FEATURE IN FOCUS

Update on Nipah Virus Infection in India

Reported by Ms Sheree CHONG, Scientific Officer, Communicable Disease Surveillance and Intelligence Office, Surveillance and Epidemiology Branch, CHP.

Nipah virus infection, caused by Nipah virus (NiV), is an emerging zoonotic infection that can cause severe disease in both animals and humans. Fruit bats of the Pteropodidae family are the natural host of NiV without apparent disease. They can shed the virus in their excretions and secretions, such as saliva, urine, semen and excreta. NiV infections have been reported in domestic animals, for example, pigs, which can act as the intermediate hosts for the transmission of the virus to humans.

Emergence of NiV causing human infections

NiV was initially isolated and identified in 1999 during an outbreak of encephalitis and respiratory illness among pig farmers and people with close contact with pigs in Malaysia and Singapore. Its name was originated from Sungai Nipah, a village in Malaysia where the first human cases lived. During the 1999 outbreak, nearly 300 human cases with over 100 deaths were reported and more than a million pigs were euthanised. In this outbreak, humans were apparently infected with NiV via close contact with infected pigs which contracted the virus from bats. No person-to-person transmission was reported. No subsequent cases (in neither swine nor human) have been reported in Malaysia and Singapore after this outbreak.

Global situation in the past two decades

Outbreaks of NiV have occurred in Bangladesh and India since 2001. In 2001, a NiV outbreak in humans was reported in Bangladesh. Since then, NiV outbreaks have been reported almost every year in different districts of Bangladesh. The last outbreak was reported in 2015. From 2001 to 2015, a total of 261 human cases of NiV infection with 198 deaths (76%) were reported there. India also reported two outbreaks of NiV infection in the eastern state of West Bengal, bordering Bangladesh, in 2001 and 2007 respectively. Seventy-one cases with 50 deaths (70%) were reported in these two outbreaks. Unlike the first NiV outbreak in which pigs were involved as intermediate hosts for disease transmission, the outbreaks in Bangladesh and India were associated with consumption of fruits or fruit products (such as raw date palm sap) contaminated with urine or saliva from infected fruit bats. Raw date palm sap is harvested by shaving one side of the date palm tree in a V shape and then a small wooden pipe is placed at the base of the V to allow the sap to flow into a clay pot for collection over the night. Bats frequently visit the harvested date palm trees and lick the sap stream that flows from the shaved part of the tree to the collection pot. They may shed the Nipah virus into the sap and transmit the disease to humans. There was also evidence of human-to-human transmission among family and care givers of infected patients as well as in healthcare settings. Nosocomial transmission accounted for around 75% of cases reported in the outbreak in India in 2001 and about half of the reported cases in Bangladesh from 2001 to 2008 were due to human-to-human transmission.

Geographical distribution of NiV

Outbreaks of NiV in Southeast Asia have a strong seasonal pattern, usually during winter and spring from December to May, and a limited geographical range. This could be related to the breeding season of the bats, increased shedding of virus by the bats and the date palm sap harvesting season. Apart from the four countries with reported human NiV outbreaks (Bangladesh, India, Malaysia and Singapore), other countries in which Pteropus fruit bats live are at potential risk of NiV infection. The distribution of these bats extends from the east coast of Africa, across South and Southeast Asia, east to the Philippines, Pacific islands and Australia. Nipah virus can emerge as a human pathogen anywhere in these distribution areas. Countries/areas with serological evidence or molecular detection in the natural reservoir (Pteropus bats species) and several
other bat species include Bangladesh, Cambodia, Mainland China, Ghana, India, Indonesia, Madagascar, Papua New Guinea, the Philippines, Taiwan and Thailand.

