- Blunting of affect: severe reduction of intensity of emotional expression
- Flattening: virtually no signs of affective expression
- Inappropriate affect: affect and speech or ideation are discordant

Sense of Self

- "Loss of boundaries": extreme confusion about one's identity and the meaning of existence
- May be manifested in delusions of control by outside force

Volition

- Inadequate interest or drive
- Inability to follow a course of action to its conclusion
- Extreme ambivalence about alternative courses of action, which leads to inaction

Relationship to External World

- Withdrawal from involvement with external world
- Preoccupation with egocentric and illogical ideas and fantasies (client "living in his or her own world")
- Emotional detachment

Psychomotor Behavior

- Observed especially in chronically severe and actively florid forms
- Catatonic posturing: rigid, bizarre posturing
- Catatonic excitement: purposeless, stereotyped, excited movement unrelated to external stimuli
- Catatonic stupor: client appears unaware of the environment
- Catatonic negativism: client actively counteracts or resists instructions or attempts to be moved
- Mannerisms, grimacing or waxy flexibility (remains passively in any position in which he or she is placed)

Criteria for Schizophrenic Disorder

- At least two of the following during active phase of the disorder (lasting at least 1 month):
  - Delusions: this alone will suffice for the diagnosis if delusions are bizarre (somatic, grandiose, religious, nihilistic, persecutory or jealous)
  - Hallucinations: this alone will suffice for the diagnosis if hallucinations include voices, speaking to one another or providing commentary
  - Disorganized speech: incoherence, marked loosening of associations, markedly illogical
  - Catatonic or grossly disorganized behavior.
  - Negative symptoms (ambivalence, flattened affect, avolition, anhedonia, asociality, apathy)
- Deterioration from previous level of functioning in such areas as work, social relations and self-care
- Duration of disturbance of at least 6 months, with 1 month of active phase, at some time during the person's life
- Onset before age 45 years
- Not due to an organic mental disorder or mental retardation, mood disorder, substance use or medical condition
- Symptoms occurring before (prodromal) and after (residual) the active phase of the illness should be considered in calculating the duration of the disorder:
  - social isolation or withdrawal
  - marked impairment in role functioning as wage-earner, student or homemaker
  - markedly peculiar behavior (e.g., collecting garbage, hoarding food)
  - marked impairment in personal hygiene and grooming
  - speech digressive, vague, over-elaborate, circumstantial (not getting to the point) or metaphorical
  - odd or bizarre ideas, magical thinking, ideas of reference, over-valuing one's importance
  - unusual perceptual experiences (e.g., sensing the presence of a force or person not actually present)

Course

- Active phase usually preceded by a prodromal phase (anxiety, phobias, mild depression); change in personality often noted by friends and relatives; length of prodromal stage highly variable, and prognosis worse for the slowly developing disorder
- Onset of active phase often precipitated by a psychosocial disorder
- Residual phase usually follows active phase; clinical picture resembles prodromal phase, although some of the psychotic symptoms may persist
- Return to premorbid functioning is unusual, and acute exacerbations with increasing residual impairment between episodes is common

Differential Diagnosis

- Affective disorders (mania and depression)
- Organic or toxic psychosis (induced by drugs or medical illness)

Management of Acute Psychotic State

The acutely psychotic or delirious client should be admitted to a room that can be readily observed but that has minimal noise and light stimulation.

Treat medical conditions or substance withdrawal as necessary.

Appropriate Consultation

Consult a physician before initiating any medications.

Nonpharmacologic Interventions

Start by ensuring your own safety, the safety of other clients and staff, and the safety of the affected client. This is done by establishing firm control of the situation as soon as possible; it may entail the use of physical restraint. In many instances, a show of force, for example, by having police or security officers present, will settle the client sufficiently so that physical means of control need not be used.

Care must be taken to avoid exacerbating the situation by failing to give the excited client enough physical and psychological room (especially if he or she is suspicious or paranoid). Thus, noise should be minimized. Eye contact may be disturbing, as it may be interpreted as threatening or aggressive. You should maintain a considerable physical distance to avoid being struck and also to appear less threatening to the frightened client. Questions asked should not be probing, and sensitive areas, if identifiable from previous background history, should be avoided. Delusion should not be challenged or supported.

If the excited, psychotic client appears on the verge of violence or escape, you should not obstruct the escape route or end up in an enclosed space alone with the client. It is preferable to allow the client to bolt than to risk being assaulted. (*See also "Violent or Acutely Agitated Psychiatric Clients," above, this chapter*.)

Pharmacologic Interventions

Medication is indispensable in the treatment of acute psychosis and the long-term management of schizophrenia; it is used to control disordered behavior, to provide symptomatic relief and as a specific treatment of the disorder.

If possible, before starting medications, do baseline ECG, complete blood count and liver function testing (LFT).

Consult a physician before initiating medication.

Acute treatment is initiated with major tranquilizers such as haloperidol (Haldol [high potency]) or loxapine (Loxapac [intermediate potency]), often in combination with a benzodiazepine, such as lorazepam.

Side effects of the major tranquilizers are orthostatic hypotension, dry mouth, blurred vision, constipation, drowsiness and several extrapyramidal side effects.

Monitoring and Follow-Up

Client should be monitored regularly for mental status (orientation, presence of psychotic symptoms, mood disorders, suicidal ideation), functional status, self-care, nutrition and side effects of medications (akathisia, dizziness, sedation, signs of parkinsonism, tardive dyskinesia and orthostatic hypotension).

Referral

Almost all acutely psychotic patients will need hospitalization, and sometimes this must be accomplished on an involuntary basis. Sometimes hospitalization can be avoided, especially if the client has solid family and community supports and under circumstances where the staff members know the client well and are familiar with his or her particular disorder and the natural course of previous relapses and remissions.

Hospitalization and Medical Evacuation

The decision as to whether to admit the client to a local hospital, treat the client on an outpatient basis or evacuate the client to a psychiatric hospital depends on a number of factors and should, of course, be taken in consultation with the best qualified available physician, preferably a psychiatrist. The following should be considered:

- Is this the first known psychotic episode? How certain is the diagnosis? Is there a need for close observation and monitoring?
- How competent are the local medical and non-medical resources to deal with schizophrenia and with this client in particular? How available is psychiatric consultation, if it is required?
- How dangerous, frightened or unpredictable is the client now or has he or she been in the past? How compliant with directions and medication?
- Is the client in need of shelter? To what extent is the family disrupted by the client? Would it be dangerous or disruptive to return the client to the family?

Whether the client enters hospital voluntarily or involuntarily, it is very important that the family be kept informed of his or her progress and that they maintain as close contact with the client as possible.

Involuntary Admission

Legal requirements must be met before a person can be hospitalized against his or her will. These requirements vary from one jurisdiction to another, so you must refer to the appropriate legislation.

- In most cases there must be evidence of risk of physical harm before an unwilling person can be admitted. The recommendation of one or more physicians is required in all jurisdictions.
- In most areas, involuntary admissions are reviewed by a review or appeal board.
- In communities where there are few doctors, relatives or other concerned individuals may be able to apply for a warrant to have the person taken into custody and assessed at the nearest hospital. Evidence for such an application is usually heard by a justice of the peace or a magistrate.
- Involuntary admission may be avoided if the client's family is able to demonstrate solidarity and strength in trying to convince the client to enter voluntarily. The family must, of course, be well informed and genuinely convinced beforehand of the need for hospitalization.
- The client or guardian should be advised of the procedures involved in involuntary admission, as well as the client's legal rights and appeal provisions.

Long-Term Maintenance and Rehabilitation of the Stabilized Schizophrenic Patient

Pharmacologic Interventions

For a considerable number of clients, the long-term use of major tranquilizers is necessary to afford the chance of a stable partial or full remission. However, because some schizophrenic clients may remain well for years, or even indefinitely, without medication, and because vulnerability to relapse cannot be predicted after one episode, medication should be tapered and, if possible, discontinued in fully remitted patients after a first psychotic break.

The maintenance dose should be the lowest dose that prevents relapse. Discovering this dosage is usually a matter of long-term, careful follow-up and monitoring—a collaborative effort involving the client, the nurse practitioner and the physician. Although the typical neuroleptic medications are often effective in suppressing the florid signs (so-called "positive symptoms"), the negative symptoms (such as lack of initiative, flatness of affect and poverty of ideas) are more difficult to control and often require the newer atypical neuroleptics (e.g., risperidone, clozapine, olanzapine).

Many clients are less than fully compliant. Relapse thought to be due to inadequate doses of medication may, in fact, result from the client not having taken the medications as prescribed. To some extent, compliance problems can be alleviated by using long-acting injectable major tranquilizers such as fluphenazine enanthate (Moditen) and fluphenazine decanoate (Modecate), the effects of which last about 2 and 3 weeks, respectively.

A serious and often irreversible side effect of long-term tranquilization is tardive dyskinesia, a neurological condition characterized by the gradual appearance of involuntary movement. These movements usually involve facial musculature and appear as lip-smacking, chewing, sucking and tongue-thrusting. At times, the extremities, limbs and trunk may be involved.

Upon appearance of these signs, consideration must be given to reducing dosages of, or even discontinuing, the medication. Unfortunately, this is often not possible without the client relapsing into psychosis. Anti-parkinsonian agents are of no value in this condition and no single effective remedy has been found to date.

The side effects of medication for schizophrenia include acute dystonic reaction, parkinsonian side effects and akathisia.

Acute Dystonic Reaction

Moderate to severe muscle spasms, usually of the neck (causing tilting of the head), back muscles (causing arching), and tongue or eye. These often dramatic and frightening effects are easily reversed.

