Of mice and mostly men — hantavirus pulmonary syndrome

First described in the United States, hantavirus pulmonary syndrome (HPS) is included in the list of infections that have “emerged” during this decade. Investigation of an outbreak of a mysterious and deadly respiratory illness in the southwestern US in 1993 resulted in the development of laboratory methods to identify the pathogen and its animal reservoir. Although other hantaviruses associated with various rodent species had been previously recognized as causing hemorrhagic fever with renal syndrome in humans, the newly identified Sin Nombre virus (SNV) strain associated with the deer mouse (Peromyscus maniculatus) causes adult respiratory distress syndrome. With the availability of laboratory tests, retrospective cases of HPS have been inferred as far back as 1959 in the US. Moreover, the oral tradition of the Navajo, who have historically inhabited the southwestern US, suggests that HPS is not a new disease. Three additional hantaviruses associated with different rodent hosts have now been confirmed as causing HPS in the US, and at least 2 more have been described as causing HPS in South America. South American HPS appears to differ from the North American infections in certain epidemiological respects.

Hantavirus is shed in the urine, feces and saliva of infected rodents. People become infected after inhaling aerosolized particles of contaminated excreta. In North America person-to-person transmission has not been demonstrated. Initial symptoms of fever, chills and myalgia occur 7 to 28 days after exposure. Headache and gastrointestinal complaints may also predominate in the early phase. Cough and shortness of breath develop at about day 5, at which time interstitial pulmonary edema is evident on chest radiographs; cardiopulmonary function may then deteriorate rapidly over the next 24 hours. Evidence suggests that asymptomatic infection is extremely rare. There is no rapid diagnostic test or proven specific treatment for HPS. Atypical lymphocytes, bandemia and thrombocytopenia with pulmonary edema, accompanied by a recent history of exposure to rodents, strongly support the diagnosis. Treatment is supportive and should begin immediately; careful monitoring of ventilatory needs, fluid and electrolyte balance, and blood pressure requires a critical care setting. The diagnosis is confirmed later by the presence of IgM or rising titres of IgG hantavirus-specific antibodies, as determined by serology; evidence of viral antigen in tissue, as indicated by immunohistochemistry; or presence of viral RNA in tissue or blood, as demonstrated by polymerase chain reaction.

In Canada, HPS is rare. As of Feb. 25, 1998, a total of 25 laboratory-confirmed cases had been reported from British Columbia, Alberta and Saskatchewan. Suspected cases in other provinces have received substantial local media attention but were not confirmed with appropriate laboratory investigations. The earliest known case of HPS, identified retrospectively, occurred in Alberta in 1989. Alberta, representing approximately 9% of the Canadian population, has reported 16 (64%) of the 25 HPS cases. All affected patients have been 15 years of age or older (mean 39 years); 17 (68%) of the patients were men, and 8 (32%) have died. Most of those infected were likely exposed to SNV-contaminated rodent excreta during farming and domestic activities in rural areas. Single cases have been linked to occupational exposure during military exercises, cleanup of a lumber mill and a wildlife survey. More than 40% of cases occurred during the months of April, May and June. The characteristics of HPS in Canada appear similar to those of cases described in the US.

Although cases of HPS have been confined to the western provinces, SNV and SN-like viruses are distributed across Canada in the rodent reservoir. Therefore, precautions to avoid exposure to hantaviruses are recommended throughout the country. Prevention is based on personal risk reduction, which can be accomplished by minimizing the presence of all rodents in and around the home, workplace and recreational properties as well as by taking precautions when cleaning rodent-infested areas and during outdoor recreational activities. Cottages, cabins and other structures that have been closed for several months should be opened and ventilated for at least 30 minutes at the beginning of the season before they are cleaned. A dilute bleach solution and most household disinfectants will destroy hantaviruses. Respiratory protec-
tion is indicated for cleanup of areas with evidence of heavy rodent infestation. More detailed advice on how to prevent HPS can be obtained from the local public health unit. Further information about all aspects of hantaviruses and HPS is available at the Web site of the US Centers for Disease Control and Prevention (www.cdc.gov/ncidod/diseases/hanta/hps).

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References