**The latest outbreak in India**

On May 19, 2018, a third outbreak of NiV infection was reported in the Southern State of Kerala in India (Figure 1). At the beginning, three deaths in the same family were reported in the Kozhikode District of Kerala. Field investigation revealed that there were bats living in an abandoned water well on the premises of a new house where the family had plans to move into after renovation. As of June 2, 2018, there were 19 reported cases (18 confirmed by laboratory tests) from two affected districts (Kozhikode and Malappuram) in Kerala State. Seventeen of the 19 reported cases died. All the reported cases were found to have direct or indirect contact with the first casualty or the family prior to contracting the disease, including a health care worker.

In response to the outbreak, a multi-disciplinary team led by the Indian Government's National Centre for Disease Control (NCDC) has been formed in Kerala and the World Health Organization (WHO) has also provided technical support to the Government of India as needed. Contact tracing has been initiated. Infection prevention and control measures have been strengthened in health facilities. Relevant sectors including animal health, wildlife and environment sectors have been involved to establish the origin and spill-over of the disease from animal to human. Risk communication messages were being delivered to the community, public and stakeholders to increase their awareness of the disease. So far, the disease has not spread to new areas. The WHO considered that the outbreak was localised at the moment and the risk was low at the national and regional levels.

**Prevention of NiV**

To reduce the risk of infection when travelling to places affected by NiV, the public should adopt the following measures:
- Avoid contact with farm animals or wild animals, especially bats and pigs;
- Observe good personal hygiene; wash hands frequently with liquid soap and water, especially after contact with animals or their droppings/secretions, and taking caring of or visiting sick people; and
- Observe good food hygiene; fruits should be thoroughly washed and peeled before consumption. Avoid drinking raw date palm sap.

In Hong Kong, no cases have been reported to the Centre for Health Protection (CHP) of the Department of Health so far. CHP will continue to closely monitor the situation, maintain close liaison with WHO and perform risk assessment based on the latest available information. Further information is available from the CHP’s website (https://www.chp.gov.hk/en/healthtopics/content/24/100584.html).

Nipah virus (NiV) is an enveloped RNA virus of the family Paramyxoviridae, genus Henipavirus, and is closely related to Hendra virus. Fruit bats of the family Pteropodidae are the natural hosts for NiV. Transmission of the disease is mainly through direct contact with infected animal (usually bats and pigs) or their contaminated body fluids (respiratory droplets, throat or nasal secretions) or tissues. It can also be transmitted via the consumption of food products (e.g. raw date palm juice) contaminated with urine or saliva from infected fruit bats. Human-to-human transmission is also possible through close contact with infected persons’ secretions (especially respiratory) and excretions.

The incubation period for NiV infection is around four to 14 days, but a period as long as 45 days has been reported. Clinical manifestations range from asymptomatic infection to acute respiratory infection (mild to severe) and fatal encephalitis. Infected people initially develop influenza-like symptoms of fever, headaches, myalgia (muscle pain), vomiting and sore throat. This can be followed by dizziness, drowsiness, altered consciousness, and neurological signs that indicate acute encephalitis. Some cases may develop atypical pneumonia and severe respiratory problems, including acute respiratory distress. Most people who survive acute encephalitis make a full recovery, but long term neurologic conditions have been reported in survivors. Approximately 20% of patients are left with residual neurological consequences such as seizure disorder and personality changes. The case fatality rate is estimated to range from 40% to 75%.

There are currently no drugs or vaccines specific for NiV infection. The primary treatment for human cases is intensive supportive care.
References
5 Nipah virus outbreaks in the WHO South-East Asia Region. World Health Organization (WHO). Available at: http://www.searo.who.int/entity/emerging_diseases/links/nipah_virus_outbreaks_sear/en/.

Update on Global and Local Epidemiology of Meningococcal Disease

Reported by Dr Cindy POON, Medical and Health Officer, Vaccine Preventable Disease Office, Surveillance and Epidemiology Branch, CHP.

Background
Meningococcal disease refers to illness caused by Neisseria meningitidis bacteria. The disease was first described in 1805 when an outbreak swept Geneva, Switzerland, although the causative bacterium was only identified in 1887. Subsequently, major outbreaks were recorded during the two world wars and epidemics have been reported on the African continent since 1909.