Assess and stabilize ABC (airway, breathing and circulation). Consult a physician about use of:

benztropine (Cogentin) (**B class drug**), 2 mg IM

Parkinsonian Side Effects

Muscle rigidity, tremor, facial masking, drooling and loss of associated movements. Treatment involves reducing the medication dosage and/or administering oral antiparkinsonian agents such as benztropine, which may be prescribed in doses of 1–8 mg/day.

Akathisia

Inner restlessness, which can be excruciatingly distressing and which only sometimes is manifested in outward restless movements. This side effect, which can only be alleviated in the same manner as the parkinsonian side effects, is sometimes mistaken for agitation due to the increasing schizophrenic disorder. It can increase risk of suicide.

Monitoring and Follow-Up

For about two-thirds of clients experiencing an acute psychotic episode requiring hospitalization, treatment will be a life-long proposition. Return to normal is unusual, and usually the schizophrenic person remains disabled in one way or another and requires long-term rehabilitation and supportive care.

Visits should be regular and frequent to prevent re-hospitalization and to monitor drug compliance, effectiveness and side effects. After an acute episode, there is a 70% chance of relapse within 1 year if the patient is not taking medication, but only a 30% chance if the medication regimen is being followed. The nurse is often in the best position to monitor compliance and drug effectiveness and even to provide the primary therapy under the direction of a consulting psychiatrist.

Frequent, regular contacts are invaluable in preventing re-admission to hospital.

The client should be assisted to engage in active social programs, to combat the tendency to withdraw.

The client should be assisted to make use of educational, employment, training and recreational opportunities. Advice and assistance may also be required with respect to housing, financial assistance, legal matters and other social services.

In the early stages of recovery, the client may need close supervision, such as that provided in sheltered workshops (vocational), transition homes and day hospitals or day-care programs.

Personal Counseling

The schizophrenic client will likely experience a number of stresses and problems directly or indirectly related to the disorder, for which personal counseling is desirable:

- Sexual dysfunction may be a side effect of the medications and may present as decreased libido or cessation of menstruation.
- Courtship: the client may experience severe interpersonal anxiety and need social skills training and counseling in this regard.
- Genetic risk: genetic counseling and planning for parenthood may be appropriate.
- Family adjustment: the client may need help in dealing with problems with other family members, since these problems are often a direct result of the client's symptoms and may be long-standing.
- Self-care: the client may need help and supervision with regard to personal hygiene, grooming, nutrition, financial management and purchases.
- Interpersonal difficulties: the client may require marital or family counseling, divorce counseling, or counseling and social skills training with regard to getting along with friends and acquaintances.

Family Support

- Educate the family on the nature of schizophrenia, the cause of the disorder, its treatments, and the family's role in supporting and managing the client at home or in the community.
- Advise family members about how to behave toward the patient, how to deal with the client's thought disorders and paranoid thinking, how to remotivate and encourage the client, and how to respond to bizarre behavior and withdrawal.
- Caution family members against talking about the client in his or her presence and to avoid being critical. The prognosis is poorer in families where there is a high degree of critical emotional expression.
- Help the family to recognize the early warning signs of relapse (especially increased social isolation, moodiness, difficulty thinking or sleeping, increased irritability or the return of symptoms previously in remission).
- Advise the family to encourage the patient to be self-sufficient by doing as much as possible for himself or herself. It is never easy to determine just what the client is capable of doing, and judicious trial and error, with constant alertness to signs of stress, is perhaps the only way.

- Calm the family's fears with regard to the client, and discuss with them any feelings of guilt or shame they might experience. Give them the facts with regard to the causes of the disorder. Encourage patience with respect to the client's anger or depression.
- Help family members to achieve a realistic understanding of the disorder so that they are neither unrealistically optimistic nor despairing. They in turn can help the client with accepting the limitations imposed by the disorder (e.g., on education, marriage, self-sufficiency).
- Have the family assist and encourage the client to attend treatment sessions or other social appointments.
- Emphasize the importance of keeping the client socially active.
- Prepare the family for what will happen if the client has to be hospitalized locally or evacuated for treatment.
- The family itself may require some counseling because of the stresses of the illness, the caretaker role and the embarrassment experienced by family members.
- Where no family is available to provide support, volunteers or professional caregivers (e.g., group or boarding home supervisors) might be encouraged to play a similar role.

In larger communities, schizophrenic patients have formed self-help groups. Although this may not be practical in a small community, such groups may be able to provide resource material and ideas that could be applied in the care and self-care of a small number of clients.

ANXIETY DISORDERS

DEFINITION

Subjective experience of fear, foreboding or panic. Distinguished from "normal" anxiety by its intensity or duration or the extent of disturbance and dysfunction in the absence of an appropriate stimulus. Symptoms may be present as a generalized pattern or in discrete periods ("attacks"), which may or may not be preceded by a triggering stimulus. Condition may present as "stress" (client not coping or functioning as well as usual), a mood disorder, a substance use problem, or one or more somatic complaints.

HISTORY

Symptoms appear in three clusters: emotional, physiologic and cognitive.

Emotional

- Sense of doom
- Apprehension
- Fearfulness
- Worry

Physiologic

- General: insomnia, fatigue, weight loss
- CNS: tremor, muscle aches, headaches, dizziness, lightheadedness, parasthesias
- Autonomic: sweating, dry mouth, increased heart rate, flushing
- Gastrointestinal: stomach upset, diarrhea, anorexia, choking
- Cardiorespiratory: shortness of breath, hyperventilation, chest pain, palpitations

Cognitive

- Poor concentration
- Poor memory
- Recurrent intrusive thoughts

Other Aspects of History

- Age at onset, pattern over time
- Symptoms experienced, onset, triggers (environment, situation, stimulus), duration, severity, associated avoidance behavior, level of distress, dysfunction and limitations
- Life events or stressors that may correlate temporally with onset
- Techniques and strategies to alleviate anxiety (e.g., chemical substances used or abused)
- Associated thoughts or behaviors intrusive?
- Review use of caffeine, any other stimulants, any recreational drug use
- Review current medications, any over-the-counter (OTC) or herbal drugs
- Review for symptoms consistent with underlying medical illnesses
- Review past medical and past psychiatric history

PHYSICAL EXAMINATION

- Mental status exam: emphasis on survey for depression; explore for any suicidal or homicidal feelings or plans; explore whether client is victim of abuse (if so, take steps to ensure client's safety)
- Cardiorespiratory exam
- Thyroid and other exams as indicated by history

DIFFERENTIAL DIAGNOSIS

- *Anxiety disorders:* generalized anxiety, panic disorder with or without agoraphobia, social phobia, specific phobia, obsessive–compulsive disorder, post-traumatic stress disorder, adjustment disorder with anxiety (< 6 months in duration)
- *Other psychiatric disorders:* depression, somatization, hypochondrias, personality disorders, victim of abuse (physical, sexual or emotional), psychosis, dementia
- *Medical disorder:* endocrine (hyperthyroidism, hypoglycemia, Cushing's disease), cardiorespiratory (e.g., congestive heart failure [CHF], cardiac arrhythmia, mitral valve prolapse, chronic obstructive pulmonary disease [COPD], pulmonary embolism, among others)
- *Substance use or withdrawal:* especially caffeine, alcohol, cannabis, cocaine, amphetamines, but any medication may be responsible

Comorbidity is common, so actively pursue depression, substance abuse, somatization.

COMPLICATIONS

- Inability to perform activities of daily living
- Social phobias
- Substance abuse

DIAGNOSTIC TESTS

- Complete blood count
- Electrocardiography (ECG)
- Thyroid-stimulating hormone (TSH)

MANAGEMENT

Depending on the type of anxiety disorder, definitive treatment may involve psychotherapy, desensitization therapy and medications. Benzodiazepines, tricyclic antidepressants, SSRIs and occasionally neuroleptics may each have a role.

Appropriate Consultation

Consult physician:

- If there are any safety concerns
- If an underlying medical problem is suspected, since management will need to be tailored for the diagnosis
- If symptoms are so intense as to interfere with normal function, in which case a short course of a benzodiazepine (minor tranquilizer) may be indicated

Nonpharmacologic Interventions

- Have the client reduce the use of stimulants, especially caffeine
- Help the client to reduce self-medicating with non-prescribed drugs, if applicable
- Review techniques to promote relaxation: breathing exercises, meditation, progressive muscle relaxation, aerobic exercise

Pharmacologic Interventions

lorazepam (Ativan) (**B class drug**), 0.5–1.0 mg PO bid to tid prn for 5 days

Monitoring and Follow-Up

- Follow up weekly
- Support and education about the illness process for the client as well as for the family are critical
- Arrange follow-up with physician at next available visit for all but very severe cases

Referral

Medevac urgently if there is profound disturbance, if there are safety issues or if the client needs more definitive treatment.

COGNITIVE IMPAIRMENT

DEFINITIONS

- *Dementia:* syndrome of acquired progressive global impairment of cognitive function sufficient to interfere with normal activities (may be due to an underlying reversible or irreversible process)
- *Delirium:* acute deterioration of ability to maintain attention or focus, consequently accompanied by disorientation and fluctuating level of consciousness and often associated with perceptual disturbances; usually due to an underlying organic problem

Delirium and dementia are both syndromes with large differential diagnoses for underlying causes. More than one factor may be involved.

These conditions are commonly seen in but are not limited to the elderly.

