

Hanta Virus

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Abstract

Since the initaila hantavirus, Hantaan virus (HTNV), was isolated in 1976, many other hantaviruses have been identified and assessed , with at least 22 being pathogenic to humans. Hantaviruses have the potential to cause the two different types of diseases in humans: hemorrhagic fever with renal syndrome (HFRS) and the hantavirus pulmonary syndrome (HPS). The major vector is rodents. Several clinical dynamics of hanta viral infestation is discussed.

Keywords: - *Hanta viral, infestation, hemorrhagic fever with renal syndrome (HFRS), hantavirus pulmonary syndrome (HPS)*

INTRODUCTION

HFRS, which includes diseases formerly known as the Korean hemorrhagic fever (KHF), epidemic hemorrhagic fever (EHF) and the nephropathia epidemica (NE), denotes a group of the clinically similar illnesses that occur throughout the Eurasian landmass and adjoining areas. After about 3 decades of its first modern description in the Russia Federation, HFRS came to the attention of the world when approximately 3,100 cases were reported from the year 1951 to 1954

among American soldiers deployed in the Republic of Korea Hantavirus once again attracted the attention of the world in the year 1993, when it was identified to be the etiologic agents of HPS outbreak in the Four Corners region of the United States. Since most HPS deaths are caused by the myocardial dysfunction and hypoperfusion rather than hypoxia, some investigators have recently begun to mainly use the term hantavirus cardiopulmonary syndrome (HCPS). Herein, one garner a global update of hantaviral infections focusing

on the virology, global prevalence, the hantaviruses causing human infections, the clinical features and treatment, laboratory diagnostics and control and prevention (Donoso Mantke et al., 2005). Lung is a major site of infection like corona virus and bullous disease (Sreeremya(a) et al., 2018). Plethysmography can be an apt diagnostic tool to assess the lung infection (Sreeremya(b) et al., 2018). Like the NIPAH virus which is carried by bat, during the infection and further assessment a route map is organized to track the record and find the infected persons (Sreeremya, 2018).

Disease Agent Characteristics:

- **Family:** Bunyaviridae; Genus:- Hantavirus
- **Virion morphology and size:** Enveloped, the helical nucleocapsid symmetry, spherical to specifically pleomorphic particles, 80-120 nm in diameter (Mulić et al., 2002)
- **Nucleic acid:** Circular, the segmented, negative-sense and ambisense, single-stranded RNA, 11.8-13.8 kb in length
- **Physicochemical properties:** Inactivated by the dry heat (56°C for 30 min) and solvent-detergent treatments

Disease Name:

- Hantavirus pulmonary syndrome (HPS) is an acute and also often fatal respiratory illness primarily found in the Americas.

Priority Level:

- Scientific/The Epidemiologic evidence regarding blood safety: Theoretical
- Public perception and/or the regulatory concern regarding blood safety: Very low to absent
- Public Concern regarding disease agent: Low but moderate in the endemic areas

BACKGROUND

- New World hantaviruses are indigenous to the US, but because of the low numbers of human infections, the disease was not recognized for many years. Regardless, the HPS is potentially referenced in Native American folklore.
- In July in the year 1959, an individual developed an HPS compatible illness and was subsequently found to have the IgG antibodies in September 1994.
- One of the earliest cases of the HPS, subsequently confirmed by immunohistochemical detection of

hantavirus antigens in postmortem tissue, occurred in the year 1978.

- In the year 1993, HPS was “newly recognized” in the Four Corners region of New Mexico with a lethality of 50%. A cluster of the healthy individuals in the Navajo Nation became ill with an acute cardiopulmonary illness and died in a short time later. The etiologic agent was designated Sin Nombre virus (SNV) (Mulić et al., 2002).
- The first outbreak of HPS in the Central America (Panama) occurred in 1999.
- Approximately, the 25 New World hantaviruses cause HPS.

Common Human Exposure Routes:

- The main route of the transmission is inhalation of airborne particles of urine, feces, or saliva from the infected rodents.
- Other potential routes of the transmission are rodent bites, touching the nose or mouth after contacting objects contaminated with the rodent urine, droppings, or saliva, or eating contaminated food.

