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REVIEW- ON THE NIPAH VIRUS (NIV) DISEASE

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Abstract:

Nipah virus (NIV) it is a type of viral infection; its name is originated in 1998-1999 from Malaysian peninsula in a village of "sangai nipah" from this village NIV is introduced. Nipah virus has been isolated from Lyle's flying fox (Pteropus lyei) in Cambodia in 2005 and viral RNA found in urine and saliva from p.lylei and Horsfield's roundleaf bat(Hipposideros larvatus) in Thailand. Specialty It is a Infectious disease Symptoms It is difficult to identify in initial start of infection, because its infection is like none, mild fever, cough, headache, shortness of breathing and quite mental disabilities. Complication's encephalitis (Inflammation of brain) it includes disabilities of mental health like memory loss, uncontrolled jerking, abnormal excessive neutronal activity in the brain. Clinical presentation ranges from asymptomatic infection to fatal encephalitis. Diagnosis there are more than one way to diagnose nipah virus (NIV) . isolation, RT-PCR, and antibody detection by the ELISHA tests are the tests that healthcare professionals use to diagnose nipah virus. Causes Nipah virus (NIV) is a virus which can be spread by direct contact with infected one. Treatment its about supportive care. but in recent cases study of ***Ribavirin was used to cure more than 100 lives.*** *Prevention avoiding exposure to bat , contaminated foods , and infected pigs.*

KEYWORDS: *Encephalitis, Zoonotic virus, Asymptomatic , Fatal encephalitis , Acute respiratory illness, Lethality , Epidemiologic , #nipahvirus(NIV).*

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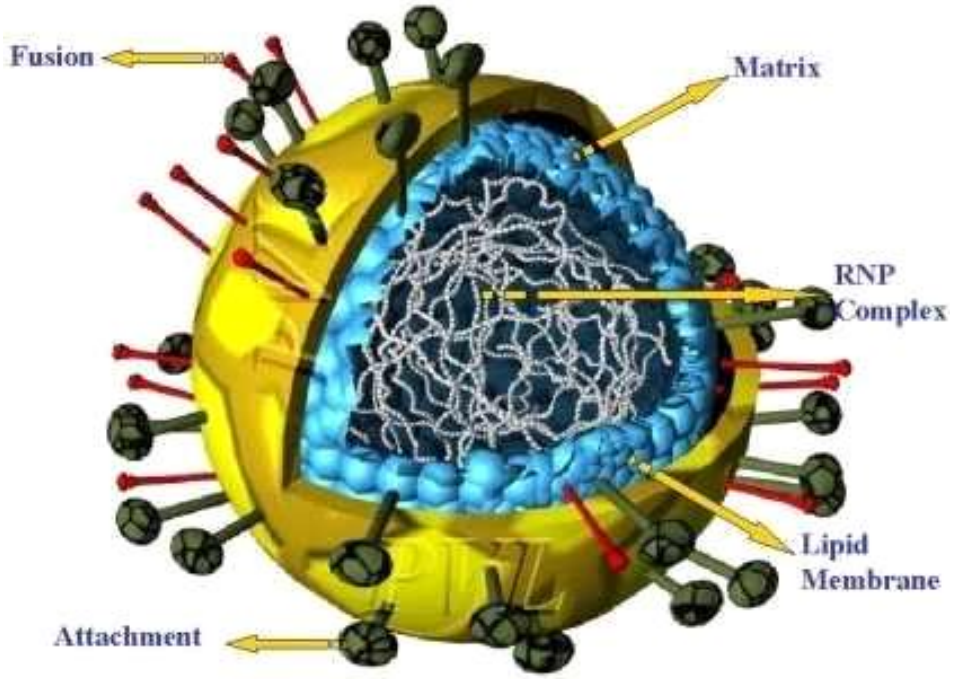
INTRODUCTION:



[8] Fig 1.1 Nipah virus (NIV)

NIPAH VIRUS (NIV) disease is originated from Malaysia and Singapore in 1998-1999 during an outbreak of encephalitis and respiratory illness among pig farmers and people with close contact with pig . Its name was originated from Sungai Nipah , a village in the Malaysian peninsula where pig farmers became ill with encephalitis ***(Inflammation of brain***). **What exactly nipah virus?** A member of the family Paramyxoviridae, genus Henipavirus, Nipah virus is a zoonotic virus, which usually gets transmitted from animals to humans through contaminated food or direct contact between people.