CAUSES

Reversible Causes

- Medications
- Metabolic derangements (e.g., blood glucose, sodium, potassium, calcium, vitamin B_{12} deficiency; thyroid, renal or liver impairment)
- Hypoxia from cardiopulmonary illness
- Intracranial pathology (e.g., neoplasm, normal-pressure hydrocephalus, infection, subdural hematoma, stroke)
- Sensory deficit states (e.g., hearing or visual impairment)
- Infections (e.g., urinary tract infection, pneumonia)

Irreversible Causes

- Alzheimer's disease
- Vascular (multi-infarct) dementia
- Chronic alcohol abuse
- Parkinson's disease
- Huntington's disease
- Head trauma
- Neoplasm

HISTORY

Elicit the history from the client, but it is just as important to elicit corroborating information from a caregiver, friend or the family.

- Client may present complaining of memory problems, problems with attention or focus, or concentration difficulties
- More often, a caregiver or family member accompanies the client, having noticed the client's difficulties with tasks that previously were not a problem (e.g., self-care, home care, shopping, finances)
- May present with concerns of inappropriate or bizarre behavior, because of delusions and hallucinations
- May present because of accompanying depression or anxiety
- Determine onset of symptoms and temporal course
- Record symptoms noted, objective behaviors observed
- Elicit degree of disturbance and dysfunction (ask about specifics, such as shopping, driving, self-care, handling of money, work performance or hobbies, as applicable; also inquire about ability to learn a new task)

Symptoms Associated with Underlying Medical Disorders

- Constitutional: fevers, sweats, weight loss, fatigue
- Sensory: vision, hearing changes
- Neurologic: new headache, tremor, ataxia, dizziness, seizure, focal deficits, transient ischemic attack (TIA)
- Endocrine: symptoms of thyroid problems, diabetes mellitus, hypercalcemia
- Cardiopulmonary: shortness of breath, cough, chest pain, sleep apnea, palpitations
- Gastrointestinal and genitourinary symptoms: as deemed necessary (it is important to inquire about incontinence)

Risk Factors and Past Medical History

- Trauma
- Falls
- Alcohol or benzodiazepine use
- Risk factors for cerebrovascular accident
- Occupational exposure
- Sexual exposure
- Previous history of cancer
- Anticoagulation or antithrombotic medication
- Nutrition

Medication

- OTC or otherwise acquired drug or remedy

PSYCHIATRIC ASSESSMENT

- Assess for mood, anhedonia, hopelessness, apathy, vegetative symptoms of depression
- Inquire about suicidal tendency
- Assess for psychotic symptoms (e.g., thought disorder, delusions, hallucinations)
- Assess for psychosocial stressors (e.g., losses, abuse or neglect)
- Observe speech, affect, mannerisms, grooming, psychomotor skills

Mental Status Examination

- Most widely used tool is Folstein's Mini Mental Status Examination
- Most sensitive items for dementia are impaired time orientation, problems with naming, inability to spell "world" backwards, and problems with copying an overlapping design
- Having the client draw a clock representing a certain time is also helpful
- Assessing judgment, by asking the person to interpret hypothetical situations (e.g., waking to find the house on fire) is also helpful

PHYSICAL EXAMINATION

The physical exam is directed by the differential diagnosis, as generated by the history, but must include the following:

- Vital signs
- Hearing and vision assessments (including fundi)
- Cardiovascular and pulmonary exam (note carotid bruits, evidence of atherosclerotic disease)
- Full neurologic exam, noting especially tremor, cogwheeling rigidity, shuffling gait, deep tendon reflexes, focal deficits in sensory and motor function, aphasia

DIFFERENTIAL DIAGNOSIS

- Dementia
- Delirium
- Depression
- Age-related memory or cognitive decline
- Substance use or abuse, medications
- Borderline intellectual function, mental retardation
- Other psychiatric disorders: psychotic, amnestic or dissociative

Delirium, dementia and depression can be difficult to distinguish.

Depression in the elderly is often referred to as pseudodementia because the accompanying apathy and associated cognitive difficulties often mimic dementia.

DIAGNOSTIC TESTS

Unless the underlying cause is obvious, blood should be drawn for the following tests:

- Complete blood count
- Electrolytes
- Calcium
- TSH
- Blood glucose

Other investigations will be driven by the history and presentation.

MANAGEMENT

Management is ultimately driven by the diagnosis.

Goals of Treatment

- Identify and correct reversible causes
- Ensure safety of the client
- Optimize functioning and quality of life

Appropriate Consultation

Consult a physician if client is assessed as delirious or in acute distress, if there are unexplained new neurologic symptoms or focal deficits, or if there are risk factors for serious intracranial pathology (e.g., anticoagulant medication, history of trauma, previous cancer).

Nonpharmacologic Interventions

- Educate and support caregivers and family
- Encourage measures to ensure safety, and aid the client in optimal functioning and independence
- Mobilize available community resources such as home care, friendly visitors

If agitation or behavioral issues are the concern, manage according to guidelines in *"Violent or Acutely Agitated Psychiatric Clients," above, this chapter*.

Pharmacologic Interventions

If at all possible, do not medicate. In particular, avoid sedation, as it may cause falls and worsen symptoms of impairment.

Monitoring and Follow-Up

Follow up regularly (e.g., monthly or more often as necessary), preferably on a home visit, to enable you to assess the client functioning in his or her own environment.

Arrange for all clients with non-urgent symptoms to see the physician at the next available visit.

Referral

Medevac may be necessary for clients with potential underlying organic pathology or if the risk–safety assessment requires that client be admitted to hospital (i.e., adequate supervision and a safe environment with family or friends not otherwise possible).

SUICIDAL BEHAVIOR

GENERAL INFORMATION

- The suicide rate has remained relatively constant for the total Canadian population over the last decade.
- The average suicide rate among First Nations people is more than twice the rate for Canadians as a whole.
- Suicides are increasing among young people and teenagers, and suicide is now the second most frequent cause of death among Canadian males between 15 and 30 years of age.
- The age-specific suicide rate for young First Nations males is several times the national average for this age group.
- Males are more likely to complete a suicide than females.
- More females than males are treated for suicide attempts.
- For every successful suicide, there are several unsuccessful attempts (estimates are that there may be 50 times as many unsuccessful attempts as successful ones).
- Most people who commit suicide give warning either verbally or through changes in their behavior.
- Many have seen a healthcare provider within the previous month.
- The strongest predictor of suicide is psychiatric illness.
- Firearms are most often used in completed suicides.
- Suicide is a highly variable and rare event, and accurate prediction is almost impossible.
- Suicide is not significantly influenced by seasonal, meteorological, cosmic or other environmental factors.
- Alcohol use is implicated in most suicides, either at the time of the suicide or in terms of chronic abuse.
- There is no evidence that "crisis lines" in themselves, without back-up and professional attention, significantly reduce suicide rates in their service areas.

FACTORS PROMOTING SUICIDAL BEHAVIOR

- *Negative life events:* Personal stressors such as unemployment, domestic problems, death of a friend or relative, financial distress, chronic or incurable illness, and interpersonal conflict and disappointments.
- *Lack of social support:* Absence of supportive and caring friends and relatives; a sense of isolation and the feeling that nobody cares or understands.
- *Presence of models:* Suicides among relatives, friends or acquaintances and publicity about recent suicides; this factor can also influence the means by which suicide is attempted.
- *Expectations:* Helplessness, pessimism and feelings of worthlessness; the impression that others would be better off if the person were dead; and a sense of powerlessness and lack of control in the person's life.
- *Attention to gestures:* Inadvertent reinforcement or encouragement of suicidal behavior by attending exclusively or primarily to the suicidal behavior itself (threats, gestures or attempts).
- *Availability of lethal means:* Presence of or easy access to guns, drugs or other instruments that are "conventional" means of suicide in the experience of the individual (e.g., through common knowledge, media depiction or personal knowledge of suicides or attempts by other).

Suicide is often an impulsive act; easy access to means increases the likelihood of completing the act.

- *Any loss (real or imagined):* Especially if the loss results in diminished self-esteem or self-confidence.

CHARACTERISTICS ASSOCIATED WITH SUICIDAL RISK

- Presence of a suicide plan
- Living alone, particularly if socially isolated and if few family resources or other social supports are available
- Marital status: separated, widowed or divorced
- Age: risk increases with age, especially among the elderly, but there has also been a recent increase in risk among young males, especially those 15–25 years of age
- Gender: male
- Race: Caucasian, Aboriginal
- Preoccupation with feelings of hopelessness, helplessness and negative expectations for the future
- Previous attempt or threat
- Death of parent while subject was a child
- Poor physical health (e.g., acute or chronic condition, terminal illness)
- Heavy alcohol or other substance use
- Psychiatric illness, especially depression or schizophrenia
- Recent separation from a loved one (e.g., bereavement)
- Unemployment
- Poor impulse control

ASSESSMENT OF PRESENT RISK

- See general characteristics (preceding section)
- Severe feelings of hopelessness, despair, emptiness or worthlessness
- Severe insomnia
- Agitation and restlessness
- Depression or schizophrenia; diminished grasp of reality
- Recent suicide attempt
- Manner of previous attempt; client's expectation of lethality of attempt
- Voices telling subject to harm self
- Desire to make active suicide attempt
- Preoccupation with suicide
- Actual preparation for contemplated attempt

CHILD AND ADOLESCENT SUICIDE

- Suicide is rare among children < 14 years of age but has increased significantly among older adolescent males and is now the second most common cause of death in this age group.
- Suicide threats, gestures or attempts are most often efforts to communicate despair, frustration and unhappiness and should be responded to as such.
- Boys succeed more often because of their use of more lethal methods.
- Most youngsters who attempt suicide talk about it with at least one person before the attempt.
- Non-specific behavioral clues include anorexia, psychosomatic complaints, rebellious behavior, neglect of personal appearance, and change in behavior or personality.

