



The Nipah Virus Scare: Kerala's Swift Response and Lessons Learned

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Article History	Abstract
<p>Received: 05 Oct 2023 Revised: 20 Nov 2023 Accepted: 01 Dec 2023</p> <p>CC License CC-BY-NC-SA 4.0</p>	<p><i>Kerala's first Nipah virus outbreak occurred in 2018. It being in the pre-covid era presented major challenges to the public health authorities highlighting the need for rapid response and improved preparedness. This article provides an in-depth analysis of the outbreak, its epidemiology, clinical presentation, public health response, challenges faced, and the crucial lessons learned. Being a third-year medical student in a Nipah-affected area was an unsettling experience. The fear was palpable as we grappled with the uncertainty of the virus's spread. The pay wards in our hospital were converted into Nipah isolation wards within a day. Hearing terms like "quarantine" and "isolation" became chilling reminders of the dire situation, emphasizing the importance of strict protocols and safety measures to protect patients and healthcare workers.</i></p> <p>Keyword: Patients, Healthcare, Workers</p>

Introduction

The Nipah virus, a zoonotic pathogen belonging to the genus Henipavirus and subfamily Paramyxoviridae originating from fruit bats of the Pteropodidae family has periodically emerged in South Asia causing severe respiratory and neurological diseases with high mortality rates. Kerala, a southern state in India, faced a notable outbreak in 2018 leading to critical lessons in disease control and preparedness. Nipah virus can be transmitted from humans to animals (Bats or pigs) or contaminated foods and can also be transmitted from human to human. Bats of the Pteropodidae family are the natural hosts of the Nipah virus. As there is no treatment or vaccine available for either people or animals, the primary treatment for humans is supportive care. In Malaysia, in the year 1998, the first cases of Nipah virus infection were reported in a pig farm causing 265 human cases with 108 deaths. Laboratory confirmation is done by ELISA, RT-PCR, and Serum neutralization. The case fatality rate (variable from region to region) is estimated at 40% to 75%.

The Nipah virus outbreak in Kerala in May 2018, specifically in the districts of Kozhikode and Malappuram was a significant public health event. This was the third Nipah virus outbreak in India, the first two being in Siliguri and Nadia, West Bengal (2007). The case fatality rate in Kerala during 2018 was estimated to be 88.8% and the mean intubation period was 9 days.

Clinical features

The clinical features of Nipah virus infection include fever, altered mental status, severe weakness, headache, respiratory distress, cough, vomiting, muscle pain, convulsion, diarrhea. It causes severe illness characterized by inflammation of the brain (encephalitis) or respiratory diseases.

Case Definitions

Suspect Nipah Case

Person from a area/ locality affected by a Nipah virus disease outbreak who has:

- Acute Fever with new onset of altered mental status or seizure and/or
- Acute Fever with severe headache and/or
- Acute Fever with Cough or shortness of breath

Probable Nipah Case

Suspect case-patient/s who resided in the same village/ house where suspect/confirmed case of NIPAH were

living during the outbreak period or such a patient who died with

- suggestive symptoms, before complete diagnostic specimens could be collected.

OR

- Suspect case-patients who came in direct contact with confirmed case-patients in a hospital setting during the outbreak period and who died before complete diagnostic specimens could be collected.

Confirmed Nipah Case

Suspected case that has laboratory confirmation of Nipah virus infection either by:

- Nipah virus RNA identified by PCR from respiratory secretions, urine, or cerebrospinal fluid.
- Isolation of Nipah virus from respiratory secretions, urine or cerebrospinal fluid.

Definition of a Contact:

A close contact is defined as a patient or a person who came in contact with a Nipah case (confirmed or probable cases) in at least one of the following ways.

- Was admitted simultaneously in a hospital ward/ shared room with a suspect/confirmed case of Nipah virus disease.
- Has had direct close contact with the suspect/confirmed case of Nipah virus disease during the illness including during transportation.
- Has had direct close contact with the (deceased) suspect/confirmed case of Nipah virus disease at a funeral or during burial preparation rituals.
- Has touched the blood or body fluids (saliva, urine, vomitus etc.) of a suspect/confirmed case of Nipah virus disease during their illness.
- Has touched the clothes or linens of a suspect/confirmed case of Nipah virus disease.

These contacts need to be followed up for appearance of symptoms of NiV for the longest. incubation period (21 days), or preferably double incubation period, of 42 days.

Treatment

There is no proven treatment recommended for Nipah virus disease. Some suggests that Ribavirin may be of use in reducing mortality among patients with encephalitis caused by Nipah virus disease but there is no data/evidence of its usefulness as a prophylactic drug. So Intensive supportive care with treatment of symptoms is the main stay of treatment.

Epidemiology

The outbreak began with an index case in Perambra, Kozhikode district on May 2nd, 2018. It was a young man who contracted the virus from an infected fruit bat / consuming contaminated date palm sap. This patient was then taken to Government Medical College, Kozhikode for further management where he later expired. Later the brother of the index case was admitted to a private hospital in Kozhikode with suspected viral encephalitis. It was the doctors at that private hospital who suspected Nipha since his symptoms were like those of his brother who had died a few days back. After testing samples at the Manipal Institute of Virology, the results came out as positive, Samples were also tested positive at the National Virology Institute, Pune.