As per **World health organization** (WHO)[1] it is a zoonotic virus (transmitted from animal to humans) and also it can be transmitted from contaminated food or directly between people. In infected people , it causes a range of illness from subclinical infection (**asymptomatic**) to acute respiratory illness and fatal encephalitis.

Because of this virus in 1998-1999 ,[2] the death of 105 humans and the culling's of about 1.1 million pig where reported**. shocking discover of Fruitbats of pteropid** species were identified as the natural reservoir hosts reason for NIV . After 1998-1999 it was reappeared in 2004 , NIV in Bangladesh with greater lethality . In contrast to the Malaysia case, epidemiologic characteristics of this outbreak suggested the possibility of fruitbats-to or person-to-person transmission. It was later found in[1] Cambodia, Ghana , Indonesia, Madagascar, the Philippines and Thailand.

In a 2005 there was an review on known and unknown infectious agents, of the 1407 human pathogens, 816 (58%) were classified as zoonotic in origin. In past decades, zoonotic pathogens have induced considerable stress and anxiety in a broad range of societies worldwide. The emergence of Nipah virus (NiV) in Peninsular Malaysia in September 1998 was the second in a series of spillover events

And recently it was found in India, in Kerala , a state situated on the tropical Malabar coast of southwestern India . In 2018 the nipah virus outbreak in Kerala , traced to fruit bats in the area . It was localized in Kozhikode and Malappuram districts of Kerala[3] and claimed 17 lives. The first suspected case was Mohammed sadiqi. The outbreak was contained and is declared over June 10 ,2018. [6] The third outbreak reported in India , with previous it was form in 2001 (45 deaths) and 2007 (5 deaths). And detailed about Nipah virus (NIV) will be discussed.