Factors Promoting Adolescent Suicide

- Loss of love object or significant person
- Identification with deceased parent
- Identification with a living person who is expressing depressed or suicidal ideas
- Parental rejection and hostility or disparagement of the child
- Use of alcohol or drugs
- Chronic social isolation
- Inability to express rage or respond to disappointment and loss; wish to retaliate
- Long-standing history of problems
- Current state of feeling hopeless and helpless

GUIDELINES FOR INTERVIEWING SUICIDAL CLIENTS

- Establish supportive, trusting, calming and non-judgmental relationship. Reassure the client that you will respect his or her confidentiality.
- Interview the client alone, at least initially, and allow him or her to talk freely and for as long as desired.
- Determine level of risk on basis of factors and characteristics described above.
- Assess adequacy of social supports, as well as strengths and weaknesses of the family.
- Assess for depression or other mental illness.
- Ask directly about suicidal thoughts, intent and fantasies.
- If suicidal thoughts are present, inquire about plans and how completely they and their consequences have been thought through; ask also about wills, farewell notes.
- Evaluate your own reaction and trust "intuitive" feelings about the client's intent.
- Explore the motives for suicide. Try to gain an understanding of how the situation is perceived by the client (e.g., no other options, escaping life, manipulating a situation, trying to cause change in or trying to hurt another, plea for attention or help, wishing to join a deceased loved one).
- Do not try to talk the person out of suicide or convince him or her that things are really not so bad. These efforts may only firm the person's resolve.
- Interview significant others such as spouse, parents and siblings.

GUIDELINES FOR MANAGEMENT

Threatened or Suspected Intent

- If intent is serious and imminent, admit to a medical facility for observation and treatment if possible.
- Consult mental health personnel, preferably a psychiatrist, by telephone or make direct referral if resources are locally available.
- If risk is high and client is uncooperative with treatment efforts, consider compulsory detention if provision is made under the local mental health ordinance.
- Enlist the aid of spouse, family, elders or friends for supporting, motivating and monitoring the client.
- "Play for time," as suicidal intent tends to wax and wane, and preventive counseling can be effective during the non-suicidal intervals. Try to establish a time-limited "contract" with the would-be suicide during which you are prepared to help the person work on his or her problems. Ask, in effect, "How much time can you give so that you and I can work together on this matter?"
- If the client is intoxicated, do not attempt to counsel but either directly or indirectly provide sympathetic support and continuous monitoring until the client is sober.

- If the client is to return home, ensure that firearms, drugs and other means of suicide are removed. A person seriously intent on suicide will find a way, but obstacles can delay the action and allow time to reconsider.
- In the case of children or adolescents, temporary removal from the home may be advisable and may require admission to a health or social welfare facility.
- Counseling the family in the case of a child or married adult should begin immediately in order to:
  - assist them in understanding what is happening
  - advise them of the treatment options and resources
  - motivate them to assist the client in treatment
  - deal with their guilt, remorse or self-blame
- Offer assistance in making referrals to mental health or social service personnel, as indicated by the circumstances.
- Treatment for children and adolescents will ultimately involve a family intervention plus individual treatment of the child aimed at enhancing self-esteem and sense of importance in the family or social environment.
- Treatment of an adult will consist of individual counseling appropriate to the presumed cause of the problem and usually will also involve family members and various health and social service professionals.
- Long-term treatment in all cases should be done by, or under the direction or supervision of, a competent mental health professional. The role of front-line medical staff depends upon their training and the local presence or absence of specialists in health and social services.
- If the client is being treated on an outpatient basis, the therapist or others must be available to respond at all times.
- Recognize the limits of your own personal responsibility and the impossibility of guaranteeing that an individual will not commit suicide even after intervention and treatment.

Unsuccessful Attempt

- Ensure that adequate emergency medical treatment has been given and that the possibility of undetected drug overdose (in addition to the apparent method) has been considered.
- Remove anything that might be used in another, impulsive attempt, especially if the client is intoxicated or impaired by drug overdose.
- Convey the idea that this potentially fatal act may be turned into a positive and constructive experience for the individual and for the family, where relevant.
- Make careful records and tag the chart to ensure that the suicidal potential is recognized on subsequent admissions or contacts. Risk of suicide is very high among those who have attempted suicide previously.
- Continue to monitor and provide support in view of the increased risk of suicide after an attempt.

Completed Suicide: Interventions for Survivors

- Family, friends and loved ones left behind by suicide often suffer guilt, anguish, despair, and depression. They are tortured by self-blame, denial, confusion, ambivalence, shame, loss and anger.
- These "survivors" themselves become at high risk for suicide and depression.
- The bereaved need sympathy, consolation, encouragement, distraction and opportunity for abreaction. Every culture has its own techniques for contending with loss and bereavement.
- The process has failed for an individual if the following features are present:
  - typical symptoms of bereavement persist without evidence of relief, recovery or restitution
  - symptoms become exaggerated, such as complete denial of the death
  - deviant behavior violates convention or culturally expected grieving or jeopardizes physical health and safety.
- It is recommended that intervention with those left behind by suicide begin as quickly as possible: within 2 or 3 days after the event.

Suicide Prevention

- The suicide problem is best viewed as a total community responsibility, which requires a cooperative community response.
- The community's "gatekeepers" should be trained to recognize suicidal symptoms, assess risk and undertake appropriate management or referral of anyone at risk.
- Healthcare professionals should take the initiative and encourage others to do likewise in encouraging at-risk individuals to talk about their problems; make them aware that resources are available, and actively assist with referrals.
- Recognize the role of changing social conditions, value systems and social organization in the etiology and epidemiology of suicide; encourage community activities that strengthen social and family solidarity and purpose.
- In view of the problem of a high number of suicide attempts, a mental health promotion strategy (*see "Mental Health Promotion," in "Mental Illness Prevention and Mental Health Promotion," above, this chapter*) is preferred to one specific to suicide "prevention."

SEXUAL ASSAULT

GENERAL

Sexual assault is any unwanted touching or sexual act that is forced on a victim (usually female) without consent. It includes kissing; grabbing of the breast, buttocks or genitals; holding the victim and rubbing against her or squeezing her; tearing or pulling at the victim's clothing; and attempted or completed vaginal, anal or oral intercourse. Force is the exertion of power by the offender that causes the victim to comply against her will. It includes, but is not limited to, physical violence or threats of physical violence to the victim or a loved one. Sexual assault does not include exhibitionism, voyeurism, verbal or gestural obscenities, or sexual harassment, although these too may be unwanted and psychologically disturbing.

Ninety percent of victims are female. Little is known about the effects of sexual assault on male victims; accordingly, the following discussion focuses on the effects of sexual assaults committed by men against females.

Statistics

- Six percent of adult women report having been raped and 21% report having been subjected to some other form of sexual assault (excluding unwanted kissing) at least once in their lives.
- Women who are physically or emotionally abused constitute an at-risk group for sexual assault.
- Nearly half of the victims are < 17 years of age at the time of the assault (see "Child Sexual Abuse," in the *MSB Pediatric Clinical Guidelines*).
- Twenty-one percent of all rapes and 17% of other forms of sexual assault occur in the victim's home.
- Two-thirds of all rapists are known to the victim, and in one-third of all rapes the offender is either a present or former intimate partner of the victim.
- In a significant number of rapes (12%), weapons are used or displayed. Almost 10% of rapes are accompanied by severe beatings, and 15% of rape victims sustain injuries that require medical attention.
- Most rape victims use more than one active strategy (e.g., pleading, reasoning, screaming, kicking) in attempting to prevent the assault.
- Sexual assault is a crime, whether the offender is known or unknown to the victim. Spouses can be charged with sexual assault.

IMMEDIATE EFFECTS

- Somatic disturbances, including nausea, vomiting, poor appetite, insomnia, nightmares, headaches, fatigue, and specific or general soreness
- Gynecological problems, including vaginal discharge, itching and burning sensations, and menstrual dysfunction
- Disturbance of affect, including anxiety, terror, depression, excitability, loss of temper, guilt, self-blame and mood swings
- Cognitive changes, including difficulty in concentrating, fear of being alone, fear of death, fear of the offender's return and fear of a recurrence
- Interpersonal difficulties at work or school and with friends and family members; mistrust of others (especially men) is common
- Alcohol or drug use or abuse
- Suicidal thoughts and attempts

LONGER-TERM EFFECTS

- Feelings of being alone
- Suspicion and distrust of others
- Self-imposed restrictions in daily life
- Episodic depression
- Sexual dysfunction

The degree and severity of both the immediate and longer-term effects of sexual assault depend on the nature of the assault, with attempted and completed rape being the most psychologically damaging. One-quarter of rape victims do not consider themselves fully recovered even as long as 4–6 years after the assault.

COURSE OF RECOVERY

Three phases in recovery after sexual assault have been identified.

- *Acute phase:* Immediately follows the assault and is characterized by symptoms described above.
- *Recoil phase:* Emotional and physical symptoms wane, and victim may resume her normal day-to-day activities. During this phase, she is likely to deny or minimize the effects of the assault upon her and refuse offers of assistance.
- *Reintegration phase:* May occur weeks, months or even years after the assault. At this time, the victim re-experiences the symptoms characteristic of the acute phase. This is sometimes triggered by an upcoming court appearance or the anniversary of the assault. During this time, the experience of the assault is integrated into the entirety of the victim's life.

INTERVENTION

Immediately after the assault, allow the victim to wait in a quiet room away from any noise and confusion. Whenever possible, a female nurse or resource person should remain with the woman throughout her stay at the medical facility.

