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Nipah Virus: Another Zoonotic Disease

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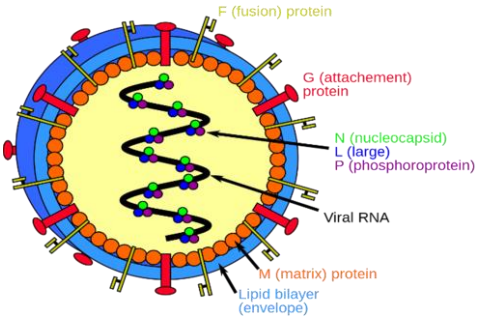
INTRODUCTION

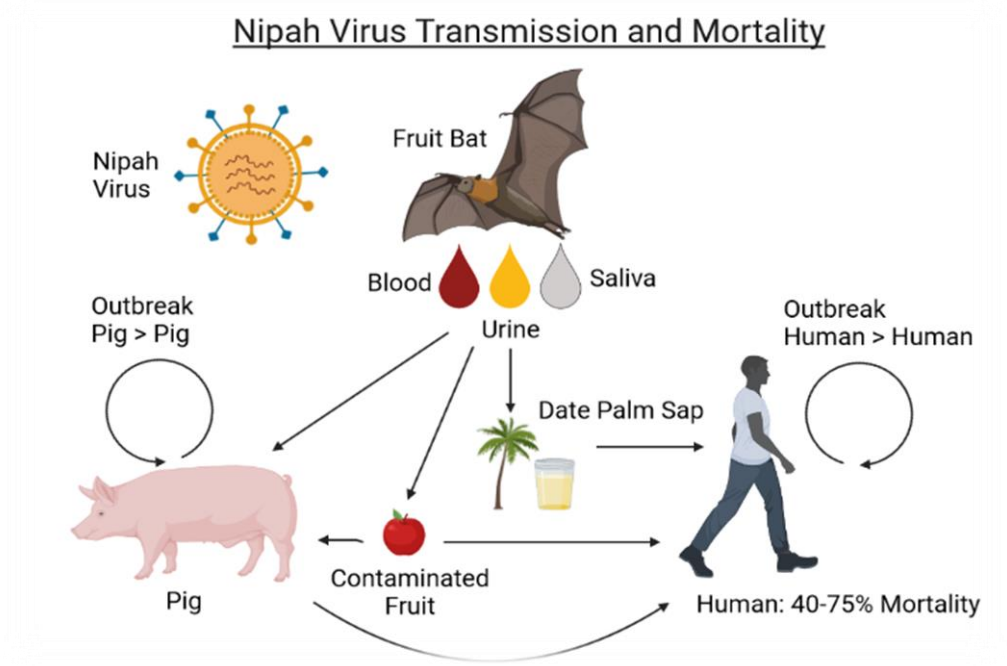
Nipah virus (NiV) is an RNA virus belonging to family *Paramyxoviridae*. It belongs to the genus *Henipavirus* which also contains Hendra virus (HeV) and the recently described Cedar virus. Bats are the natural reservoir of Henipaviruses. While Cedar virus has not been found to be pathogenic to any animal, NiV and HeV cause lethal neurologic and/or respiratory disease. NiV is one of the pathogens on the WHO priority list of pathogens likely to cause outbreaks needing urgent research and development action [3]. It first emerged in Malaysia in 1998 and has since caused several outbreaks in South and Southeast Asia. NiV is highly pathogenic to a broad range of mammals and is considered to have pandemic potential due to its zoonotic as well as person to person transmission . The reservoir of infection, *Pteropus* bats, have a worldwide distribution. It is likely that new areas where they reside will be the location of spillover events in the future. A recent outbreak in a new geographical area in Kerala, India is just the latest such event . Research into this disease has been hampered by the relatively small number of cases as well as difficulties in diagnosis. NiV is classified as a Biological safety level 4 (BSL 4) pathogen and access to such laboratories is limited in many countries. Research into epidemiology, modes of transmission and potential prevention and control strategies is needed urgently. A One Health approach that takes into account humans, domestic and peri-domestic animals, and the environment is required to control the disease effectively.



Clinical features

The incubation period of NiV varies from 4 to 21 days. NiV primarily causes acute encephalitis and respiratory illness and is highly fatal. A small percentage of infected people are asymptomatic .

A short incubation period is followed by prodromal signs and symptoms such as a fever headache and myalgia . Features of encephalitis develop within a week, with the most common symptoms being altered mental status, areflexia, hypotonia, segmental myoclonus, gaze palsy, and limb weakness. Patients deteriorate rapidly and coma and death follow within a few days.



Symptoms may initially include one or several of the following:

- Fever
- Headache
- Cough
- Sore throat
- Difficulty breathing
- Vomiting

Severe symptoms may follow, such as:

- Disorientation, drowsiness, or confusion
- Seizures
- Coma
- Brain swelling (encephalitis)

Death may occur in 40-75% of cases. Long-term side effects in survivors of Nipah virus infection have been noted, including persistent convulsions and personality changes.

Infections that lead to symptoms and sometimes death much later after exposure (known as dormant or latent infections) have also been reported months and even years after exposure.

Diagnosis

Specimens for virus detection may be collected from symptomatic patients or at post-mortem examination. Specimens for serological testing should be collected late in the course of infection, 10–14 days after onset. The NCDC, India, recommends throat swabs (in viral transport medium), urine, blood and/or CSF for diagnosis. Samples must be collected safely and transported in triple container packing at 2–8 °C. Storage at −20 °C is recommended beyond 48 h of collection. Processing of the clinical samples requires a BSL 4 facility. However, virus inactivation by sample irradiation may be an effective

technique to make the samples safe to use in a BSL-2 laboratory

Management and control

Patients must be isolated and rigorous infection control practices implemented. Treatment of NiV infection is primarily supportive- maintenance of airway, breathing and circulation. Fluid and electrolyte balance is maintained. Patients with severe pneumonia and acute respiratory failure must be supported by mechanical ventilation. Invasive mechanical ventilation is preferred.

CONCLUSION

NiV has emerged as a deadly zoonotic disease. Bats, the natural reservoir of the virus, are effective at virus dissemination and human outbreaks continue to be reported regularly. Due to the worldwide distribution of bats, outbreaks in new areas are likely to occur. The high case fatality rate and acute course of disease make the infection difficult to diagnose. This is further compounded by the lack of easily available low-cost diagnostic tests and facilities equipped to handle viral samples. Effective treatment and prophylaxis are unavailable due to a lack of studies in human subjects because the overall case burden is small and the course of infection is acute. The recent outbreak in India highlights the possibility of potential spillover events in areas where currently known risk factors do not exist. The establishment of surveillance systems for NiV is necessary, particularly in South and Southeast Asia. There is an urgent need for countries in South and Southeast Asia to work together to strengthen surveillance systems in order to monitor spillover events and prevent transmission. A better understanding of bat ecology and the causes of spill-over events, the development of effective treatment and prophylaxis for humans and animals and strengthening of surveillance systems to prevent outbreaks is required to curb the threat posed by NiV.