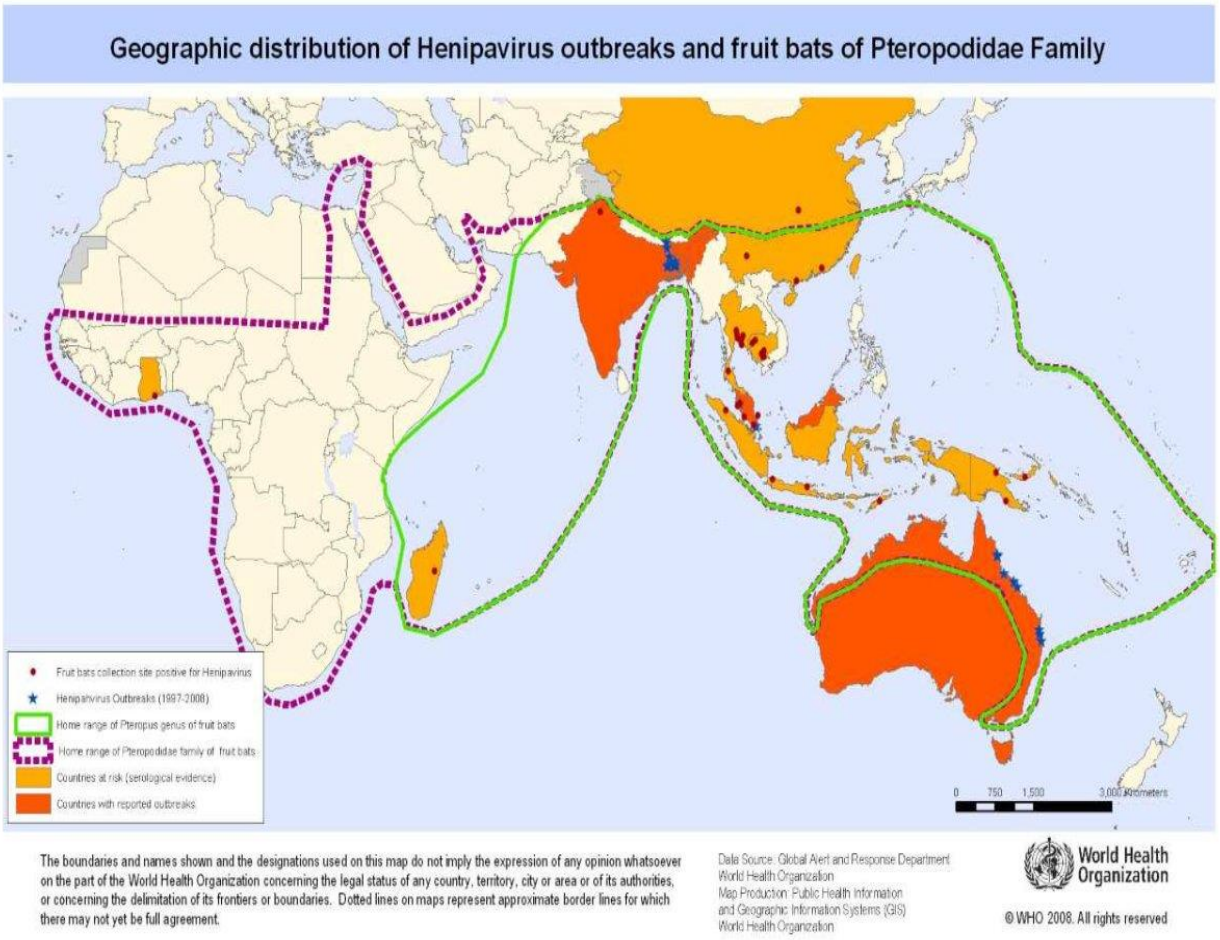


Fig1.2 Geographic distribution of henipavirus outbreak

Histology of Nipah virus (NIV) :

In 1998-1999, NIV disease came to an outbreak of acute encephalitis with molarity rates mostly among pig handler in Malaysia and this led to know about novel paramyxovirus named as nipah virus. For this infection study team start investigation on NIV that included epidemiology, microbiology, molecular biology and pathology was pivotal in the discovery of this new human infection. clinical and autopsy findings infected human cases of NIV because of this there is the need of diagnosis. So diagnosis was established in all cases by a combination of immunohistochemistry (IHC) and serology. The main motive is to finding histopathological view that included a systemic vasculitis with extensive thrombosis and parenchymal necrosis, particularly in the central nervous system (CNS). Endothelial cell damage, necrosis and syncytial gaint cell fomation were seen in afected vessels.

WHAT IS IHC?

IHC is used to analysis the widespread presence of nipah virus antigens in endothelial and smooth muscle cells of blood vessels .