From the index patient, the Nipha virus was transmitted to 16 people who were there at medical college at the time the index patient visited the hospital, either as a patient or by-stander. Shortly two more people were infected making the total count 18. A nurse named Lini who took care of the index patient at Government Hospital, Perambra before diagnosis also succumbed. Under the leadership of Kerala Govt Health Minister K.K Shailaja, a team was formed which included the district collector, health secretary and a dedicated team of doctors and volunteers who worked day and night, creating and publishing the route maps of confirmed cases in order to trace their contacts and to make them self-report who were later put under quarantine and observed, also providing instructions on quarantine and lockdown, burial of bodies of the dead infected persons. Kerala's efforts in containing the outbreak were highly lauded by many including Robert Gallio of the Institute of Human Virology, Baltimore. Even though Kerala's health department has only had limited knowledge to fight the alien virus during the first outbreak, a coordinated effort was launched to contain the outbreak. In Kozhikode, even a call center was launched to provide psychological support for those in quarantine, which was a new strategy in the pre-Covid era. A rapid response team was formed to support people under quarantine.

To fight the outbreak a human monoclonal antibody M102.4 (Clinical trials are still going on) was imported from Australia. The outbreak also led to the revival of WHO's Nipha drug trials group. After index case, 16 of the affected patients succumbed to the disease and two patients recovered fully. The transmission was person

to person in the primary case and served as a point source for the 15 cases including two health workers. The outbreak was contained within three weeks and was declared over by July 2018.

Following 2018 a new case of Nipha was detected in Ernakulam on June 4th, 2019. It was a 23-year-old student. Immediate control measures were taken with the 2018 experience. Over 300 people were put under observation, but no further cases were reported. The student later recovered. A medical board treatment protocol using monoclonal antibody protocol and point-of-care testing was formed. This was the fourth occurrence of Nipah in India following 2001 (45 deaths), 2007 (5 Deaths) 2016 (16 deaths).

In 2021 Nipha virus outbreak started with a 12-year-old boy's death in Kozhikode Pazhur village. This time also the outbreak was localised in Pazhur village and claimed one life. The outbreak was contained and declared on 1st September 2021. This was Kerala's 3rd Nipah virus outbreak. Relatives of the dead boy and those involved in his treatment were put under quarantine and all of them had negative test results. It is a fact and needs to be specially mentioned that on January 30, 2020, when India's first covid case was reported in Kerala, the experience of handling the Nipah virus held Kerala in a good position to fight back the outbreak. No cases were reported in 2022.

In August - September 2023 six cases including two deaths of the Nipha virus was reported in Kozhikode district. Other people who tested positive are undergoing treatment. The zoonotic disease has been revisiting the north Kerala district 3rd time in Kozhikode since 2018. Currently, Nipha is managed by 2021 guidelines. The nine panchayats were declared as containment zones, there schools were temporarily closed, and public gatherings were restricted. Mass testing of the close contacts of confirmed cases was carried out and no new cases were reported till now.

An important point to be noted is the striking similarity between the Nipha outbreaks during 2018 and 2023; where hospitals have played a major role in the transmission of virus. In 2023 Index case came into contact with a second victim at a private hospital leading to the development of the cluster at a later's home. One of the healthcare workers from the private hospital was also tested positive. As of today, no other cases or death were reported.

Conclusion

According to a survey conducted by the National Institute of Virology, it has been found that Nipah virus is in circulation among the bat population across 9 states (Kerala, Tamil Nadu, Karnataka, Goa, Maharashtra, Bihar, West Bengal, Assam and Meghalaya) and 1 union territory (Pondicherry). The question of why Nipah has been reemerging only in Kerala has been answered differently by different experts.

Some says that the virus might have become endemic in Kerala bat population. Another reason attributed to the outbreaks is the tradition of drinking fresh toddy or sweet tree sap which may get contaminated by infected bats. We know that the first infection was spread to human from nature, but it still remains unclear whether it was a bat or any other animal or from fruits. It has to be mentioned that Kerala has failed to invest in disease epidemiology that is crucial in understanding and preparing for this zoonotic infection although Kerala has an expertise in launching a formidable outbreak containment effort. It's very clear that a detailed study on Nipah virus dynamics is essential to establish why and how the virus spillover occur, whether there is a specific time frame and if geography or climate has any role to play in these events.

After the outbreaks in May 2018 and June 2019, it was our assumption that outbreaks usually coincided with the breeding season of bats (it was assumed to be from December to May), when the virus replicates in bats and that the virus spillover happens during this stressful period. But with outbreaks happening in September (2021) and the current one August, we are no longer sure if seasonality of outbreaks can be predicted," says R. Aravind, Head of Infectious Diseases, Govt. MCH, Thiruvananthapuram

However, breeding season has to be considered as just one of the many reasons for the virus spillovers and the others being climatic changes ecological factors and loss of habitat that can act as stressors at any point of time. Hence extensive study and research is required regarding this.

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