

# HANTAVIRUS

## REPORTING INFORMATION

- Class A(2)
- Report by the end of the next business day.
- [Confidential Case Report Card](#) (3812.11 rev. 12/81), [lab report](#) (3833.11), or telephone

## AGENT

Hantaviruses belonging to the family Bunyaviridae include Sin Nombre, Black Creek Canal, Bayou, New York, Hantaan, Prospect Hill, Puumala, Seoul viruses, and others. Since 1993, about 20 new hantaviruses have been described from the Americas, half of which are pathogenic to humans.

**Infectious Dose** - Unknown.

## CASE DEFINITION

For Hantavirus Pulmonary Syndrome (Sin Nombre virus)

### Clinical description

Hantavirus pulmonary syndrome (HPS), commonly referred to as hantavirus disease, is a febrile illness characterized by bilateral interstitial pulmonary infiltrates and respiratory compromise usually requiring supplemental oxygen and clinically resembling acute respiratory disease syndrome (ARDS). The typical prodrome consists of fever, chills, myalgia, headache, and gastrointestinal symptoms. Typical clinical laboratory findings include hemoconcentration, left shift in the white blood cell count, neutrophilic leukocytosis, thrombocytopenia, and circulating immunoblasts.

### Clinical case definition

An illness characterized by one or more of the following clinical features:

- a febrile illness (temperature  $>101^{\circ}\text{F}$ ) characterized by bilateral diffuse interstitial edema that may radiographically resemble ARDS, with respiratory compromise requiring supplemental oxygen, developing within 72 hours of hospitalization, and occurring in a previously healthy person
- an unexplained respiratory illness resulting in death, with an autopsy examination demonstrating noncardiogenic pulmonary edema without an identifiable cause

### Laboratory criteria for diagnosis

- detection of hantavirus-specific immunoglobulin M or rising titers of hantavirus-specific immunoglobulin G, or
- detection of hantavirus-specific ribonucleic acid sequence by polymerase chain reaction in clinical specimens, or
- detection of hantavirus antigen by immunohistochemistry

### Case classification

Confirmed: a clinically compatible case that is laboratory confirmed

### Comment

Laboratory testing should be performed or confirmed at a reference laboratory. Because the clinical illness is nonspecific and ARDS is common, a screening case definition can be used to determine which patients to test. In general, a predisposing medical condition (e.g., chronic pulmonary disease, malignancy, trauma, burn, and surgery) is a more likely cause of ARDS than HPS, and patients who have these underlying conditions and ARDS need not be tested for hantavirus.

## SIGNS AND SYMPTOMS

For Hantavirus Pulmonary Syndrome: Fever, myalgia and variable respiratory symptoms (e.g. cough) are followed by the abrupt onset of acute respiratory distress. Other symptoms reported during the early phase of illness have included headache and gastrointestinal complaints (e.g. abdominal pain, nausea, vomiting). The hospital course is characterized by fever, hypoxia, hypotension (*MMWR* 1993; Vol. 42 (42), p. 819).

The fatality rate is 44%.

## **DIAGNOSIS**

Specific serology, polymerase chain reaction, and immunohistochemistry are used to make the diagnosis.

### **Laboratory procedures available**

The specific tests described above are available at the Ohio Department of Health Laboratories (ODHL) (serology) and the Centers for Disease Control and Prevention (CDC). Specimens must be submitted via the ODHL. Contact the Chief Microbiologist at the ODHL, (614) 466-2278, for further details on specimen submission.

## **EPIDEMIOLOGY**

### **Source**

Rodents are the reservoir for the hantaviruses. The deer mouse (*Peromyscus maniculatus*) is the suspected primary reservoir for Sin Nombre virus (Hantavirus Pulmonary Syndrome). Mice, voles and rats are the reservoirs for Hantaan, Puumala and Seoul viruses, respectively. These viruses have specific species of rodents as reservoir hosts.

### **Occurrence**

In 1993, Hantavirus Pulmonary Syndrome was recognized in the southwestern U.S. As of October 9, 1998, 196 human cases have been identified from the U.S. Most cases (95%) were from states west of the Mississippi River. All cases were traced to exposure in rural areas. The reservoir host, the deer mouse, occurs in Ohio, however there have been no cases in Ohio.

The other Hantaviruses are known from South and Central America, Europe, and Asia; an estimated 100,000 cases occur annually. Antibody to Hantaan-related virus was found in wild rats collected in Columbus and Cincinnati, Ohio, as well as other inland U.S. cities, in 1983 (*J. Infectious Disease*, July 1985;152(1):126-136). Human cases due to Hantaan virus in the U.S. are not known. Some other hantaviruses occurring in the U.S. are Prospect Hill (non-pathogenic), Black Creek Canal, Bayou, and New York viruses.

### **Mode of Transmission**

Infected rodents shed hantavirus in feces, urine and saliva. Most human infections are thought to occur when infective saliva or excreta are inhaled as aerosols produced directly from the animal.

Transmission might also occur when dried materials contaminated by rodent excreta are disturbed, directly introduced into broken skin, the conjunctivae, or, possibly, ingested in contaminated food or water. Transmission via rodent bite has also occurred (*MMWR* 1993;42[RR-11]).

### **Period of Communicability**

Person-to-person transmission of hantaviruses is not known. Healthy rodents can shed hantaviruses for many weeks.

### **Incubation Period**

Five to 42 days is the generally recognized incubation period for hantaviruses. For Hantavirus Pulmonary Syndrome (Sin Nombre virus), an incubation period has not yet been defined, but is thought to be approximately 2 weeks, with a range from a few days to 6 weeks.

## **PUBLIC HEALTH MANAGEMENT**

### **Case**

#### Investigation

The Bureau of Infectious Disease Control at ODH can be contacted for assistance in evaluating suspect cases. Once a case is confirmed, a complete travel and clinical history should be obtained for the 6 weeks prior to onset. The Vector-borne Disease Program at ODH should be contacted regarding the environmental investigation for cases that appear to be acquired in Ohio.

### Treatment

Treatment usually involves maintenance of fluids, blood pressure, ventilation and electrolytes. Ribavirin therapy is under investigation.

### Isolation

No information currently available

### **Contacts**

No prophylactic treatment has yet been identified for contacts of cases. Person-to-person transmission is not believed to occur.

### **Prevention and Control**

Discourage rodent infestations by storing foods in sealed containers. Remove pet foods nightly and store in a secure place. Dispose of unwanted food and garbage in tight-fitting, rodent-proof containers. Eliminate rodent harborage for a distance of 100 feet from the home and other buildings. Seal holes where rodents may enter the home.

Eliminate rodents found in buildings with snap traps. Secure the trap on a length of string at least 2 feet long and tie the other end to a heavy object. Spray the trapped rodent and the area around the trap with 10% bleach solution (13 ounces of bleach to 1 gallon of water) or hospital-grade Lysol (over-the counter disinfectant sprays are apparently ineffective). The rodent and surrounding area should be thoroughly wetted before being handled. Wear rubber gloves to pick up the trap and rodent, placing the rodent in a sealable plastic bag. Place that bag into another plastic bag and seal tightly. Spray bag with disinfectant. Dispose of the bagged rodent in the trash or, if feasible, bury at a depth of 2-3 feet.

In places where the disease has occurred, the structure should be vacated until it has been professionally cleaned and disinfected, and the rodents have been eliminated by a professional equipped to work in places where there is a hazard of infection.

For more details on prevention and control, contact the Vector-borne Disease Program, ODH at 614-752-1029. See also *MMWR* 1993;42: (RR-11).