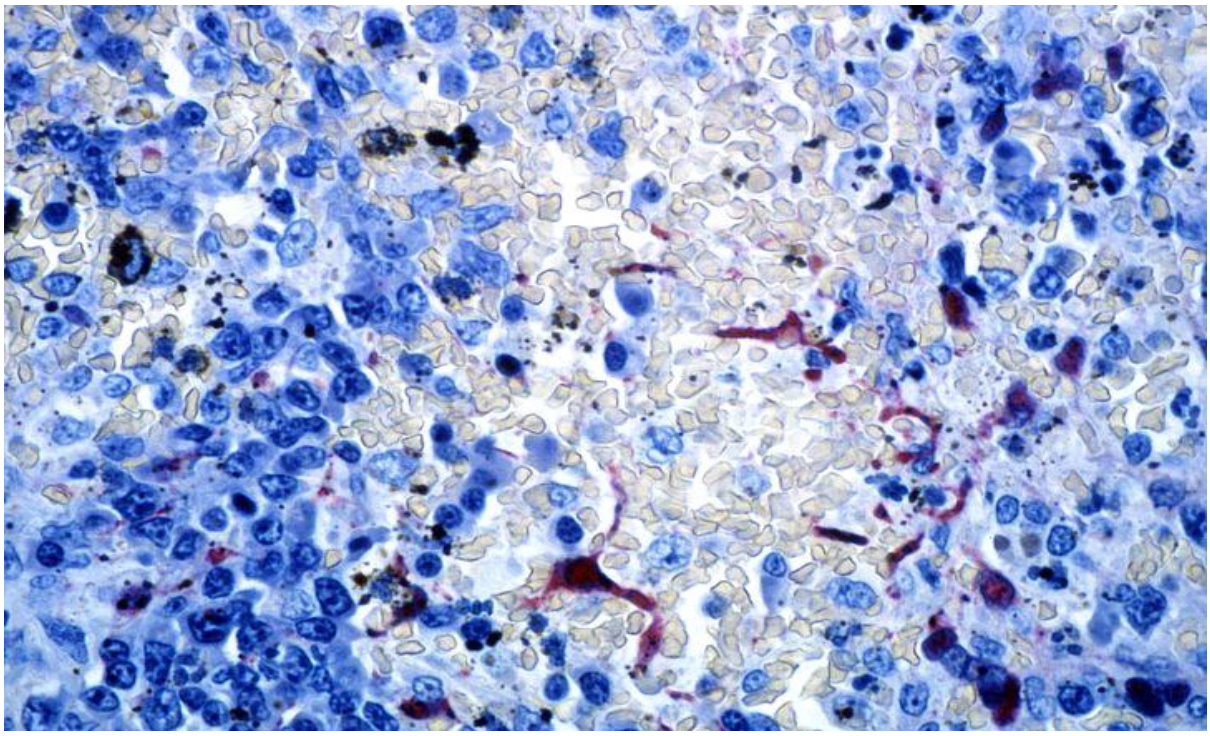


Fig1.3 laboratory-tests-that-are-used-to-diagnose-hendra-virus-hv-and-nipah-virus-[11]

When an outbreak take place in Malaysia and Singapore this virus killed more than 100 people. Because of this loss, researchers start study on NIV so they came know that it is a disease of brain fever (Encephalitis), which was spreading through sick pigs or their contaminates tissues.

But it was also recognized in Bangladesh in 2001, and this disease is periodically seen in eastern India. many other region may be at risk for infection, as evidence or after the recent study of this virus it is found in the known Pteropus bat species (natural reservoir) and other bat species in a number of countries, including Combodia, Ghana, Madagascar,I ndonesia, the Philippines and Thailand.

Fig 1.4 Bat Containing outbreak of Nipah virus

In [12] subsequent outbreaks in Bangladesh and India, consumption fruit products like raw date plam juice or other fruits contaminated with urine or saliva from infected fruits bats was most likely source of infection.

As per WHO, there are currently no studies on viral persistence in bodily fluids or the environment including contaminated foods. One thing is noticed NIV shows human-to-human transmission among family and care givers of infected patient.

It is seen, there is direct transmission of NIV from human-to-human through close contact with people's secretion and excretions.[12]in siliguri , India in 2001, transmission of the virus was also reported within a health -care , 75% cases occurred among hospitals staff or visitors . From 2001-2008, half of reported was from Bangladesh.
In #reference you can see the morbidity and mortality due to NIV or NIV like virus encephalitis in WHO South-East Asia region,2001-2018[12]
http://www.who.int/news-room/fact-sheets/detail/nipah-virus.

TRANSMISSION:
Transmission of this virus was started from ill-pigs or fruit bats (pteropodidae) , also from contaminated foods by infected bats AND THEN its started direct human to human transmission.