Likelihood of Secondary Transmission:

In general, spread to medical personnel or the contact is limited. However, person-to-person transmission of the New World hanta viruses was documented in one outbreak in southern Argentina and Chile (Andes virus), and the nosocomial transmission occurred in southern Argentina (Mulić et al., 2002).

At-Risk Populations:

The greatest risk is among people in the rural and semirural areas, especially if they work, play, or live in any closed space where the rodents are present. Primary exposure occurs during cleaning in and around houses that are infested with the rodents and opening and cleaning of the previously unused buildings.

Other individuals who are at aggrandized risk include campers and hikers, as well as farmers, construction, utility, and the pest-control workers, and the military.

Communication strategies on preventive measures

Most of the countries communicate specific preventive measures to the general population only during outbreaks. Nine countries stated that the preventive measures are communicated to the public on a regular basis. Those countries that

have not faced the outbreaks stated that they would communicate the preventive measures if an outbreak occurred. The most frequent communication tools are the mass media (TV, radio, newspapers), institutional websites (health and occupational health), the presentations and workshops for health professionals, and articles in the specialised journals (hunters, pest controllers, etc.). National public health institutes are generally responsible for the communication strategy on the hantavirus, supported, if needed, by the public health services at the regional phase (Mailles et al.,2005).

Impact assessment of the preventive measures

Two countries have mainly assessed hantavirus preventive measures, communication strategies for preventive measures, or the level of the awareness/knowledge in the general population on hantavirus. In 2005, several small scale studies on the impact of preventive measures were conducted in Germany. In the year 2012, a case-control study was carried out in the German state of Baden-Württemberg to assess and investigate disease awareness, disease knowledge and the implementation of preventive measures. Preliminary results indicated that controls were allied with a

higher knowledge on the hantavirus than cases and suggested that controls used prevention measures (e.g. wet-wiping of surfaces, the ventilation, using dust masks when cleaning) more frequently than cases(Donoso Mantke et al.,2005). A case-control study and assessment conducted in northern Sweden included questions on the use of preventive measures. In Albania, the survey on the level of knowledge of hantavirus disease among the general population and the health specialists is still in its early stages. Several countries are planning to conduct impact assessment studies and further investigations; however, respondents to this survey emphasised the need to mainly perform further impact assessment studies, but were not able to carry out any such studies due to the low case numbers in their countries (Kraigher et al., 2012).

Impact assessment of preventive measures for the hantavirus conducted in European countries (Glass et al., 1997)

Countries Total no.(%)

Performed Germany, Sweden 1 (7)

Ongoing Albania 1 (3)

Not performed

Austria, Belgium, Bosnia-Herzegovina, Croatia, the Czech Republic, Estonia, Finland, France, Greece, Hungary,

Kosovo, Latvia, Luxembourg, the Netherlands, Norway, former Yugoslav Republic of Macedonia, Serbia, Slovakia, Slovenia, Spain, The Switzerland, Poland, Portugal, Romania, the United Kingdom 26 (90)

Country profiles

This section comprises summarised country-specific information on preventive measures for hantavirus and the communication strategies as expressed in the telephone survey. The following information was garnered by the contacted experts during the telephone survey (Glass et al., 1997).

Albania-case studies

Hantavirus infection is notifiable since the year 1986. Twelve cases were reported in 2011–2012 (nine in 2011, three in the year 2012). Affected areas were principally located in the northern and western part of the country, where in the year 2010 a cluster of 12 cases was identified. The information on the preventive measures is available at the national and regional level. The information is in the different format for the general public and health professionals. The preventive measures focus on the animal reservoir (i.e. the rodent control, deratisation) and the human–environmental aspects (i.e.

