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Nipah virus, a paramyxovirus that emerges from wildlife hosts and represent a threat to human health

Virus Nipah, un paramixovirus que emerge de los hospedadores de vida silvestre y representa una amenaza para la salud humana

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The Nipah virus (NiV) belongs to the family *Paramyxoviridae*, genus *Henipavirus* and has recently been recognized as causing serious diseases with high mortality rates in humans. In 1999, NiV was identified in Malaysia during an outbreak of encephalitis and respiratory diseases in pigs and in people responsible for the care of these animals (1,2).

The name of the virus came from the village of Kampung Sungai Nipah (Malaysia) where a group of pigs with encephalitis became ill (2). Given the relationship of NiV with the Hendra virus, to investigate the reservoirs of the NiV, macrochiroptera bats of the genus *Pteropus* were selected, in which the NiV was afterward identified (1). In the outbreak of 1999, the NiV virus caused mild disease in pigs and around 300 human cases were reported, exceeding 100 deaths (1,2). To stop the outbreak, more than one million pigs were slaughtered, which caused a huge commercial loss for Malaysia (2). Since then, no cases have been reported in pigs or humans in that Asian country.

The NiV infection is usually linked with encephalitis, after exposure it is estimated that there is an incubation period of 5 to 14 days. The disease is accompanied by a fever and headache, followed by lethargy, disorientation and mental confusion. These signs can progress to coma within 24 to 48 hours. Some patients have a respiratory disease at the beginning of the infection and 50% of them show severe neurological signs. It has been shown that NiV infects certain populations of leukocytes and it is believed that these infected cells could cross the blood-brain barrier, which would facilitate the entry of NiV into the central nervous system (3).

The lethality is 40% and was calculated in the 1998-1999 outbreak. Long-term sequelae have been observed after NiV infection, including persistent seizures and behavior changes. There is no acquired natural immunity and latent infections with subsequent reactivation of NiV and death have also been reported months and even years after exposure.

The new paramyxoviruses continue to emerge from wildlife hosts and pose a constant threat to human health worldwide. Recently in the Philippines, a similar virus to Nipah was also associated with diseases in humans (2). On the other hand, in Bangladesh, the transmission from person to person has been demonstrated, where outbreaks occur annually (2). This frequency may be related to the seasonal changes that determine in the animals' certain adaptations when the season is not favorable, which causes drastic

changes in their diet and lifestyle. For example, the hibernation of certain mammals (bats, marmots, dormice, etc.), as well as the winter lethargy of amphibians and reptiles, or the summer lethargy in different mammals, are the ways of facing the adverse season.

Human transmission of NiV in Bangladesh was associated with close contact with sick patients or their secretions. Although isolates of NiV are related to outbreaks in humans, they do not seem to have sustained transmission. Exposures between humans lead to a high risk of transmission, an observation supported by recent findings in experimental animal models during the first outbreak in Malaysia, which also affected Singapore, where most human infections were due to direct contact with diseased pigs or its contaminated tissues (1). It is believed that transmission occurred through unprotected exposure to pig secretions or unprotected contact with the tissue of a sick animal. In subsequent outbreaks in Bangladesh and India, the consumption of fruit or fruit products such as date palm juice contaminated with urine or saliva from infected bats was the most likely source of infection (1, 2). However, during the last outbreaks, NiV spread directly from person to person through close contact with people's secretions.

Currently, there are no studies on the persistence of NiV in body fluids or the environment, including fruits (2). Nipah virus transmission from person to person has also been reported among relatives and caregivers of infected patients. In Siliguri (India) in 2001, the transmission of NiV was also reported in health care centers, where 75% of the cases occurred among hospital staff or visitors (2). Between 2001 and 2008, approximately half of the cases reported in Bangladesh were due to nosocomial infections in the care of infected patients (2).

There is no treatment for NiV infections; the treatment is limited to the management of symptoms. It has been shown that ribavirin (Virazole[™]) is effective against viruses *in vitro*, but to date research in humans has not been conclusive and the clinical usefulness of ribavirin remains uncertain (1). On the other hand, in the experimental animal models, the monoclonal antibody directed to the glycoprotein Nipah G was evaluated and some protection was demonstrated, but this treatment is still incipient (3).

Although the outbreaks appear to be small and circumscribed to the Asian continent, NiV is extremely lethal and requires the design of a more dynamic surveillance strategy. In the tropical America little is known about the paramyxoviruses present in wild reservoirs as abundant as bats. Therefore, this field of research should be considered to design studies as soon as possible. These studies will indeed help to assess the potential risk to human and animal health by elucidating the distribution of NiV in our region.

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