HUMAN TO HUMAN TRANSMISSION:
Human to human transmission was[10] observed in the Malaysian outbreak, there it was reported, especially in families of infected index cases. About 240 or more care workers (HCWs) in the three hospitals in which [13] 80% of encephalitis patients was seen, there was no report of any serious illness, encephalitis, or hospital admissions among any HCW or pathology worker . But as per report 3 nurses who have cared for outbreak related encephalitis patient had observe the second serum samples that were positive for nipah virus (NIV) IgG antibodies . This statement was false authors concluded, because they had no symptoms of encephalitis and blood samples showed no IGM response were negative for Anti-NIV neutralizing antibodies, one of there staff nurse who had a MRI (magnetic resonance imaging) changes similar to those seen in acute nipah virus. from then she has cared for the infected but had no previous contact or attachment with pigs ,it is observed she had mid NIV infection.

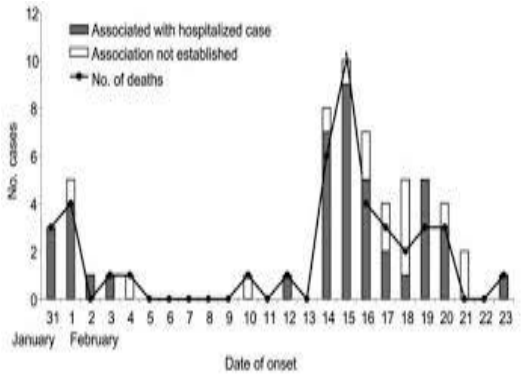


Fig1.5 Graph of Case history

The circumstances was very dissimilar in Bangladesh and India, where it is seen that encephalitis outbreaks have resulted from person-to-person transmission . About half of the cases identified in Bangladesh between 2001 and 2007 involved human-to-human transmission (14]. The clearest figure of person-to-person transmission occurred during the Faridpur outbreak in 2004, where the chain of transmission eventually involved 5 generations and affected 34 people.

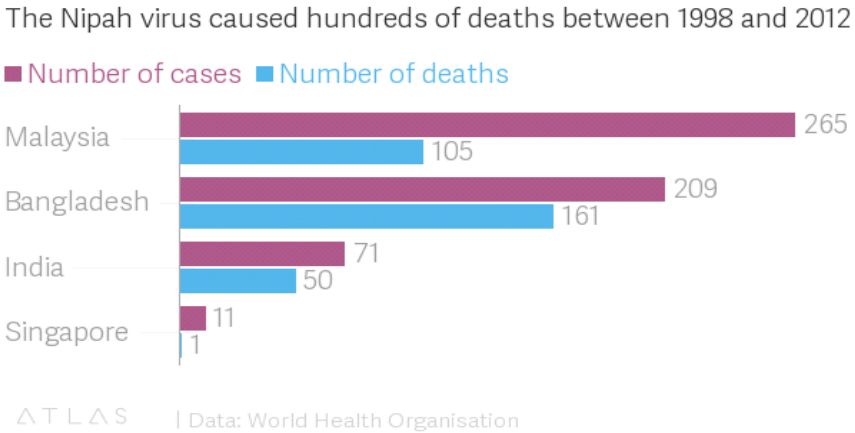


Fig1.5 Nipah virus Caused hundreds of deaths Between 1998-2012

CLINICAL SIGNIFICANCE:

PHYLOGENETIC ANALYSIS

The main purpose of phylogenetic analysis is to classification system explicitly grouped in a way that reflects their evolutionary relationships. Evolutionary analysis, over the last three decades, has increasingly been applied to the study of microbial pathogens. Phylogenetic and photodynamic analysis are the fundamental tools to investigate how the genealogy of a pathogen population is influenced by the interaction between pathogen's demographic history and environmental, ecological and host immunological factors [21] . Its help in Monitoring the genetic evolution of NiV represents an needful strategy to control the local as well as global epidemic and to develop efficient preventive and therapeutic strategies with a great impact in clinical practice.