Maintain an empathetic, non-judgmental and non-intrusive attitude that communicates understanding of the emotional upheaval the victim is experiencing. If the victim is reluctant to talk about her experience, do not probe or otherwise pressure her to do so. On the other hand, if the victim elects to vent, validate her emotions and "normalize" her reactions (i.e., let her know that her experiences are not dissimilar to those of other victims).

Explain the medical procedures that the victim will undergo and the rationale for them (i.e., to determine any injuries, test for venereal diseases and document assault for possible legal proceedings). *Be familiar with the adult sexual assault examination (ASAE) kit.*

When possible, ask the victim if she would prefer a female professional caregiver. In all cases, another woman should be present in the room during the medical examination.

Determine whether the sexual assault could have resulted in a pregnancy; if so, discuss the possibility of administering immediate pregnancy prophylaxis. Discuss the client's need and wish for prophylaxis for sexually transmitted disease (STD) (*see "Sexually Transmitted Diseases," in chapter 11, "Communicable Diseases"*).

Accord the victim the dignity of making her own decisions about who can be told that she has been assaulted and indicate that, whatever her decision, she has your support.

Provide information on police and court procedures and on what may be expected as a consequence of specific legal intervention. The decision to contact the police must be made by the victim.

Keep all information given by the victim confidential unless she specifically requests otherwise.

Offer to talk to the victim's family and friends about their reactions to the rape and the ways in which they can support the victim during the recovery process. If the victim so wishes, explain to the family the importance of allowing the victim to talk about her experience at her own pace.

Inform the victim of any services specifically available for sexual assault victims. In many areas, rape crisis centers located in major urban centers will accept collect long-distance telephone calls.

Help the victim to clarify the problems that need immediate attention (e.g., where and with whom she can stay in order to feel safe) and assist her in taking actions to solve these problems.

Arrange a follow-up appointment at which time bruising not evident during the initial examination can be documented and the victim's adjustment can be monitored. During this appointment, it is important to give the victim information about the recovery phases. In particular, the victim should know that the symptoms she is currently experiencing will subside (the time frame is variable), but she is likely to re-experience these symptoms as part of the recovery process.

If it appears that the victim is unable to function, a psychiatric and psychological referral should be considered.

FAMILY VIOLENCE

Maintain a high index of suspicion and include matter-of-fact screening for abuse as a routine part of good healthcare.

Information about child abuse and child sexual abuse is presented in the *MSB Clinical Guidelines in Pediatrics for Northern Nursing Stations.*

SPOUSAL ABUSE

The healthcare system, and nurses, physicians and public health personnel in particular, are in a strategic position to identify and assist people who are in abusive relationships. Battered women often do not recognize the nature of the problem or identify themselves as "battered," and in cases where they do, they frequently conceal the situation because of shame or fear of retaliation. The healthcare facility often provides the first opportunity to put the problem in perspective for the victim and advise her about her options.

There are four major categories of physical injury or trauma frequently exhibited by but not limited to women seeking medical attention after assault:

- Serious bleeding injuries, especially to the head and face; in the case of sexual assault, there may be vaginal or anal tearing that requires stitching
- Internal injuries, concussion, perforated eardrums, damaged spleen or kidney, abdominal injuries, punctured lungs, severe bruising, eye injuries and strangulation marks on the neck
- Burns from cigarettes, hot appliances, scalding liquids or acid
- Broken or cracked jaw, arm, pelvis, rib, collar bone or leg

Notice also signs of old, untreated injuries. Some women do not attend medical services or are not allowed to do so. Evidence of previous injuries may establish the presence of a pattern. Note your observations and suspicions on the chart so that other medical personnel will be alert for other indications of abuse.

Pregnancy increases susceptibility to assault.

Apart from the obvious physical evidence, there are a number of more subtle physical and psychological symptoms that should be noted:

- Anxiety attacks or depression
- Psychosomatic complaints, including headache, pains in the chest or abdomen, insomnia, fatigue and backache
- Stiff neck or shoulder muscles (due to violent shaking), which mimic the symptoms of whiplash
- Damage to the eardrums
- Marital problems, especially where reference is made to fighting (arguing), jealousy, impulsiveness or drinking on the part of the husband or wife
- Substance abuse problems
- Repeated suicidal gestures or attempts
- Uncontrollable crying

Such vague or non-specific symptoms often lead the healthcare provider to feel that "There is something going on and I do not know what it is." These complaints, coupled with frequent visits to the healthcare facility, poor compliance with treatment recommendations and unresponsiveness to treatment, form what is known as the spousal abuse syndrome.

Guidelines for Assessment and Management

To confirm the abuse, you must ask the woman or man directly if the partner is hitting or threatening to do so. Both men and women tend to minimize abuse, and it is often useful to give examples and to phrase questions in such a way that the client feels that he or she has permission to talk about the abuse.

- Interview and examine the assaulted client by herself or himself or with an advocate present. The client will not feel free to talk if her or his partner is nearby.
- A female client may be more comfortable talking to a woman, whether a nurse, doctor or social services worker. Clients should be asked about their preference.
- Allow the client to talk at her or his own pace. Do not pressure. This may be the only chance the client has to disclose.
- Indicate that you believe what is being said. Be supportive. Discuss options, but do not give advice. Avoid wording that implies blame.
- Avoid expressions of disgust, horror or anger in response to the abuse; also avoid "putting down" the abuser.
- Let the client know that no one deserves or has to tolerate abuse.
- Assess present danger. If there are children in the home, assess whether they are in danger. If you honestly believe that there is a clear danger, address it immediately.
- Offer assistance in arranging for safety. Possible safe refuges are abuse shelters, transition homes or the home of a sympathetic relative or friend.
- Offer to contact the police should the client wish to lay a charge or to have the police lay a charge. Make sure that you know the procedures and the victim's legal rights to make it easier to decide and to act.
- Help set up a safety plan. Assist the person in leaving the home or the relationship if that is desired, but do not pressure the person to do so. Try to reduce anxiety and provide necessary information so that rational, informed decisions regarding life and safety can be made.
- Provide information on the resources and community supports available. If a support group for assaulted women or men exists in the community, ask if the person would like to be contacted by one of its members.
- Document the physical and psychological signs of abuse carefully and thoroughly in the appropriate chart or record. This report should include a description of the injuries requiring medical attention and the treatment provided and a description of any injuries not requiring medical attention (e.g., bruises and minor lacerations).

ELDER ABUSE

Because of the greater need for and use of medical services by elderly people, healthcare professionals are in an ideal situation to detect potential and actual cases of elder abuse. However, because of the absence of a standard definition and a lack of recognition of the problem, elder abuse is under-reported.

As for other victims of family violence, shame, embarrassment and fear may make disclosure of abuse difficult.

The family is the greatest source of abuse, with the most frequent offenders being a son, a daughter and a spouse, in that order.

An elderly person, like a child, is often dependent and can represent a burden to the caregiver, which results in either intentional or unintentional abuse. Elderly people are often unwilling to lay charges because of their dependence, lack of alternatives, fear of abandonment and reprisal, fear of institutionalization or sense of loyalty to the family.

Factors unique to the elderly abused victim:

- Without intervention, the abuse is likely to continue for the remainder of the person's life.
- Institutionalization may be the only alternative to the present living situation.

Those at highest risk for abuse by family members are single or widowed women > 75 years of age who are living with relatives and who have moderate to severe physical or mental impairments, such that assistance is required to meet basic needs.

Types of Abuse of the Elderly

Physical

- Assault
- Rough handling
- Gross neglect
- Withholding of food or personal or medical care

Psychosocial

- Confinement
- Isolation
- Lack of attention
- Intimidation
- Verbal or emotional abuse

Financial

- Withholding finances
- Fraud
- Theft
- Misuse of funds
- Withholding means for daily living

The most frequent type of abuse is financial, followed by psychosocial and physical.

Symptoms of Physical Abuse and Neglect

- Bruises, welts, burns and other similar lesions for which adequate explanation is lacking
- Sores, ulcerations and other similar lesions that do not heal
- Undernourishment and dehydration when mental alertness enables expression of needs but immobility prevents independently meeting those needs
- Oversedation or withholding of prescribed drugs
- Failure to keep medical appointments for needed care (because no one will take the person to the appointment)

Emotional or Psychological Symptoms

- Denial of any problems in relation to caregivers and/or overprotectiveness of caregivers
- Emotional withdrawal and passivity; resignation to current life situation
- Fear and anxiety
- Unusual ease in settling into a medical setting (relief from abusive situation)
- Absence of expectations of being comforted

Assessment and Management

- Assess mental competence and refer to territorial or provincial mental health legislation to determine possible courses of action.
- If protective legislation for vulnerable or elderly adults exists, report suspected cases of abuse to the agency mandated to investigate and intervene.
- The elderly person, if judged competent, is entitled to make decisions that effect his or her life. The language used when discussing the elderly person's living situation should reflect this (i.e., avoid infantilization).
- Determine whether abuse or neglect reflects inadequate preparation or unrealistic expectations on the part of the caregivers.
- Use outreach programs such as a home nursing program, Meals on Wheels, homemakers, and home help aids to enable the elderly person to remain in his or her residence and community.
- Consult community social services to determine what form of assistance would be available to the elderly person and the care providers.
- Ensure regular medical and nursing care, using frequent home visits to monitor the risk to the elderly person.
- Ensure that there is an accurate and complete medical and social history on the medical record so that this information is available if legal decisions are made concerning the abused person.

- Establish a positive relationship with both the elderly person and the caregiver/abuser.
- Engage social services and other members of the extended family to reduce the stress on the caregiver's family.
- Provide counseling to the abused elderly person and the caregiver to discover and resolve hidden conflict that may be at the root of the problem.
- As a last resort, removal from the home may be necessary. If consent cannot be obtained through counseling, it may be necessary to proceed by way of the legal process, including appointment of a legal guardian.

