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Epidemiology, Diagnosis, Prevention and Treatment of Nipah Virus

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ABSTRACT

Nipah virus (NiV) is an emerging bat virus. The Nipah virus first identified in Malaysia and since cause outbreak in Southeast Asia. It causes a very serious emotional and respiratory illness. It is highly contagious and spreads to the community through infected animals or other infected people. Different strains of the virus show different clinical and epidemiological features. Prompt diagnosis and implementation of infection control measures are essential to contain the outbreak. A number of serological and molecular diagnostic methods are designed for diagnosis and observation. Difficulty in diagnosing and managing arises when a new location is affected.However, no effective treatment or prophylaxis is readily available, although a few alternatives show promise. From bats to humanconsidering the common chains of transmission, the One Health approach is needed to prevent and control NiV infections.

Introduction

The Nipah virus (NiV) infection is also called Nipah virus encephalitis and forms a new species of Henipavirus in the small family Paramyxoviridae [1]. The first NiV was classified and identified by Drs. Kaw Bing Chua in 1999. Initially, the spread of infection could not be controlled as the methods were aimed at controlling the outbreak of Japan Encephalitis (JE), until NiV was isolated from the victim's cerebrospinal fluid after 2 months, [2]. The virus was named after the village of Kampung Sungai Nipah where it was first discovered. The NiV Natural reservoir has been identified as a fruit bats of the genus Pteropus. The disease can affect both humans and animals, such as pigs, equally and the means of transmission are: human-to-human transmission and animal-to-human contact with infected pigs and pigs. The only way to deal with this deadly and infectious disease is to provide immediate symptoms ∗ Related author: Public Health Evidence South Asia, Prasanna School of Public Health, Manipal Academy of Higher Education, Manipal 576104, India. Email address: suzane109@gmail.com (D.S. Patil). treatment [3]. The death toll from NiV infection is very high. Therefore, in planning future prevention, control and interventions knowledge about the epidemiological features of NiV disease is important.

Epidemiology

In Malaysia from 1998 to 1999 first Niv human infection was identified. [4]. The name 'Nipah' comes from Sungai Nipah (Nipah River valley). A number of cases of flu, headache and loss of consciousness were reported from the state of Perak, Malaysia in September 1998. Initially, four cases of IgM antibodies against Japanese Encephalitis (JE) and JE outbreaks were announced. Despite the implementation of control measures, the outbreak increased. At the end of the year, a number of clusters were reported in the Port Dickson region, some 200 miles [300 km] to the south. In March 1999, an outbreak (11 cases, one death) was reported from Singapore among slaughterhouses. In this outbreak, close contact with pigs or pig feces was shown to be a serious risk [5]. Infected animals themselves showed mild respiratory illness. In Malaysia, a large number of animals are raised together on pig farms / slaughterhouses, where the outbreak and spread of animals to animals began. The pruning of more than a million pigs followed by deep burial disposal and rapid removal of contaminants with lime, as well as other control strategies have been effective in controlling outbreaks [6]. Dogs were also found to be more susceptible to the disease and farm dogs were identified as another danger. There is no evidence of human transmission from person to person from this outbreak. Finally, Pteropus bats have been shown to be the poorest pond in Malaysia which infects breeding birds, pigs, by eating fruit bitten by bats.In India, there was a major outbreak (possibly 66 cases and 45 deaths) in Siliguri, West Bengal in 2001 and another minor outbreak (five cases, 100% deaths) in 2007 in the Nadia region, West Bengal. The outbreak was just across the border from the Nipah belt in Bangladesh. In May 2018, a NiV outbreak was announced in the Kozhikode and Malappuram districts of Kerala, a region southwest of the west coast, which is geographically cut off from the previously affected areas. The use of date palm sap is not uncommon in this area. There have been 18 confirmed cases and 17 deaths since June 1, 2018. All cases were under the economically productive age group, with no gender differences [7]. In 2001 in Siliguri, the reference case remained unknown but was admitted to Siliguri Hospital and infected 11 cases, all patients in the hospital. These patients were transferred to other hospitals and the infection infected 25 staff members and eight visitors. The 2007 outbreak included one person who

contracted the disease as a result of drinking alcohol made from palm oil and all others, including one health worker, contracted the disease earlier [8]. At least one health care professional also diagnosed the disease in a health care facility in this latest outbreak in 2018. Every Indian outbreak has seen human-to-human transmission.

Diagnosis

Laboratory laboratory tests for NiV encephalitis include detection of anti-NiV immunoglobulin M (IgM) and IgG antibody in serum and cerebrospinal fluid (CSF), with or without a virus. The most commonly used diagnostic method is the testing of an enzyme-linked immunosorbent assay (ELISA), using a monoclonal antibody-based antigen, virus detection and NiV detection in the Hendra virus [9]. Direct ELISA testing was used to detect antiNiV-specific IgM, whereas, indirect IgG ELISA was used to detect IgG antibody. Other methods such as serum neutralizing tests, RT-PCR detection of viral RNA in serum, urine, and CSF, virus isolation and nucleic acid enhancement tests are available [10]. Magnetic resonance imaging (MRI) of the brain acted as a critical diagnostic tool in acute encephalitis and relapse / late-onset of NiV, as ELISA's diagnostic sensitivity was unreliable [11].

Prevention

Precautionary measures have focused on preventing the contamination of palm juice, raising awareness about the dangers of drinking palm milk and preventing the spread of human-to-human transmission. The use of skirts to cover the milk-producing areas of palm trees has been found to effectively prevent contact with bats [12]. In 2015, a study examining the behaviour of people who ate raw palm milk, found that awareness of NiV was very low among them and even people who knew them were more likely to eat it as people who did not [13]. A randomized controlled trial examining behavioural change interventions conducted in 2017 found that spreading a message promoting safe use of the juice reduced the melting exposure that may have been contaminated while the message discouraging the use of the juice did not [14]. WHO's advice in the event of an outbreak of the disease includes avoiding exposure to pigs and bats and the use of bat-bitten fruit or raw palm milk / toddler / juice. To reduce the risk of passing the animal to the person gloves and other protective clothing should be worn when handling sick animals or their tissues and during slaughter and slaughter. Preventing human-to-human transmission includes the implementation of infection control procedures such as the isolation of patients, the use of protective equipment and good hygiene practices. Contacts identified by tracking contacts are checked and kept under surveillance until they are found not to be. The hospital area was found to be contaminated by the NiV surrounding patients [15]. Health care facilities should establish and ensure compliance with standard measures to prevent and control infection when caring for suspected or confirmed cases of NV infection. Health care workers exposed to a patient suspected of being a NiV should inform the authorities and get tested for NiV. Affected patients are advised to avoid prolonged contact with patients. Funeral methods that require direct contact with the remains are not recommended.

Treatment

Ribambeirin also delayed the death of NiV-infected hamsters by five days. Administration of chloroquine alone or in combination with rakuvirin did not provide protection against NiV disease [16]. Favipiravir (T-705) has shown inhibition of NiV duplication and regulation in cell concentration. In the Syrian hamster model, oral administration of favipiravir twice a day or under the skin once a day for 14 days protects animals [17]. Monoclonal antibody (m102.4) when given to African green monkeys twice after exposure to NiV from day 1, 3 or 5 and again after two days has been shown to prevent disease even after receiving clinical symptoms of disease. Supportive treatment remains the most common treatment for acute Nipah encephalitis. Antibiotics with a broad-spectrum of nosocomial diseases, prevention of deep venous thrombosis, mechanical ventilation and anticonvulsants in unconscious patients are some of the treatment options given to infected patients [18].

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