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A BRIEF REVIEW ON NIPAH VIRUS (NIV)

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ABSTRACT

Nipah virus was first identified in Malaysia 20 years ago. NiV is an emerging bat-borne pathogen. It causes severe respiratory and neurological illness which is highly lethal. It is highly contagious in nature and transmitted from infected persons and infected animals. Some of the people are asymptomatic. The pathogenesis of this disease mostly occurs in respiratory, lymphoid tissues and endothelium. Diagnosis involves the PCR, Immunohistochemistry and serum neutralization test. Preventive measures should be taken to reduce the infectious condition.

KEYWORDS: Nipah Virus, Clinical features, Pathogenesis, Diagnosis, Prevention.

INTRODUCTION

Nipah Virus consists of RNA as genetic material that belongs to the family paramyxoviridae and genus Henipavirus that contains Hendar virus and also Cader virus which is recently described. Bats are the Natural source of Henipavirus.[1] NiV and Hev causes lethal damage to respiratory and or neurological disorder whereas the cedar virus has not been found pathogenic to any animal.[2] Niv was first emerged in Malaysia in the year 1998. NiV is severely pathogenic to wide range of mammals and is considered to be potentially pandemic due to person to person transmission as well as Zoonotic transmission.[3] According to WHO, NiV is one of the important pathogens likely to cause outbreaks that needs urgent research and development.[4]

Clinical features

Nipah Virus incubation period ranges from 4-21 days. Respiratory illness and acute encephalitis are primarily caused by NiV. A small percentage of infected people are in asymptomatic condition.[5] The initial incubation period is followed by early signs and symptoms such as fever, head ache and myalgia. Encephalitis features occurs within a week, and the most common symptoms like hypotonia, areflexia, altered mental status, Segmental myoclonus, Gaze plasy and limb weakness. Patient worsens quickly and leads to coma, death within a few days. 20 percent of survivors have residual neurological defects that range from fatigue to fatigue to focal neurological deficits and depression.[6] Respiratory system involvement may be present as cough, atypical pneumonia and respiratory distress.[7,8] Old age, thrombocytopenia, Comorbidities and increased aminotransferases on admission, brain stem involvement and seizures are the risk factors of poor prognosis.[9]

Pathogenesis

The virus enters into host through oral and nasal route then causes infection. The site of initial replication is unknown. However, antigens of high concentrations found in respiratory and lymphoid indicates that these tissues are probable initial replication sites for virus.[10] Then Virus in the blood spreads all over the body and is followed by secondary replication in the endothelium. The NiV glycoprotein 'G' binds to the cellular receptors of ephrin-B2 that is expressed on smooth muscle and endothelial cells of brain, lungs, prostate, placenta along with blood vessels all other tissues.[11] Distribution of Ephrin B_2 receptor explains the pathological and clinical features that are appeared in disease. During embryogenesis, this receptor also plays a key role in the migration of neuron precursors.[12] By hematogenous route, the CNS is invaded primarily, through direct invasion via olfactory nerves that has been appeared in porcine model.[13] Attribution to its evasion of innate immune response due to high lethality of Nipah virus. Inhibition of interferon activity by P-gene products.[14]

Diagnosis

PCR

PCR targeting N gene developed by US centers for Disease Control and Prevention (CDC).[15] The RNA of Nipah virus is observed by PCR from the secretions of respiratory tract, cerebrospinal fluids or urine. These tests are used commonly for diagnosis and highly specific and sensitive. Detection of N gene by a Taq-Man probe-based assay which was developed in 2004.[16]

Immunohistochemistry

Immuno his to chemistry mostly used the formalin fixed tissue because the site of replication of virus vascular endothelium a broad range of tissue present in brain, kidney, lungs, spleen and blood vessels. previously, Immunohistochemistry uses convalescent human serum which is replaced by rabbit serum against NiV.[17]

Serum neutralization test

In this test the virus is incubated by test sera and then allowed to infect Vero cells. The development of cytopathic effects can be blocked by positive sera and tests can be read at 3 days. A modified neutralization test can be developed which can be read at 24hrs.[18]

Prevention

Prevention of contamination of date palm sap. Increasing awareness among the people regarding the consumption of date palm sap and prevention of spreading from person to person. Sap producing areas of date palm trees should be covered with skirts which has been found effectively prevents in contact with bats.[19]

Person-to-person transmission prevention includes the execution of infection control practices such as separation of patients, personal protective equipment uses and good hand hygiene conditions. Patients identified through contact tracing are tested and contacts are kept under observation up to the test negative. Surfaces of hospitals have been found to be contaminated by nipah virus around patients.[20] Standard infection prevention and control measures when caring for suspected or confirmed cases of NiV infection must be compliance by health care facilities. Health care workers should inform the authorities and undergo testing for NiV, when any person exposed to a suspected NiV infection.[4]

CONCLUSION

NiV was emerged as a deadly zoonotic disease. Bats are effective at dissemination of virus and these are main sources of NiV. The virus spread easily from infected people. The disease course is difficult to identify by diagnostic tests. Preventive measures should be followed, because there is no proper and effective treatment due to lack of studies in human subjects. Health approaches are necessary to the people to control and prevent the NiV.

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