cleaning up of the cottages, avoiding exposure to rodents) (Predy et al., 1997). The data is tailored to the general population as well as to specific risk groups (mine workers, shepherds, populations in rural areas). Information on increased case numbers is conveyed to the general public. In addition, it is mainly communicated to health professionals in the weekly bulletin via e-mail and is also accessible on the website of the Institute of Public Health. Information is garnered via the mass media (TV, newspapers) during non-epidemic periods, along with the information on Crimean-Congo haemorrhagic fever (CCHF) and copious during outbreaks. Posters on the streets or public transportation are used during outbreaks in the endemic areas. Risk groups received tailored information during outbreaks in the form of the leaflets for miners and reports for the health professionals. Presentations are given at the scientific meetings and conferences. At the national level, the Institute of Public Health is responsible for the communication of the preventive measures, assisted by the regional level in the affected districts (McConnell, 2009). If necessary, clinicians, the nephrologists, may be involved. Infection with the hantavirus can progress to Hantavirus Pulmonary Syndrome (HPS), a rare but

quite severe, sometimes fatal, respiratory disease in humans. Hantaviruses belong to the Bunyaviridae family of the viruses. There are 5 genera within the family: bunyavirus, phlebovirus, nairovirus, tospovirus, and the hantavirus. The viruses causing HPS in this country are Sin Nombre, Black Creek Canal, Bayou, and the New York.

Rodents are the one and only known reservoir of hantaviruses, and individual virus species appear to be associated with the single major rodent species. In the United States, deer mice (along with cotton rats and rice rats in the southeastern states and mainly white-footed mouse in the Northeast) are the reservoir of the virus. The deer mouse, which is most common in North America, is the major host species of the Sin Nombre virus, which is mainly responsible for the majority of the HPS cases in the United States and Canada.

Transmission of the virus to the humans occurs from the aerosolization of saliva, urine, or feces of infected mice or rats. To date, the human-to-human transmission of a hantavirus has only been reported in cases of the Andes virus in Chile and also Argentina. Due to the small number of HPS cases, the incubation period is quiet

not positively known. However, on the basis of limited information, it appears that symptoms may mainly develop between 1 and 5 weeks after exposure to fresh urine, droppings, or the saliva of infected rodents. Early symptoms encompass fatigue, fever, and muscle aches, especially in the large muscle groups (thighs, hips, back, and sometimes shoulders). These symptoms are quiet universal. There may also be headache, dizziness, chills, and abdominal problems, such as the nausea, vomiting, diarrhea, and abdominal pain. Roughly half of all the HPS patients experience these symptoms. Four to 10 days after the primary phase of illness, the late symptoms of HPS appear. These include coughing and shortness of the breath. Hantavirus infection, non-HPS is a febrile illness with non-specific viral symptoms encompassing fever, chills, myalgia, headache, and the gastrointestinal symptoms, but no cardio-pulmonary symptoms.

There is no specific treatment, cure, or the vaccine for Hantavirus infection (Douglass et al., 2003). However, we do know that if HPS patients are recognized early and receive the medical care in an intensive care unit, they may do better. In the intensive care, patients are intubated and given oxygen therapy to help them through

the period of the severe respiratory distress. Case fatality rates for HPS have been reported as high as 36 to 50%, and survivors may require weeks to months to fully recover.

Hemorrhagic Fever with the renal Syndrome (HFRS) is a group of clinically similar illnesses caused by Hantaviruses from the family Bunyaviridae. HFRS encompasses diseases such as Korean hemorrhagic fever, the epidemic hemorrhagic fever, and nephropathis epidemica. The viruses that cause HFRS encompass Hantaan, Dobrava, Saaremaa, Seoul, and Puumala. Symptoms of HFRS generally develop within 1 to 2 weeks after exposure to infectious material, but in rare cases, they may take up to 7-8 weeks to develop. Initial symptoms begin suddenly and include intense headaches, back and the abdominal pain, fever, chills, nausea, and blurred vision. Individuals may have flushing of the face, the inflammation or redness of the eyes, or the rash (Hopkins et al., 2002).

CONCLUSION

Hanta virus major carrier or the vector is mice. The pathogen mainly causes kidney malfunction and lung malfunction, specifically hemorrhagic fever with renal syndrome (HFRS) and the Hantavirus

pulmonary syndrome (HPS). The various clinical manifestations are discussed in this paper.

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