Special Considerations in Conducting an Interview about Potential Elder Abuse

- In the initial stages, the suspected victim should be interviewed separately and the degree of risk to the person's physical and emotional well-being should be determined.
- Members of the family, boarding home staff or other caregivers should be interviewed separately.
- Note the client's mental status, behavior, emotional responses and attitudes toward the caregivers.
- Note the attitude of the caregivers toward caregiving, control of the client's activities, extent of outside contacts, and the physical and emotional well-being of their charge.
- Ensure that the best qualified and most appropriate (with respect to mandate) resource person is notified and made responsible for conducting the necessary interviews and investigations.

RESOURCE UTILIZATION IN COMMUNITY MENTAL HEALTH CARE

Perhaps in no other clinical area is the mobilization and coordination of paramedical and non-medical resources more important for effective treatment and prevention than in mental health.

Much of mental health (and, conversely, mental illness) is the product of social experiences in a variety of contexts (family, friendships, school, work, recreation, community). These same "contexts" can be mobilized to provide therapeutic or health-promoting environments and experiences.

GUIDELINES FOR RESOURCE UTILIZATION IN MENTAL HEALTH CARE

Identify the resources currently or potentially involved with the client or the mental health problem. Consider both formal (social service, medical, educational) and informal (family, spouse, friends, volunteers) resources.

Make or facilitate referral to appropriate services or agencies and enlist the help of informal resources. Some effort may be required to "sell" the service to the client or to persuade the resource to become involved. There may be stigma, fear, misunderstanding, mistrust or indifference on the part of either the client or the resource.

Coordinate or encourage coordination of all the resources involved. Face-to-face meetings of both the formal and informal resource persons, while time consuming, are ultimately more efficient. They also permit the following to take place:

- sharing of information
- assignment of goals
- identification of expectations of both the client and the resource person
- clarification of responsibilities
- establishment of communication networks
- development of a mutually acceptable plan
- avoidance of duplication of effort
- a public commitment to provide a service or take action.

Collaborate with the other resources in providing the service. Conduct joint client interviews where appropriate. Offer treatment or other programs jointly with other resources.

Keep the informal resources, particularly the family and, where possible, the client, centrally involved in the process. Doing so encourages a sense of mastery, independence and responsibility.

Work with others, where possible. The natural caregivers generally have more contact and a more intense and meaningful involvement with the client and therefore have a significant impact. The professionals' role is to provide information and guidance to the caregivers so that their interactions with the client will be salutary and even deliberately systematic and therapeutic in some cases.

This same principle applies to more formal "helpers," such as volunteers, church members and clergy, self-help organizations and even the other community agencies providing service to the client. Some of these agencies have frequent and significant contact with clients and can play an active role in treatment and follow-up.

Provide support for the caregivers, for example by offering back-up to informal helpers, by linking resources working on similar problems, by sharing information about community resources and by providing technical assistance. If possible, offer training through workshops or information sessions in your specialty to help the resources (formal and informal) to serve their mental health charges.

Ensure that communication between the concerned resources is open and adequate.

Discuss with the resource people involved the limits and constraints imposed by the principle of confidentiality (*see "Records and Confidentiality," in "Clinical Assessment and Management," above, this chapter*).

Participate as a resource in the development of self-help and parent support groups for various classes of mental health problems, providing the necessary support and supervision.

Establish formal liaison between the agencies most immediately involved with mental health problems. This might be by way of standing or ad hoc interagency committees. It is better to have such committees in place relatively permanently than to have to assemble one as each problem arises. This is particularly true for traumatic personal experiences requiring mental health intervention, such as child abuse, sexual abuse and wife battering, but could be extended to less traumatic and more long-standing problems such as parenting difficulties, mental retardation, learning disabilities, juvenile delinquency and substance abuse.

Effective case-finding and resource utilization depend on well-informed professional and lay communities. Community resource directories, advertisements of special events (e.g., talks, open houses, health fairs) and interagency conferences are good means for keeping the community aware of its resources.

Volunteer corps are extremely helpful with inpatient care and preventive activities. The Canadian Mental Health Association is a particularly valuable resource for a community, and development of a local chapter and use of its resources are encouraged.

PROGRAM CONSULTANTS

In sparsely populated, resource-poor areas, the professional in almost any discipline is often expected (or expects himself or herself) to be an expert in every aspect of his or her profession. Recognizing the unrealistic nature of this expectation does not always allay the feeling that one should know or be able to do something.

At the same time, this feeling of responsibility often persuades one not to bother someone else with the problem, with the result that the individual feels frustrated and dissatisfied, and nothing gets done.

Consultation on mental health programming is available from a number of sources (Health Canada, universities, provincial or territorial departments of health and human resources, the Canadian Mental Health Association and various special interest groups), which should be used as resources in any way possible. Most agencies are more than willing to share their knowledge and expertise.

ABBREVIATIONS

ABC	airway, breathing and circulation
ABO	blood typing system
ACE	angiotensin-converting enzyme
AIDS	acquired immunodeficiency syndrome
ALT	alanine aminotransferase
ANA	antinuclear antibody
AP	anteroposterior
ASA	acetylsalicylic acid
ASAE	adult sexual assault examination
AST	aspartate aminotransferase
AZT	zidovudine
BCG	bacille Calmette-Guérin
bid	twice a day
bpm	beats per minute
BUN	blood urea nitrogen
CHF	congestive heart failure
CNS	central nervous system
COPD	chronic obstructive pulmonary disease
CPR	cardiopulmonary resuscitation
CSF	cerebrospinal fluid
CT	computed tomography
CVA	cerebrovascular accident
D5W	5% dextrose in water
D5W/0.25% NS	5% dextrose in 0.25% normal saline
DIP	distal interphalangeal
DS	double strength
DTs	delirium tremens
DUB	dysfunctional uterine bleeding
ECG	electrocardiogram or electrocardiography
ECHO virus	enteric cytopathogenic human orphan virus
ENT	ear, nose and throat
ESR	erythrocyte sedimentation rate
FEV_1	forced expiratory volume in the first second
FSH	follicle-stimulating hormone
G6PD	glucose-6-phosphate dehydrogenase
GAS	group A *Streptococcus*
GBS	group B *Streptococcus*
GERD	gastroesophageal reflux disease
GGT	gamma-glutamyltranspeptidase
GI	gastrointestinal
GLA	gamma-linolenic acid
GTT	glucose tolerance test
GU	genitourinary
Hb_{A1C}	glycosylated hemoglobin
HCG	human chorionic gonadotropin
HDL	high-density lipoprotein
HELLP	hemolysis, elevated liver enzymes, low platelet count
HIV	human immunodeficiency virus
HMG-CoA	HMG co-enzyme A (statin)
HPV	human papillomavirus
HRT	hormone replacement therapy
hs	at bedtime
IBS	irritable bowel syndrome
INH	isoniazid
INR	international normalized ratio
IU	international units
IUD	intrauterine device
IUGR	intrauterine growth retardation
IV	intravenous
JVP	jugular venous pressure
LDH	lactate dehydrogenase
LDL	low-density lipoprotein
LFT	liver function tests
MCHC	mean corpuscular hemoglobin concentration
MCP	metacarpophalangeal
MCV	mean corpuscular volume
MDI	metered dose inhaler
MRI	magnetic resonance imaging
NSAID	nonsteroidal anti-inflammatory drugs
OC	oral contraceptive

OCP	oral contraceptive pills
od	once daily
OTC	over-the-counter
Pap	Papanicolaou
pc	after a meal
PCP	phencyclidine
PEFR	peak expiratory flow rate
PERRLA	pupils equal, round, reactive to light; accommodation normal
PID	pelvic inflammatory disease
PIP	proximal interphalangeal
PMI	point of maximal impulse
PMS	premenstrual syndrome
PO	by mouth
PPD	purified protein derivative
prn	as required
PSA	prostate surface antigen
PT	prothrombin time
PTT	partial thromboplastin time
PUD	peptic ulcer disease
PV	per vagina
PVC	premature ventricular contractions
q#h	every # hours
qid	four times a day
RBC	red blood cells
RhIG	Rh immune globulin
SC	subcutaneous
SD	standard deviation
SL	sublingual
SPE	serum protein electrophoresis
SSRI	selective serotonin re-uptake inhibitors
STD	sexually transmitted disease
STSS	streptococcal toxic shock syndrome
T_4	thyroxine
TB	tuberculosis
TIA	transient ischemic attack
TIBC	total iron-binding capacity
tid	three times a day
TSH	thyroid-stimulating hormone
VDRL	Venereal Disease Research Laboratory
VLDL	very-low-density lipoprotein
WBC	white blood cells

BIBLIOGRAPHY

BOOKS AND MONOGRAPHS

Benenson, A., editor. *Control of Communicable Diseases Manual*, 16th ed. American Public Health Association, Washington, DC, 1995.

Campbell, J.E. *Basic Trauma Life Support for Paramedics and Advanced EMS Providers*, 3rd ed. Prentice-Hall, Inc., New York, NY, 1995.

Canadian Task Force on the Periodic Health Examination. *The Canadian Guide to Clinical Preventive Health Care*. Health Canada, Ottawa, ON, 1994. Cat. No. H21-117-1994E.

Carruthers-Czyzewski, P., editor. *Nonprescription Drug Reference for Health Professionals*. Canadian Pharmaceutical Association, Ottawa, ON, 1996.

