

Hantavirus: Essential Information for European Clinicians

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Hantavirus infections, while geographically diverse, pose a consistent threat in certain European regions, manifesting as severe febrile illnesses. Clinicians must understand the distinct presentations and transmission routes to ensure timely diagnosis and appropriate patient care.

KEY TAKEAWAYS

- **The Pivot:** Hantavirus infections are zoonotic, transmitted primarily through rodent excreta, with human-to-human transmission being rare.
- **The Data:** Clinical manifestations range from mild febrile illness to severe Hantavirus Hemorrhagic Fever with Renal Syndrome (HFRS) or Hantavirus Cardiopulmonary Syndrome (HCPS).
- **The Action:** Prompt recognition of early symptoms and appropriate supportive care are critical, as no specific antiviral treatment exists.

Hantaviruses are a genus of RNA viruses within the family Hantaviridae, known for causing two severe clinical syndromes in humans: Hantavirus Hemorrhagic Fever with Renal Syndrome (HFRS) and Hantavirus Cardiopulmonary Syndrome (HCPS).¹ These zoonotic infections transmit to humans primarily through inhalation of aerosols contaminated with urine, faeces, or saliva from infected rodents.¹ The specific rodent reservoir and the resulting clinical syndrome vary by geographic region; for instance, in Europe, the Puumala virus, carried by bank voles (*Myodes glareolus*), commonly causes a milder form of HFRS known as nephropathia epidemica.¹

The incubation period for hantavirus infection typically ranges from 2 to 4 weeks, but can extend from a few days to up to 6 weeks.¹ Initial symptoms are non-specific, often mimicking influenza or other viral infections, making early diagnosis challenging.¹ Patients present with sudden onset of fever, headache, myalgia, and gastrointestinal symptoms such as nausea, vomiting, and abdominal pain.¹ These early symptoms can quickly progress to more severe manifestations depending on the specific hantavirus strain involved.¹

Understanding the Clinical Syndromes

HFRS, the more common presentation in Europe, is characterized by a classic pentad of fever, haemorrhage, renal involvement, shock, and thrombocytopenia.¹ The severity of HFRS varies significantly, from mild forms like nephropathia epidemica to severe cases caused by strains such as Hantaan virus or Seoul virus.¹ Nephropathia epidemica, prevalent in Scandinavia and Western Europe, typically presents with acute kidney injury, transient myopia, and mild haemorrhagic manifestations.¹ Patients often experience a sudden onset of fever, malaise, and headache, followed by flank pain and oliguria.¹ Renal involvement can range from mild proteinuria to acute renal failure requiring dialysis,

though most cases are self-limiting.¹

But the more severe forms of HFRS, caused by Hantaan or Seoul viruses, can lead to profound renal failure, disseminated intravascular coagulation, and significant mortality rates, sometimes exceeding 10%.¹ These severe cases often involve extensive haemorrhage, including petechiae, ecchymoses, and bleeding from mucous membranes, alongside severe hypotension and shock.¹ The pathophysiology involves increased vascular permeability, leading to plasma leakage, hypovolemia, and organ dysfunction.¹ Thrombocytopenia is a consistent finding, contributing to the haemorrhagic diathesis.¹

HCPS, primarily associated with hantaviruses in the Americas (e.g., Sin Nombre virus), is characterized by rapid onset of pulmonary oedema and cardiogenic shock.¹ While less common in Europe, clinicians should remain aware of its potential.¹ HCPS typically begins with a prodromal phase of fever, myalgia, and fatigue, similar to HFRS.¹ This is followed by a rapid progression to respiratory distress, cough, and dyspnoea, culminating in severe non-cardiogenic pulmonary oedema and hypotension.¹ The mortality rate for HCPS is considerably higher than for HFRS, often exceeding 30%.¹ The critical mechanism involves increased capillary permeability in the lungs, leading to fluid extravasation into the alveolar spaces.¹

Diagnosis relies on a combination of clinical suspicion, epidemiological context, and laboratory confirmation.¹ Serological tests, such as enzyme-linked immunosorbent assays (ELISA) for IgM and IgG antibodies, are the primary diagnostic tools.¹ PCR can detect viral RNA in acute phase samples, particularly in blood or tissue.¹ Early recognition is paramount, as there is no specific antiviral treatment for hantavirus infections.¹ Management is entirely supportive, focusing on maintaining fluid and electrolyte balance, managing hypotension, and providing renal replacement therapy if necessary for HFRS.¹ For HCPS, aggressive respiratory support, including mechanical ventilation, and circulatory support are crucial.¹

Preventive measures focus on rodent control and avoiding contact with rodent excreta.¹ This includes sealing entry points to homes and workplaces, trapping rodents, and cleaning contaminated areas with disinfectants.¹ Individuals working in environments with potential rodent exposure, such as farmers, forest workers, and pest control operators, are at higher risk and should take appropriate precautions, including wearing personal protective equipment.¹ The lack of a vaccine for human use underscores the importance of these public health interventions.¹

The open-label nature of clinical experience with hantavirus, given the absence of specific therapeutics, is the obvious caveat.¹ All current management strategies are based on supportive care and symptom management, which can vary widely in efficacy depending on the severity of the disease and the resources available.¹ The challenge remains in distinguishing hantavirus infection from other febrile illnesses in its early stages, particularly in non-endemic areas where clinician awareness may be lower.¹

CLINICAL IMPLICATIONS

European clinicians must maintain a high index of suspicion for hantavirus infection, especially in patients presenting with acute febrile illness and renal dysfunction or unexplained respiratory distress, particularly if they report rodent exposure. The non-specific initial symptoms mean that a detailed exposure history is often the most valuable diagnostic clue, far more so than any early lab marker.

The lack of specific antiviral treatments means that patient outcomes hinge entirely on prompt supportive

care. For HFRS, this translates to meticulous fluid management and early consideration of renal replacement therapy. For the less common but more lethal HCPS, aggressive respiratory and circulatory support are non-negotiable.

Public health messaging around rodent control and personal protective measures remains the only true intervention against hantavirus. Clinicians have a role in educating at-risk populations, particularly those in agricultural or forestry sectors, about these basic but effective preventive strategies. Relying on treatment after infection is a poor substitute for preventing it altogether.

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REFERENCES

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