

## Hantavirus Infection Pulmonary Syndrome



### Case Definition

- Demonstration of specific hantavirus IgM antibodies by ELISA or Western blot techniques; or
- PCR analysis of autopsy or biopsy tissues in specialized laboratories.

### Reporting Requirements

- All cases of IgM antibodies or positive isolates for hantavirus are reportable by laboratory.
- All clinical cases of hantavirus infection pulmonary syndrome are reportable by attending health care professional.

### Clinical Presentation/Natural History

Hantavirus infection often presents as a “flu-like” illness, characterized by fever, intense headache, myalgia, nausea and other gastro-intestinal complaints, followed by the abrupt onset of respiratory distress and hypotension. The illness can progress rapidly to severe respiratory failure (adult respiratory distress syndrome) and cardiogenic shock. An elevated hematocrit and thrombocytopenia are found in most cases. Crude mortality is as high as 50-60% and death is generally due to respiratory failure. In survivors, recovery is rapid, with full restoration of normal lung function.

### Etiology

A viral disease; approximately four different hantavirus species have been identified in North America and five in South America, with serologic cross-reactivity. The most common species is called Sin Nombre.

### Epidemiology

**Reservoir:** Major reservoir is the deer mouse. Hantavirus antibodies have also been found in pack rats, chipmunks and other wild rodents. Deer mice are found primarily in rural and semi-rural areas,

often in old buildings and barns. Rural dwellers, cottagers and campers are most at risk for exposure.

**Transmission:** Primarily transmitted through inhalation of aerosol from rodent saliva, urine or feces. Infection may also occur from rodent bites; from ingestion of food contaminated by rodent saliva, urine or feces; or from eye, mouth or broken skin contact with rodent saliva, urine or feces. There has been no evidence of person-to-person spread of virus species found in North America, or infection from pets or livestock. However, one hantavirus species from South America (Andes virus) has shown evidence of person-to-person spread.

### Occurrence:

**General:** The disease was first recognized in 1993 in the southwestern United States. Since then, sporadic cases have been reported elsewhere in the United States and in Canada. The first Canadian case occurred in 1994 in British Columbia. As of July 1999, 32 cases of hantavirus pulmonary syndrome had been confirmed in Canada: six in British Columbia, 20 in Alberta, five in Saskatchewan and one in Manitoba. Many of these cases resulted from occupational exposures during ranch or farm activities. Disease occurrence coincides with the presence and increased number of carrier rodents.

**Manitoba:** The first confirmed case of hantavirus infection was reported in 1999. A second case was reported in 2000.

**Incubation Period:** The incubation period is approximately two weeks, with a range from a few days to six weeks.

**Susceptibility and Resistance:** All persons without prior infection are presumed to be susceptible. No inapparent infections have been documented.

**Period of Communicability:** As indicated above, person-to-person hantavirus transmission has only been reported from one species of hantavirus found in South America.

## Diagnosis

Diagnosis requires the demonstration of specific hantavirus antibodies by ELISA. Blood specimens should be sent to the Cadham Provincial Laboratory (CPL), which will forward them to the Canadian Science Centre for Human and Animal Health (CSCHAH) in Winnipeg for testing. Autopsy or biopsy tissues may also be sent to CSCHAH (via the CPL) for PCR analysis.

## Key Investigations

- History of relevant exposure. Investigate for occupational exposure (e.g., farm or other outdoor worker), exposure through camping, hiking, etc., or inadequate home rodent control.
- Laboratory confirmation.

## Control

### Management of Cases:

- If “flu-like” symptoms occur three to 42 days following exposure to rodents, refer to a physician for investigation and management.
- Exterminate rodents in and around households if feasible.
- For respiratory distress syndrome, specialist respiratory intensive care management is required. No specific antiviral drugs are currently recommended.
- Isolation precautions are not required, as person-to-person transmission has not occurred in North America.

### Management of Contacts:

- Human contacts require no investigation unless a common exposure is suspected. If so, then patient management is as indicated above.

### Management of Environment:

- Prevent rodents from entering homes by using steel wool, metal roof flashing or cement to cover all openings.

- Use rodent-proof storage containers for food, pet and animal food, grain and garbage. Discourage rodents from living around homes by keeping grass short, storing hay on pallets, placing wood piles 100 feet or more from the home and raising them at least 12 inches off the ground, and removing abandoned vehicles, discarded tires and old, unused buildings (which may serve as nesting sites) from the property.
- Trap and dispose of mice living in homes.
- Dispose of dead rodents and droppings using plastic or rubber gloves. Wet carcasses with a disinfectant (such as dilute bleach, 1:10 solution) and place them in double plastic bags or burn them. Clean all traps with disinfectant.
- When cleaning areas contaminated by rodent urine, feces or nests, ventilate the area by opening windows and doors; water down the area with general household disinfectant to reduce dust; damp-mop floors and carpets with a mixture of water, detergent and disinfectant before vacuuming or sweeping; wear full length clothing to avoid skin contamination; use gloves to handle soiled clothes; wash dirty laundry with hot water and detergent, and dry thoroughly; if dust generation cannot be avoided in an area that has to be cleaned, a NIOSH (U.S. National Institute of Occupational Safety and Health) approved dust/fume/mist respirator should be used.

### Management of Outbreaks:

- Rodent control. Professional assistance may be required.
- Surveillance for hantavirus infection in wild rodents.
- Public education regarding rodent avoidance and rodent control in homes. Monitoring of rodent numbers and infection rates is desirable but is as yet of unproven value.

### Preventive Measures:

- Wash hands and face well before eating, drinking or smoking.

- Avoid playing on hands and knees or camping in grass or other areas where there is evidence of rodents, such as tunnels, nests, rodent feces, etc. Do not play with wild rodents.
- Public education for farmers and other rural dwellers to avoid exposure.

## **Additional Resources**

### **For the public:**

Information Sheet: Prevention of Hantavirus Infection (revised June 2000). Available from Audiovisual and Publications Department, Manitoba Health, telephone (204) 786-7112, fax (204) 772-7213.