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Newly outbreak of Nipah virus: epidemiology, symptoms, transmission, diagnostic testing, treatment, and global health concern

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Dear Editor,

On 4 September 2021, the Kerala State Health Department reported a lone incidence of the Nipah virus (NiV) illness in the Kozhikode district of Kerala state, India. In South East Asia and Western Pacific WHO Regions, Nipah is an emerging zoonotic disease of public health significance due to its very high case fatality ratio. In India, this is the fifth epidemic of illness. A 12-year-old boy who had a low-grade fever on August 29 was treated at a nearby medical facility by his family. As his condition worsened, he was moved to multiple hospitals on August 31. The patient's condition continued to worsen on September 1, and his family asked that he be transferred to a different hospital in Kozhikode. Cerebrospinal fluid, plasma, and serum samples were sent to the National Institute of Virology in Pune, India, on September 3. On September 4, real-time PCR was utilized to establish the NiV's presence in serum, cerebrospinal fluid, and plasma samples. An enzyme-linked immunosorbent assay serology test was used to validate the presence of immunoglobulin M antibodies in the plasma sample. The patient passed away on September 5 and was safely buried and cremated in Kozhikode that same day[1]. The Malaysian town where the initial outbreak was reported in 1998–1999 is where the name 'Nipah' originates[2,3]. NiV was later established as the cause of the first NiV outbreak in Malaysia–Singapore (1998–1999), which was initially mistaken for Japanese encephalitis[4–6].

Encephalitis and NiV infection are related (inflammation of the brain). After exposure and a 5-day to 14-day incubation period, the illness starts with a fever and headache that linger for 3–14 days. Until lethargy, disorientation, and confusion set in. Within 24–48 hours, these signs and symptoms can develop into a coma. Early in their infections, some individuals experience respiratory problems, and 50% of those who displayed severe neurological symptoms also had pulmonary symptoms[7]. People can contract the NiV through direct contact with sick animals, such as infected pigs or bats, or their bodily fluids (such as saliva, urine, or blood). Consuming food that has been contaminated with an infected animal's body fluids (such as palm sap or fruit tainted by an infected bat). Interacting closely with a NiV-positive individual or their body fluids (including respiratory or nasal droplets, blood, or urine). People likely contracted the virus during the first recorded NiV outbreak via close interaction with sick pigs. The NiV strain discovered during that outbreak appeared to have spread first among bats, then to pigs, then pig populations. Then, those who had regular contact with the diseased pigs started getting sick. In that outbreak, there was no information on man-to-man transmission. NiV transmission from human to human is, nevertheless, frequently documented in Bangladesh and India. This is most frequently observed in healthcare facilities and the family and care of NiV-infected individuals. In addition, exposure to food products tainted by sick animals can result in transmission. Examples include eating fruit tainted with bat saliva or urine or raw date palm sap. People that climb trees where bats frequently roost have also been found to experience certain occurrences of NiV infection[8].

Viral isolation, histology, immunohistochemistry, serological, and molecular diagnostic techniques can all be used to determine the presence of the NiV. The gold standard for virus isolation is quite beneficial, especially when figuring out the cause of a fresh outbreak. NiV can be successfully cultivated in Vero cells and has a cytopathic impact in 3 days. The preferred samples for NiV isolation include blood, human cerebrospinal fluid, nasal/throat swabs, biopsies, and urine taken in the time of acute phase. NiV can be isolated from lungs, spleens, serum, and kidneys in animals like pigs and cats. By using an enzyme-linked immunosorbent assay, antibodies to NiV can be found throughout the convalescent stages of infection. These immunological techniques can be used to detect NiV and other closely related viruses without a BSL-4 laboratory, but their sensitivity and specificity are marginally lower than those of molecular assays. For a more thorough identification of NiV, molecular methods including real-time PCR, real-time real-time PCR, and other molecular assays can be used. The most frequently used nested primers during the NiV epidemics in Singapore and Malaysia were those that coded for conserved regions of the M, N, and P genes. For the genetic and molecular characterization of NiV, real-time PCR and genome sequencing are essential, particularly when a new incident happens[9]. These techniques are quick, sensitive, and specific. A NiV infection cannot be cured by medication or vaccination. Instead, doctors employ supportive care. They concentrate on relaxation, hydration, and addressing certain symptoms as they

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appear, in other words. Researchers are investigating monoclonal antibodies, which are immune system-based therapeutics for the NiV. Remdesivir, an antiviral medication, has also been investigated by experts in infected primates. During the original outbreak in Malaysia, physicians treated a small number of patients with antiviral ribavirin. How well it operates, however, is uncertain[10]. NiV can only be treated with supportive care, such as rest, hydration, and the treatment of certain symptoms as they arise. Acetaminophen and/or ibuprofen, dimenhydrinate, and/or ondansetron are examples of supportive drugs. Acetaminophen and/or ibuprofen are also used to treat pain and fevers, manage nausea and vomiting, and treat respiratory problems. To reduce seizures brought on by acute encephalitis and keep neurological symptoms under control, antiseizure drugs such as benzodiazepines, levetiracetam, and/or phenytoin may be administered. Monoclonal antibody therapies, which are immunotherapeutic treatments, are currently being developed and tested for the treatment of NiV infection even though there are currently no licensed medication treatments for the condition. Clinical trials are being conducted on monoclonal antibody m102.4, which is being applied on an individual basis. Studies on nonhuman primates following NiV exposure have demonstrated that antiviral medications, such as remdesivir, are efficacious. In the initial NiV outbreak, ribavirin was also utilized to treat a small number of patients, although its effectiveness in treating people is yet unknown[11].

The high mortality rate of a virus, which prevents it from infecting another host since the first died, can prevent the infection from spreading. But it is important to remember that the most recent NiV outbreaks were frequently found in remote areas. Given that the WHO estimates that the incubation period for NiV can continue up to 45 days in the most severe cases, it is reasonable to infer that the increase in infection rates in the outbreak occurring in a heavily populated area could be significantly higher. The expansion of the globalization, human population, trade, and modern move habits all favor human connections. When considering the threat posed by the presence of a certain proportion of subclinical patients, NiV gains importance as a potential trigger for another global pandemic[12].

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The authors declare that they have no financial conflict of interest with regard to the content of this report.

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