Global epidemiology
There have been epidemics of meningococcal disease in Asia, Europe and the Americas, but the largest and most frequently recurring outbreaks occurred in sub-Saharan Africa. Epidemics occur in seasonal cycles during the dry season from December to June in the African meningitis belt which stretches across the continent from Senegal to Ethiopia (Figure 1). Major epidemics occur every five to 12 years in this region, during which the attack rates can reach 1 000 cases per 100 000 persons in affected areas. Other regions of the world also have occasional outbreaks but significantly lower incidence of less than three cases per 100 000 population.

According to the World Health Organization (WHO), there are no reliable estimates of global meningococcal disease burden due to inadequate surveillance in several parts of the world. Of the 12 N. meningitidis serogroups identified, serogroups A, B, C, X, W, and Y are responsible for the majority of the disease, but serogroup distribution varies by location and time. Serogroup A had historically accounted for 90% of meningococcal disease cases in the meningitis belt. After the progressive roll-out of monovalent serogroup A meningococcal conjugate vaccine in 2010, outbreaks due to serogroup A have been significantly reduced. Recent epidemics and outbreaks in the meningitis belt were primarily due to serogroups C, W and X. Dry and dusty conditions during the dry season between December and June, large population displacements at the regional level due to pilgrimages and overcrowded living conditions are risk factors for meningococcal disease outbreaks in the region. In the Americas, Australia and Europe, majority of cases were accounted by serogroups B, C and Y, though increasing numbers of serogroup W have been observed in some areas. In Asia, five major serogroups (A, B, C, W and Y) were reported to be variedly present in different countries.
Invasive meningococcal infection is a statutory notifiable disease in Hong Kong. In the past five years, a total of 24 sporadic cases were recorded by the Centre for Health Protection (CHP) of the Department of Health (DH). Three to six cases were reported annually, giving an annual incidence of 0.04 – 0.08 per 100,000 population. The ages of the patients ranged from one month to 97 years (median: 50 years), with 15 (63%) of them being male. Five (21%), 14 (58%) and five (21%) cases affected children aged below 18 years, adults aged 18-64 years and elderly aged 65 years or above respectively. Twenty cases (83%) had probably acquired the infection locally (Figure 2). Two cases were imported from Mainland China and one case was imported from the United Kingdom. The remaining patient worked in Hong Kong but lived in Mainland China, and thus the importation status was undetermined.

Invasive meningococcal infection mainly results in severe illness including meningitis and sepsis. Among the 24 cases, 13 cases were diagnosed as sepsis, six cases were diagnosed as meningitis, three cases had both forms of the disease and two cases were diagnosed as septic arthritis. The most common serogroup identified was serogroup Y (eight cases), followed by serogroup B (six cases), serogroup C (three cases), serogroup W135 (three cases) and serogroup X (one case). There were three cases with unknown serogroup. One fatal case was recorded each year in 2015, 2016 and 2017, giving an overall case fatality rate of 12.5%.

In 2018, seven sporadic confirmed cases of invasive meningococcal infection affecting six persons have been reported to the CHP (as of June 20), exceeding the annual number of cases in the past five years. Two cases were actually the same person having been infected by *N. Meningitidis* of different serogroups in two different episodes. He (22-year-old) had one episode of meningitis and sepsis in January 2018 caused by serogroup Y and another episode of sepsis caused by serogroup B in June 2018. He had no travel history during the incubation period in the first episode and was classified as locally acquired infection. He had travelled to Mainland China and Macao during the incubation period in the second episode. The other five cases affected one male and four females aged one month to 65 years. One of them had history of travel to the United Kingdom and the Czech Republic during the whole incubation period and was classified as imported infection. The cases were either diagnosed as sepsis (four cases) or having both meningitis and sepsis (one case). Serogroup C was identified in two cases, while serogroups B, Y and W135 were each identified in one case. One fatal case was recorded in June with the cause of death currently under investigation. No neurological sequelae were recorded among those recovered.

