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Resurgence of Nipah Virus: A Challenge to Public Health System

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Abstract

Nipah virus resurgence has challenged the epidemiological surveillance and response system in our country. It has pointed towards our low healthcare system capacity and lack of a robust surveillance strategy. It demands to bring into light the concept of One Health, where human and animal health are tackled together. Enormous focus needs to be given on private sector integration with the disease surveillance system.

Keywords: Nipah Virus; Resurgence; Epidemiological Surveillance; Onehealth Approach.

Introduction

Background

The definition of zoonosis accepted by WHO is: Zoonosis refers to a disease that can be transmitted between animals and humans. Nipah virus (NiV) infection is emerging as a fatal zoonosis that can be life threatening.[1]

Problem Statement

The first outbreak of Nipah virus in human was observed in Malaysia in 1999. NiV caused havoc in Malaysia and Singapore between September 1998 and May 1999, affecting 276 people and leading to 106 deaths. In the SEA Region, Bangladesh observed Nipah virus outbreaks in the years 2001, 2003 and 2007, and in India in 2001 and 2007 followed by 2018.[2]

Case fatality rate for this deadly virus ranges from 40 to 75%.[3]

In June 2018, Kerala had declared itself free from the Nipah virus. Now this is the 'fourth coming' of the disease in India in 2019.[4]

Epidemiology

According to WHO, the fruit bats of the Pteropodidae Family serve as the host for Nipah virus. It can spread through direct contact with infected bats, pigs, or from other NiV-infected people. The incubation period varies from 4 to 18 days, although an incubation period of as long as 45 days has been reported. Nipah Virus has been listed as a potential biological weapon by CDC because of its availability, ease of production and dissemination, and high virulence in terms of high mortality and health impact.[5]

In Malaysia, NiV was first transmitted to pigs and then to humans. However, in Bangladesh and India, NiV travelled directly from bats to humans.

Etiopathogenesis

It is primarily due to endothelial cell damage resulting in systemic vasculitis of small blood vessels, extensive thrombosis, and necrosis as indicated by clinical and autopsy studies. Involvement of the central nervous system is especially severe in the brain but direct neuronal infection may also play a role.

Clinical presentation

An infected person can present with sudden onset of flu-like symptoms such as fever, headaches, pain in the muscles, vomiting and sore throat, followed by dizziness, drowsiness, altered consciousness and focal neurological signs indicating acute encephalitis. Encephalitis and seizures can also occur in severe cases.

Prevention of Nipah virus

This disease can be prevented by avoiding animals that are known to be infected. People in affected countries should also avoid eating or drinking date palm sap.

Treatments of Nipah virus

According to WHO, no vaccine is currently available for either humans or animals and only intensive supportive care can help managing the symptoms. Early treatment with the antiviral drug, ribavirin, can reduce the duration of fever and the severity of disease.

Factors aiding the resurgence of Nipah

About 58 species of fruit bats (often called flying foxes) are considered natural hosts of the Nipah virus and India is the home to many of these fruit bats. Hence, virus can resurface anywhere in India.[6]

The virus has so far surfaced only in Malaysia, Singapore, Bangladesh and the states of West Bengal and Kerala in India; however, according to the World Health Organization (WHO), the habitat of these fruit bats extends from the east coast of Africa, across south and South-East Asia, east to the Philippines, Pacific islands and Australia.

Pigs can become infected after consuming partially bat-eaten fruits and almost all piggeries are unregulated in India. Also, it is very difficult to trace the infected bat as infected bats have not shown any symptom so far.

A study was carried out by the Consortium for Conservation Medicine in the US in 2008 to determine the circulation of virus among fruit bats in Northern India. 41 bats from Haryana were tested for the presence of antibodies against Nipah viruses. 20 bats were found positive for the virus.[6]

With the increase in population, there has been an increase in the rate of urban expansion, leading to fragmentation of forests due to construction of roads and large-scale forest clearing for agricultural purposes. This has been the main cause that has led to the spread of NiV. The only way to curb this would be to control the demographic and economic growth rate.[7]

Public Health Strategies to prevent resurgence of Nipah

Environmental factors play a vital role in the emergence of zoonotic disease in humans. Climatic changes like drought or floods, deforestation, urbanization, industrialization on large scale leads to destruction of animal habitats leading to increase in the viral load in their body, thereby infecting the fruits, animals or humans who come in contact with them. Hence, it is necessary to adopt 'one health' approach by considering human, animal and environmental health. The reasons for multiple outbreaks are attributed to inefficient healthcare system capacity and lack of a robust surveillance strategy. It is also necessary to undertake rigorous research for developing vaccines and medicines to prevent and treat NiV.

According to the WHO, certain precautions can be taken to protect from the virus. Fruits should be washed thoroughly and peeled before consumption. Fruit with signs of bat bites should be discarded. Also, gloves and other protective clothing should be worn while handling sick animals and their tissues, and hygienic measures should be taken while conducting slaughtering and culling procedures.

Future projection for epidemic preparedness in India

Surveillance in India is pretty robust, but all the states are not at the same level. Nipah virus outbreak

has clearly showed the value of preparedness and the dangers of not following standard protocols. Although Indian government has strengthened the surveillance and response system for managing the disease outbreaks, yet many challenges still surface the existing healthcare system. It is still unclear that if Indian healthcare system can practise the concept of One Health, where human and animal health are tackled together. Private sector has yet not been integrated with the disease surveillance system. And there is high demand to increase the investment on health care to reduce the burden.

Conclusion

Low healthcare system capacity and lack of a robust surveillance strategy contribute enormously to the spread of this deadly virus. Interdisciplinary and multi sectoral approach is vital in preventing the emergence of NiV.[8]

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