Cash, J.C.; Glass, C.A. *Family Practice Guidelines*. Lippincott Williams & Wilkins, Philadelphia, PA, 1999.

Chapman K, Tames P. *Breathing to Live*. Canadian Medical Association, Ottawa, ON, 1991.

Chapman K, Tames P. *Breathing to Live* [supplement]. Canadian Medical Association, Ottawa, ON, 1994.

Chin, H.G. *On Call Obstetrics and Gynecology*. W.B. Saunders Company, Philadelphia, PA, 1997.

Dambro, M.R. *The 5 Minute Clinical Consult*. Williams & Wilkins, Philadelphia, PA, 1995.

Edmunds, M.; Mayhew, M. *Procedures for Primary Care Practitioners*. Mosby, Baltimore, MD,1996.

Ford, L.C. *Nurse Practitioner's Drug Handbook*. Springhouse Corporation, Springhouse, PA, 1998.

Goroll, A.; May, L.; Mulley, A., Jr. *Primary Care Medicine—Office Evaluation and Management of the Adult Patient*, 3rd ed. J.B. Lippincott Co., Philadelphia, PA, 1995.

Graber M.A. General surgery: abdominal pain. In: *University of Iowa Family Practice Handbook*, 3rd ed. Mosby, St. Louis, MO, 1997.

Gray, J., editor-in-chief. *Therapeutic Choices*, 2nd ed. Canadian Pharmacists Association, Ottawa, ON, 1998.

Health Canada. *Canadian Immunization Guide*, 5th ed. Health Canada, Ottawa, ON, 1998.

Health Canada. *Canadian STD Guidelines*. Health Canada, Ottawa, ON, 1998.

Jamison, J. *Differential Diagnosis for Primary Practice*. Churchill Livingston, London, UK, 1999.

Jarvis, C. *Physical Examination and Health Assessment*, 2nd ed. W.B. Saunders Company, Philadelphia, PA, 1996.

Laplante, L. *Hypertension: The Therapeutic Alliance*, 2nd ed. Grosvenor House Press Inc., Toronto, ON, 1994.

Lay, T., et al. *Meeting Report: Managing Acid-Related Upper GI Disorders*. Published through an educational grant from Novartis Consumer Health Canada Inc., 1999.

Levine, M.; Lexchin, J.; Pellizzari, R., editors. *Drugs of Choice*, 2nd ed. Canadian Medical Association, Ottawa, ON, 1997.

Lommel, L.L.; Jackson, P.L. *Assessing and Managing Common Signs and Symptoms*. The Regents, University of California, San Francisco, CA, 1997.

Medical Services Branch. *Guidelines for Delivery of HIV/AIDS Programs and Services*. Health Canada, Ottawa, ON, 1995.

Medical Services Branch. *MSB Clinical Guidelines in Pediatrics for Northern Nursing Stations*. Health Canada, Ottawa, ON, 1995.

Medical Services Branch. *Patient Care in Flight Manual*. Health Canada, Ottawa, ON, 1985.

Petterson, W.G. *Non-Ulcer Upper Gastrointestinal Disorders*, 2nd ed. Grosvenor House Press Inc., Toronto, ON, 1995.

Rubin, R.H.; Voss, C.; Derksen, D.J. *Medicine: A Primary Care Approach.* W.B. Saunders Company, Philadelphia, PA, 1996.

Stanhope, M.; Knollmueller, R.N. *Handbook of Community and Home Health Nursing*, 2nd ed. Mosby Year Book, Inc., St. Louis, MO, 1996.

Toth, P.P.; Jothivijayarani, A., editors. *University of Iowa Family Practice Handbook*, 3rd ed. Mosby, St. Louis, MO, 1997.

Trobe, J.D. *The Physician's Guide to Eye Care*. American Academy of Ophthalmology, San Francisco, CA, 1993.

Uphold, C.R.; Graham, M.V. *Clinical Guidelines in Family Practice*, 3rd ed. Barmarrae Books, Gainesville, FL, 1998.

INTERNET GUIDELINES, STATEMENTS AND OTHER DOCUMENTS

Internet addresses are valid as of June 2000.

Canadian Association for Study of the Liver. *Canadian Consensus Conference on the Management of Viral Hepatitis*. CASL and Health Canada. Available: http://www.lhsc.on.ca/casl/cont.htm.

Canadian Association of Emergency Physicians (CAEP). *Guidelines for Emergency Management of Adult Asthma*. CAEP, Ottawa, ON. Available: http://www.caep.ca/ [select "Guidelines" under "CAEP library"].

College of Physicians & Surgeons of Manitoba (CPSM). *Guideline No. 318. Medicine: Screening, Assessment and Diagnosis of Diabetes Mellitus and Gestational Diabetes Mellitus in Adults*. CPSM, Winnipeg, MB, revised November 1998. Available: http://www.umanitoba.ca/cgi-bin/colleges/cps/college.cgi/318.html.

College of Physician & Surgeons of Manitoba (CPSM). *Guideline No. 324. Investigation of Adult Blood Diseases*. CPSM, Winnipeg, MB, March 1995. Available: http://www.umanitoba.ca/cgi-bin/colleges/cps/college.cgi/324.html.

College of Physicians & Surgeons of Manitoba (CPSM). *Guideline No. 603. Women's Health: Screening and Diagnosis of Diabetes in Pregnancy*. CPSM, Winnipeg, MB, revised January 4, 2000. Available: http://www.umanitoba.ca/cgi-bin/colleges/cps/college.cgi/603.html.

College of Physicians & Surgeons of Manitoba (CPSM). *Guideline No. 628. Women's Health: Multiple Pregnancy*. CPSM, Winnipeg, MB, revised January 4, 2000. Available: http://www.umanitoba.ca/cgi-bin/colleges/cps/college.cgi/628.html.

College of Physicians & Surgeons of Manitoba (CPSM). *Guideline No. 902. Paediatrics: Initial Fluid and Electrolyte Management of Diabetic Ketoacidosis (DKA) in Childhood*. CPSM, Winnipeg, MB, revised June 1997. Available: http://www.umanitoba.ca/cgi-bin/colleges/cps/college.cgi/902.html.

Douwens, R. Hypothermia prevention, recognition and treatment. Articles, protocols and research on life-saving skills [Web site]. Available: http://hypothermia.org.

Institute for Clinical Evaluative Sciences (ICES). A "sore throat score" for use in the office. ICES, Toronto, ON, 1998. Available: http://www.ices.on.ca/docs/fb1410a.htm.

Ontario Association of Medical Laboratories (OAML). *Guidelines for Lipid Testing CLP 017*. OAML, Toronto, ON, August 1998. Available: http://www.oaml.com/guide.html.

Society of Obstetricians and Gynaecologists of Canada (SOGC). *Canadian Consensus Conference on Contraception*. SOGC, Ottawa, ON, May/June/July 1998. Available: http://www.sogc.org/SOGCnet/sogc_docs/common/guide/library_e.shtml.

Society of Obstetricians and Gynaecologists of Canada (SOGC). *Canadian Consensus Conference on Menopause and Osteoporosis*. SOGC, Ottawa, ON, November/December 1998. Available: http://www.sogc.org/SOGCnet/sogc_docs/common/guide/library_e.shtml.

SOGC Clinical Practice—Gynecology Committee and Social and Sexual Issues Committee. *Clinical Practice Guideline No. 14: Bacterial Vaginosis*. Society of Obstetricians and Gynaecologists of Canada, Ottawa, ON, March 1997. Available: http://www.sogc.org/SOGCnet/sogc_docs/common/guide/library_e.shtml.

SOGC Clinical Practice—Obstetrics Committee. *Clinical Practice Guideline No. 12: Guidelines for the Management of Nausea and Vomiting in Pregnancy*. Society of Obstetricians and Gynaecologists of Canada, Ottawa, ON, November 1995. Available: http://www.sogc.org/SOGCnet/sogc_docs/common/guide/library_e.shtml.

SOGC Clinical Practice—Obstetrics Committee. *Clinical Practice Guideline No. 71: Healthy Beginnings: Guidelines for Care during Pregnancy and Childbirth*. Society of Obstetricians and Gynaecologists of Canada, Ottawa, ON, December 1998. Available: http://www.sogc.org/SOGCnet/sogc_docs/common/guide/library_e.shtml.

SOGC Maternal–Fetal Medicine Committee. *Clinical Practice Guideline No. 15: Post-Term Pregnancy.* Society of Obstetricians and Gynaecologists of Canada, Ottawa, ON, March 1997. Available: http://www.sogc.org/SOGCnet/sogc_docs/common/guide/library_e.shtml.

SOGC Maternal–Fetal Medicine Committee. *Clinical Practice Guideline No. 61: Statement on the Prevention of Early-Onset Group B Streptococcal Infections in the Newborn*. Society of Obstetricians and Gynaecologists of Canada, Ottawa, ON, June 1997. Available: http://www.sogc.org/SOGCnet/sogc_docs/common/guide/library_e.shtml.

SOGC Maternal–Fetal Medicine Committee. *Clinical Practice Guideline No. 62: HIV Screening in Pregnancy*. Society of Obstetricians and Gynaecologists of Canada, Ottawa, ON, June 1997. Available: http://www.sogc.org/SOGCnet/sogc_docs/common/guide/library_e.shtml.

JOURNAL ARTICLES

Some of these journal articles are also available electronically through the Internet (Internet addresses are valid as of June 2000).

Al Garf, A. Differential diagnosis of lower abdominal pain in the female patient. *Update Primary Health Care Journal* 1996;10(1) [online journal]. Available: http://www.zurba.com/update/Issues/issues.htm.

