Tetanus

Manitoba Health
Public Health
Communicable Disease Control Unit

Case Definition

Clinically compatible illness without other apparent medical cause, with or without laboratory evidence of the organism or its toxin, and with or without history of injury.

Reporting Requirements

- All specimens positive for *Clostridium tetani* or its toxin must be reported by laboratory.
- All cases must be reported by attending health care professional.

Clinical Presentation/Natural History

An acute disease induced by an exotoxin of the tetanus bacillus, which grows anaerobically at the site of an injury. The disease is characterized by painful muscular contractions, primarily of the masseter and neck muscles, secondarily of trunk muscles. A common first sign, suggestive of tetanus in older children and adults, is abdominal rigidity, though rigidity is sometimes confined to the region of injury. Generalized spasms occur, frequently induced by sensory stimuli; typical features of the tetanic spasm are the position of opisthotonus and the facial expression known as "risus sardonicus." The case-fatality rate, ranging from 10-90%, is highest in infants and the elderly. The rate varies inversely with the length of the incubation period and the availability of experienced intensive care unit personnel and resources. Neonatal tetanus is uncommon in industrialized countries and is caused by contamination of the cord stump.

Etiology

Clostridium tetani, the tetanus bacillus.

Epidemiology

Reservoir and Source: The reservoir is the intestine of horses and other animals, including humans, in which the organism is a harmless normal inhabitant. The source is soil or fomites contaminated with animal and human feces.

Transmission: Introduction of the organism from the environment where it is ubiquitous via wounds (punctures and lacerations), burns, or by injected contaminated street drugs. Tetanus occasionally follows surgical procedures, including circumcision. The presence of necrotic tissue and/or foreign bodies favours growth of the anaerobic pathogen.

Occurrence:

General: Worldwide. Sporadic and relatively uncommon in the United States and most industrial countries. During the period 1989-1990, there were 117 cases reported from 34 states in the United States; 58% occurred in people of 60 years of age while 6% were among those younger than 20 years of age. The case-fatality rate increased with age from 17% in those 40 to 49 years old to 50% in those 80 years or age or older. An average of 50 cases per year are reported. The disease is more common in agricultural regions and in underdeveloped areas, where contact with animal excreta is more likely and immunization is inadequate. It is an important cause of death in many countries of Asia, Africa and South America, especially in rural and tropical areas where tetanus neonatorum is common (see below). Parenteral use of drugs by addicts, particularly intramuscular or subcutaneous use, can result in individual cases and occasional circumscribed outbreaks.

Canada: In 1994 (latest year for which national statistics are available) there were three cases.

Manitoba: The two most recent cases occurred in 1991 and 1993. The 1991 case occurred in a farmer with an uncertain immunization history who had an injury from a cultivator tip.

Incubation Period: Usually three to 21 days, although it may range from one day to several months, depending on the character, extent and location of the wound; average 10 days. Most cases occur within 14 days. In general, shorter incubation periods are associated with more heavily contaminated wounds, more severe disease and a worse prognosis.

Susceptibility and Resistance: Susceptibility is general. Active immunity is induced by tetanus toxoid and persists for at least 10 years after full immunization; transient passive immunity follows injection of tetanus immune globulin (TIG) or tetanus antitoxin (equine origin). Infants of actively immunized mothers acquire passive immunity that protects them from neonatal tetanus. Recovery from tetanus may not result in immunity; second attacks can occur.

Period of Communicability: No evidence of communicability from person-to-person.

Diagnosis

History of an injury or apparent portal of entry may be lacking. Attempts for laboratory confirmation are of little help. The organism is rarely recovered from the site of infection, and there is usually no detectable antibody response.

Key Investigations

- Immunization history.

Control

Management of Cases:

Treatment:

- TIG IM in doses of 3,000-6,000 IU.
- **To obtain treatment doses of TIG, please contact your local Medical Officer of Health (MOH). If after regular hours, contact the MOH on call at 945-0183.**
- If TIG is not available, tetanus antitoxin (equine origin) in a single large dose should be given IV following appropriate testing for hypersensitivity (see footnote 3 in table below under **Preventive Measures**)
- IV metronidazole in large doses should be given for seven to 14 days.
- The wound should be debrided widely and excised if possible. Wide debridement of the umbilical stump in neonates is not indicated.
- Maintain an adequate airway and employ sedation as indicated. Muscle relaxant drugs together with tracheostomy or nasotracheal intubation and mechanically assisted respiration may be lifesaving. Active immunization should be initiated concurrently with therapy.

Public Health Measures:

- Isolation of patient not required.

Management of Contacts:

- No follow-up measures required.

Management of Outbreaks:

- Consider intravenous drug use as a potential source.

Preventive Measures:

- All persons should have received a primary immunization series and should receive booster doses of tetanus diphtheria combined toxoids every 10 years.
- Some travel clinics give tetanus diphtheria toxoids, if a booster dose has not been received within the last five years, to travellers visiting countries where sterile needles are not available, and who might sustain anything more severe than a clean, minor wound (see also section on wound prophylaxis in next paragraph). If this approach is used, care must be taken not to immunize so frequently that adverse reactions, due to high levels of circulating antibodies, occur.
- Prophylaxis of wounds. Tetanus prophylaxis in persons with wounds is based on careful assessment of whether the wound is clean or contaminated, the immunization status of the person, proper use of tetanus toxoid and/or TIG (see table, below), wound cleaning and, where required, surgical debridement and the proper use of antibiotics. Prophylaxis should be administered promptly on the day the wound occurred. Penicillin given for seven days may kill *C. tetani* in the wound, but this does not obviate the need for prompt treatment of the wound together with appropriate immunization.

Summary Guide to Tetanus Prophylaxis in Wound Management

History of tetanus immunization (doses)	Clean, minor wounds		All other wounds[1]	
	Td[2]	TIG[3]	Td	TIG[3]
Uncertain or <3	Yes[4]	No	Yes[4]	Yes
3 or more	No[5]	No	No[6]	No

1 "All other wounds" include: major wounds; those contaminated with dirt, animal excreta, other foreign bodies, or saliva; puncture wounds; or wounds with devitalized tissue.

2 For children <7, a pediatric formulation of diphtheria containing vaccine should be used (e.g., DaPTP/Hib depending on past immunization history and age). **For adults the tetanus booster should normally include diphtheria toxoid (i.e., Td) unless it is specifically contraindicated.**

3 Passive immunization with at least 250 IU of Tetanus Immune Globulin (TIG) IM (or 1,500 to 5,000 IU of antitoxin of animal origin if TIG is not available). Emergency departments are normally stocked with this amount of tetanus immune globulin. When tetanus toxoid and TIG or antitoxin are given concurrently, separate syringes and separate sites must be used.

When antitoxin of animal origin is given, it is essential to avoid anaphylaxis by first injecting 0.02 ml of a 1:100 dilution in physiologic saline intradermally, with a syringe containing adrenaline on hand. Pretest with a 1:1,000 dilution if there has been prior animal serum exposure, together with a similar injection of physiologic saline as a negative control. If after 15 to 20 minutes there is a wheal with surrounding erythema at least 3 mm larger than the negative control, it is necessary to desensitize the individual.

4 The primary immunization series with tetanus and diphtheria toxoids should be completed.

5 Yes, if more than 10 years have elapsed since the last dose. Children should have their immunization brought up to date according to the appropriate pediatric schedule (see the Canadian Immunization Guide).

6 Yes, if more than five years have elapsed since the last dose. Children should have their immunization brought up to date according the appropriate pediatric schedule (see the Canadian Immunization Guide).