Hantavirus – Quick Tips

History

According to the Centers for Disease Control and Prevention (CDC), hantaviruses are a group of viruses that may be carried by some rodents. Some hantaviruses can cause a rare but deadly disease called Hantavirus Pulmonary Syndrome. The disease is commonly called “HPS” for short. Hantavirus and HPS first appeared on the radar of healthcare professionals in 1993 after a cluster of mysterious respiratory related deaths occurred in the Four Corners (the borders of Arizona, Colorado, New Mexico and Utah) region of the U.S.

Within six months of these reports, area medical investigators and virologists were able to link the deaths to a virus that was carried by rodents. Researchers then began to examine stored lung tissue from people in the area who died from unexplained lung diseases. They found evidence of infection from the hantavirus as early as 1959 indicating the virus existed, unrecognized, for several decades.

The CDC believes that the initial outbreak in the Four Corner region was caused by a 1993 increase of rainfall in the area. The resulting spike in crop production meant more food for rodents. The CDC estimates the rodent population increased by 100% over the prior year. This spike in population led to increased rodent contact with people.

How the Virus is Transmitted

According to the CDC, the deer mouse, white-footed mouse, cotton rat and rice rat are the known transmitters of hantaviruses in the U.S. But in the interest of safety, the CDC recommends avoiding contact with all rodents.

Transmission occurs, according to the CDC, when rodents shed the virus in their urine, droppings and saliva. The virus is mainly transmitted to people when they breathe in air contaminated with the virus.

The CDC describes the most common transmission method and less common methods this way:

The most common reason is when fresh rodent urine, droppings, or nesting

materials are stirred up, tiny droplets containing the virus get into the air. This process is known as “airborne transmission.”

Less common methods rodents may spread hantavirus to people include:

- If a rodent with the virus bites someone, the virus may be spread to that person, but this type of transmission is rare.
- Researchers believe that people may be able to get the virus if they touch something that has been contaminated with rodent urine, droppings, or saliva, and then touch their nose or mouth.
- Researchers also suspect people can become sick if they eat food contaminated by urine, droppings, or saliva from an infected rodent.

According to the Mayo Clinic, the North American strain of HPS isn’t transmitted via person-to-person contact. They state, “People who become infected with the North American strain of hantavirus pulmonary syndrome aren’t contagious to other people. However, certain outbreaks in South America have shown evidence of being transmitted from person-to-person, which illustrates variation across strains in different regions.” The CDC’s hantavirus resource page also states that HPS cannot be transferred person-to-person via blood transfusion.

The CDC flags occupations such as construction, utility and pest-control as being most at risk for hantavirus exposure. However, anyone who comes in contact with a rodent is at risk.

The CDC also identifies activities that place individuals at risk for hantavirus exposure as:

- Opening and cleaning previously unused buildings
    - Opening or cleaning cabins, sheds and outbuildings, including barns, garages and storage facilities that have been closed during the winter is a potential risk for hantavirus infections, especially in rural settings.
- Housecleaning activities
    - Cleaning in and around your own home can put you at risk if rodents have made it their home too. Many homes can expect to shelter rodents, especially as the weather turns cold.
- Work-related exposure
    - Construction, utility and pest control workers can be exposed when they work in crawl spaces, under houses, or in vacant buildings that may have a rodent population.
- Campers and hikers
    - Campers and hikers can also be exposed when they use infested trail shelters or camp in other rodent habitats.

Through January of 2016, there were 692 confirmed cases of the HPS in the U.S. This map from the CDC shows the breakdown for each state (map current as of January 8, 2016):

Hantavirus Pulmonary Syndrome (HPS) Cases, by State of Residence

Symptoms and Treatment

According to the CDC, “due to the small number of HPS cases, the “incubation time” is not positively known. However, on the basis of limited information, it

appears that symptoms may develop between one and eight weeks after exposure to fresh urine, droppings, or saliva of infected rodents.” The CDC breaks symptoms down into early and late. Early symptoms include fatigue, fever and muscle aches, especially in the large muscle groups—thighs, hips, back, and sometimes shoulders. These symptoms are universal. There may also be headaches, dizziness, chills and abdominal problems, such as nausea, vomiting, diarrhea, and abdominal pain. About one-half of all HPS patients experience these symptoms.

Four to 10 days after the initial phase of illness, the late symptoms of HPS appear. According to CDC resources, “these include coughing and shortness of breath, with the sensation of, as one survivor put it, a “…tight band around my chest and a pillow over my face” as the lungs fill with fluid.” The CDC reports that HPS has a mortality rate of 38%.

There are limited treatment options for HPS, and both the CDC and Mayo Clinic state that because of this, the earlier the victim receives medical attention the better the long term prognosis. The Mayo Clinic offers the following overview of treatment protocols:

Specific treatment options for hantavirus pulmonary syndrome are limited. But the prognosis improves with early recognition, immediate hospitalization and adequate support for breathing.

Supportive therapy

People with severe cases need immediate treatment in an intensive care unit. Intubation and mechanical ventilation may be needed to support breathing and to help manage fluid in the lungs (pulmonary edema). Intubation involves placing a breathing tube through your nose or mouth into the windpipe (trachea) to help keep your airways open and functioning.

Blood oxygenation

In extremely severe cases of pulmonary distress, you’ll need a method called extracorporeal membrane oxygenation to help ensure you retain a sufficient supply of oxygen. This involves continuously pumping your blood through a machine that removes carbon dioxide and adds oxygen. The oxygenated blood is then returned to your body.

Prevention, Personal Protection and Cleaning

Back in 1993, during the peak of the hantavirus outbreak, the CDC published their Interim guidelines for hantavirus risk reduction. There have been no updates to this document since its original publication. The guidelines offer direction for those looking to safely eradicate rodent infestations and those looking to reduce exposure risk when rodent contact is a possibility. Detailed cleaning procedures as well as appropriate personal protective equipment (PPE) are discussed. For those seeking direction in this area, please refer to the CDC’s guidelines.

Commonly Asked Questions

Q: What PPE should I use if I’m cleaning up rodent contaminants that may contain hantavirus?

A: The best answer to this is currently found in the CDC's Hantavirus Infection – Southwestern United States: Interim Recommendations for Risk Reduction. It states the following, "Persons involved in the clean-up should wear coveralls (disposable if possible), rubber boots or disposable shoe covers, rubber or plastic gloves, protective goggles, and an appropriate respiratory protection device, such as a half-mask air-purifying (or negative-pressure) respirator with a high-efficiency particulate air (HEPA) filter or a powered air-purifying respirator (PAPR) with HEPA filters. Respirators (including positive-pressure types) are not considered protective if facial hair interferes with the face seal, since proper fit cannot be assured. Respirator practices should follow a comprehensive user program and be supervised by a knowledgeable person." Since 1993, the approval designations for negative-pressure, air-purifying respirators has changed. The current equivalent to a HEPA filter is a P100 filter.

Sources

CDC's Hantavirus Resource Page

Mayo Clinic's Hantavirus Resource Page

OSHA's Hantavirus Resource Page

CDC's Hantavirus Infection – Southwestern United States: Interim Recommendations for Risk Reduction

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