COMPLICATIONS AND SEQUELAE

The appearance period in humans ranged from 4 days to 2 months, with more than 90% at 2 weeks less [15]. Infected patient suffers with fever , headache , dizziness and vomitting which developed into the illustration of severe encephalitis. many patients had a reduced level of consciousness and renowned signs of brainstem dysfuction , including abnormal doll's eye reflex, pupillary reflexes , viscometer changes and mycoclonic jerks[15]. Neurological involvement was diverse and multifocal (having more than one focus), including aseptic meningitis , diffuse encephalitis , and focal brainstem involvement. Unconscious conditions shows cerebellar signs were relatively common .

A idiosyncratic and interesting feature of NIV infection was the development of relapse and late-onset encephalitis, some of which occured months or years after the acute illness. It is seen in Tan's series of 160 cases who survived the initial encephalitis, 12 (7.5%) the country which occured after the recovery from acute encephailitis. there are such examples 3 cases who had late-onset encephalitis (Neurological manifestation did not cause). as per study the longest delay was 11 year late-onset. A study on 22 patients who survived NIV showed that almost a third has persistent neurologic and cognitive dysfunctions. mostly all had disabiling chronic fatigue syndrome, and more than half had behavioral and neuropsychiatric changes, similar to the Malaysian and Singapore outbreak.[16]

RESPIRATORY INVOLVEMENT

Respiratory involvement through NIV was established as having effects on the nervous system, in which the involvement of other organs systems was seen to various degrees. IN the past outbreak, respiratory involvement was described in 14 to 31% of cases, it was not clear if this was part of initial presentation to aspiration or ventilator-associated pneumonia. Histology says that in Singapore, 2 out of the 11 patients had only respiratory symptoms and no encephalitis, while the remaining patients had encephalitis . cases in Bangladesh and India had higher rates of respiratory participation, comprising half to two thirds of cases , in which some of them developing acute respiratory distress syndrome . These dissimilarities may relate to differences between the 2 strains as discussed later.

DIAGNOSIS

Laboratory diagnosis of Nipah virus infection is manufacture using reverse transcriptase polymerase chain reaction(RT-PCR) from throat swabs, cerebrospinal fluid, urine and blood analysis during acute and convalescent stages of the disease. IgG and IgM antibody detection can be done after recovery to confirm Nipah virus infection. Immunohistochemistry on tissues collected during autopsy also confirms the disease.[17]] Viral RNA can be isolated from the saliva of infected persons. As no laboratory has complete control over the specimens it receives, standard precautions should always be adopted and practiced. The basic objective of a biosafety program is the containment of potentially harmful biological agents. The purpose of containment is to reduce or eliminate exposure of laboratory workers, other persons, and the outside environment to potentially hazardous agents. The use of vaccines may provide an increased level of personal protection. The term “containment” is used in describing safe methods, facilities and equipment for managing infectious materials in the laboratory environment where they are being handled or maintained. The appropriate combination of the elements of containment required in a laboratory is determined on the basis of the risk assessment of the work to be done with a specific agent.

PREVENTION:

In terms of prevention till now there is no effective treatment for NiV virus. Treatment measures were largely supportive and consisted of anticonvulsants, treatment of secondary infection, mechanical ventilation, and rehabilitation. But we can prevent it by avoiding exposer to bat in endemic areas and sick pigs. Avoid drinking of raw palm sap (alcoholic beverages) contaminated by bat excrete eating of fruits partially consumed by bats and using water from wells infested by bats [19] .Avoid direct contact with bats or pigs in the epidemic areas.[20] Maintain

absolute general hygiene, wash your hands frequently Maintain quarantine from the infected individual. Stay home if you are sick. Clothes, utensils and items typically used in the toilet or bathroom of the infected person should be cleaned separately and maintained hygienically. Handle and prepare food safely Ensure distance from the dead; avoid kissing or hugging the person who died of Nipah infection.

FUTURE ASPECTS:

Nipah virus and Hendra [20] virus is another virus that belongs to Hepina virus genus. Antibodies to NIV have been found in fruit bats in India, Indonesia and Timor-Leste. An investigational subunit vaccine with cross-protective antibodies to Hendra (HENV) and Nipah (NIPV) viruses shows potential protection in humans.

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