American College of Obstetrics and Gynecology. ACOG practice patterns. Emergency oral contraception. Number 2, October 1996. *International Journal of Gynaecology and Obstetrics* 1997;56:203–210.

American College of Physicians. Clinical Guideline, Part 1. Screening for thyroid disease. *Annals of Internal Medicine* 1998;121:141–143. Also available: http://www.acponline.org/journals/annals/15jul98/ppthyroid1.htm.

American Diabetes Association. Clinical practice recommendations: diabetic retinopathy. *Diabetes Care* 1999;22(Supplement 1).

American Thoracic Society. Standards for the diagnosis and care of patients with chronic obstructive pulmonary disease. *American Journal of Respiratory Care* 1995;152:S77–S120.

Baloh, R.W. The dizzy patient. *Postgraduate Medicine* 1999;105(2):161–164, 167–172. Also available: http://www.postgradmed.com/issues/1999/02_99/baloh.htm.

Bessman, J.D.; Gilmer, P.R., Jr.; Gardner, F.H. Improved classification of anemias by MCV and RDW. *American Journal of Clinical Pathology* 1983;80:322–326.

Beveridge, R.C.; Grunfeld, A.F.; Hodder, R.V.; et al, for the CAEP/CTS Asthma Advisory Committee. Guidelines for the emergency management of asthma in adults. *Canadian Medical Association Journal* 1996;155(1):25–37. Also available: http://www.cma.ca/ cmaj/vol-155/0025.htm.

Borenstein, D.G. Management of neck pain: a primary care approach. *Hospital Practice (Office Edition)* 1998;33(10):147–150, 153–154, 160. Also available: http://www.hospprac.com/issues/1998/10/boren.htm.

Canadian Rhinitis Symposium. Assessing and Treating Rhinitis—a Practical Guide for Canadian Physicians (Proceedings of the Canadian Rhinitis Symposium, Toronto, ON, January 14–15, 1994). *Canadian Medical Association Journal* 1994;151(Supplement):S1–S27.

Canadian Thoracic Society Workshop Group. Guidelines for the assessment and management of chronic obstructive pulmonary disease. *Canadian Medical Association Journal* 1992;147(4):420–428.

Committee on Infectious Diseases and Committee on Fetus and Newborn, American Academy of Pediatrics. Revised guidelines for prevention of early-onset group B streptococcal (GBS) infection. *Pediatrics* 1997;99(3):489–496. Also available: http://www.pediatrics.org/all.shtml [subscription required to access online version].

Consensus Conference on the Treatment of Community Acquired Pneumonia in the Non-Immunocompromised Host. Management of community acquired pneumonia. *Canadian Journal of Infectious Disease* 1993;4:25–28. Summary available: http://www.theberries.ns.ca/Archives/CAPneumonia.html.

Division of Tuberculosis Prevention and Control, Laboratory Centre for Disease Control, Health Canada. Recommendations. In: *Proceedings of the National Consensus Conference on Tuberculosis*, December 3–5, 1997. *Canada Communicable Disease Report* 1998;24(Supplement 2). Also available: http://www.hc-sc.gc.ca/hpb/lcdc/publicat/ccdr/ 98vol24/24s2/index.html

Ernst, P.; FitzGerald, J.M.; Spier, S. Canadian Asthma Consensus Conference. Summary of recommendations. *Canadian Respiratory Journal* 1996;3(2):89–100. Also available: http://www.pulsus.com/ Respir/03_02/erns_ed.htm.

Feldman, R.D.; Campbell, N.; Larochelle, P.; et al., for the Task Force for the Development of the 1999 Canadian Recommendations for the Management of Hypertension. 1999 Canadian recommendations for the management of hypertension. *Canadian Medical Association Journal* 1999;161(12 Supplement):S1–S17. Also available: http://www.cma.ca/cmaj/vol-161/issue-12/ hypertension/index.htm.

Helewa, M.E.; Burrow, R.F.; Smith, J., et al. Report of the Canadian Hypertension Society Consensus Conference: 1. Definitions, evaluation and classification of hypertensive disorders in pregnancy. *Canadian Medical Association Journal* 1997;157:715–725. Also available: http://www.cma.ca/cmaj/vol-157/issue-6/0715.htm.

McIsaac, W.J.; White, D.; Tannenbaum, D.; et al. A clinical score to reduce unnecessary antibiotic use in patients with sore throat. *Canadian Medical Association Journal* 1998;158(1):75–83. Also available: http://www.cma.ca/cmaj/vol-158/issue-1/0075.htm.

Meltzer, S.; Leiter, L.; Daneman, D.; et al. 1998 clinical practice guidelines for the management of diabetes in Canada. *Canadian Medical Association Journal* 1998;159(8 Supplement):S1–S29. Also available: http://www.cma.ca/cmaj/vol-159/issue-8/diabetescpg/index.htm.

Moutquin, J.-M.; Garner, P.R.; Burrows, R.F.; et al. Report of the Canadian Hypertension Society Consensus Conference: 2. Nonpharmacologic management and prevention of hypertensive disorders in pregnancy. *Canadian Medical Association Journal* 1997;157:907–919. Also available: http://www.cma.ca/cmaj/vol-157/issue-7/0907.htm.

Ogilvie, R.I.; Burgess, E.D.; Cusson, J.R.; et al. Report of the Canadian Hypertension Society Consensus Conference: 3. Pharmacologic treatment of essential hypertension. *Canadian Medical Association Journal* 1993;149:575–584.

Paterson W.G.; Thompson, W.G.; Vanner, S.J., et al. Recommendations for the management of irritable bowel syndrome in family practice [consensus conference, June 1997, under the auspices of Queen's University Gastrointestinal Motility Education Centre National Conference]. *Canadian Medical Association Journal* 1999:161:154–160. Also available: http://www.cma.ca/cmaj/vol-161/issue-2/0154.htm.

Pryse-Phillips, W.E.M.; Dodick, D.W.; Edmeads, J.G., et al. Guidelines for the diagnosis and management of migraine in clinical practice. *Canadian Medical Association Journal* 1997;156:1273–1287. Also available: http://www.cma.ca/cmaj/vol-156/issue-9/1273.htm.

Pryse-Phillips, W.E.M.; Dodick, D.W.; Edmeads, J.G., et al. Guidelines for the nonpharmacologic management of migraine in clinical practice. *Canadian Medical Association Journal* 1998;159:47–54. Also available http://www.cma.ca/cmaj/vol-159/issue-1/0047.htm

Rey, É.; LeLorier J.; Burgess, E.; et al. Report of the Canadian Hypertension Society Consensus Conference: 3. Pharmacologic treatment of hypertensive disorders in pregnancy. *Canadian Medical Association Journal* 1997;157:1245–1254. Also available: http://www.cma.ca/cmaj/vol-157/issue-9/1245.htm.

Saint, S.; Bent, S.; Vittinghoffe, E.; et al. Antibiotics in chronic obstructive pulmonary disease exacerbations. A meta-analysis. *Journal of the American Medical Association* 1995;273(12):957–960.

Santen, S. Cholecystitis and biliary colic. In: *emedicine: Emergency Medicine* [online resource, updated May 21, 2000]. Available: emedicine.com [select "Gastrointestinal," under "Emergency medicine"].

Saskatchewan Health Services Utilization and Research Commission (SHSURC). *Cholesterol testing and treatment*. SHSURC, Saskatoon, SK, November 1995. Available: http://www.sdh.sk.ca/hsurc/cholesterolguideline.htm.

Shojania, A.M. How do you investigate a patient with anemia? *Manitoba Medicine* 1993;94–95.

Siafakas, N.M.; Vermeire, P.; Pride, N.B.; et al. Optimal assessment and management of chronic obstructive pulmonary disease (COPD). The European Respiratory Society Task Force. *European Respiratory Journal* 1995;8(8):1398–1420.

Swaanenburg, J.C.J.M.; Rutten, W.P.; Holdrinet, A.C.; et al. The determination of reference values for hematologic parameters using results obtained from patient populations. *American Journal of Clinical Pathology* 1987;88:182–191.

Therapeutics Initiative. Definitive treatment of peptic ulcer disease by eradication of *Helicobacter pylori* (*H. pylori*). *Therapeutics Letter*, issue 2, November 1994 [online journal]. Available: http://www.ti.ubc.ca/pages/letter2.html.

Therapeutics Initiative. Medical management of ischemic heart disease: the optimal use of nitrates. *Therapeutics Letter*, issue 6, May 1995 [online journal]. Available: http://www.ti.ubc.ca/pages/letter6.html.

Thompson, J.; Balfour, N.; Butt, P.; et al. Chest pain guideline and continuous quality improvement system for Canadian rural emergency health care facilities. *Canadian Journal of Rural Medicine* 1999;4(1):9–19. Also available: http://www.cma.ca/cjrm/vol-4/issue-1/0009.htm.

Tuberculosis Committee, Canadian Thoracic Society. Essentials of tuberculosis control for the practising physician. *Canadian Medical Association Journal* 1994;150:1561–1571.

Turner, A.R. A rational approach to the assessment of anemia. *Canadian Journal of Continuing Medical Education* 1993;Oct:19–29.

UK Prospective Diabetes Study Group. Intensive blood-glucose control with sulphonylureas or insulin compared with conventional treatment and risk of complications in patients with type 2 diabetes (UKPDS 33). *Lancet* 1998;352(9131):837–853. Also available: http://www.thelancet.com/newlancet/reg/issues/vol352no9131/.

Subject index

Note: "GAS" stands for "group A streptococcal"; drugs are indexed under their generic names.

A

B

C

D

E

F

G

H

I

J

K

L

M

N

O

P

Q

R

S

T

U

V

W

X

Z