Preventive measures

Meningococcal infection is mainly transmitted by direct person-to-person contact and through respiratory droplets from patients or asymptomatic meningococcal carriers. Therefore, members of the public are advised to observe good personal and environmental hygiene practices to avoid the infection.

While sporadic cases of meningococcal disease are known to occur in some countries in schools, colleges, military barracks and other places where large numbers of adolescents and young adults congregate, the risk of contracting meningococcal disease in travellers is generally low. Nonetheless, persons who are planning their trip to Mecca in Saudi Arabia during the Hajj pilgrimage, to sub-Saharan regions of mid Africa during the dry season, or to areas that are known to experience epidemic meningococcal disease should seek professional advice from doctors for vaccination in view of the individual’s age, health condition, and details of the journey such as place, duration and nature. The public can refer to DH’s Travel Health Service website (https://www.travelhealth.gov.hk/english/travel_related_diseases/news.html#Meningococcal_meningitis) or announcements of other health authorities (e.g. WHO and Centers for Disease Control and Prevention of the United States) for information on areas/places with epidemic meningococcal disease.

References

Two sporadic cases of listeriosis

The Centre for Health Protection (CHP) recorded two cases of listeriosis in early June 2018. The first case was an 89-year-old woman with underlying illness. She developed fever and vomiting on June 1 and was admitted to a public hospital on June 2. Her blood culture collected on June 2 yielded *Listeria monocytogenes*. She was treated with antibiotics and her condition was stable. She did not recall consuming any high-risk food during the incubation period.

The second case was a 60-year-old man with underlying illness. He was admitted to a public hospital for acute heart failure on June 1. His blood culture collected on June 1 yielded *Listeria monocytogenes*. The clinical diagnoses were heart failure and sepsis. He was treated with antibiotics and required intensive care. He developed cardiogenic shock with multi-organ failure and he passed away on June 4. According to his family, he had consumed a variety of ready-to-eat foods, including smoked salmon, salad and sushi during the incubation period.

Both patients had no travel history during the incubation period and their household contacts remained asymptomatic. So far, no epidemiological linkage has been identified among the two cases.

A sporadic case of necrotising fasciitis due to *Vibrio vulnificus* infection

On June 4, 2018, CHP recorded a sporadic case of necrotising fasciitis due to *Vibrio vulnificus* infection affecting a 63-year-old male with good past health. He presented with fever and bilateral painful upper limbs swelling on June 3. He was admitted to a public hospital on June 3 and was treated with antibiotics and surgical debridement. The clinical diagnosis was necrotising fasciitis and his condition was stable. Right upper limb tissue collected on June 3 grew *Vibrio vulnificus*. He had history of catching fishes in an abandoned pond but did not report injury. He had no recent travel history and his home contacts were asymptomatic.

A sporadic case of *Streptococcus suis* infection

On June 5, 2018, CHP recorded a sporadic case of *Streptococcus suis* infection affecting a 47-year-old woman with good past health. She had presented with fever, headache and dizziness since June 2. She had an episode of loss of consciousness on June 3 and was admitted to a public hospital on the same day. Her blood collected on June 3 grew *Streptococcus suis*. She was treated with antibiotics and her condition remained stable. She had a small cut by metal on her right hand and had handled raw pork at home during incubation period. Her home contacts remained asymptomatic.

Infectious Disease (ID) Forum “Human Papilloma Virus (HPV) - Next Steps” on June 11, 2018

On June 11, 2018, an ID Forum with the title “Human Papilloma Virus - Next Steps” was held. Professor Richard Hillman from St Vincent’s Hospital Australia, gave an international perspective on the topic highlighting that HPV as an infective agent as well as a major oncogen. He exemplified how Hong Kong’s HPV-related problem was progressively expanding by using local cancer data. He also shared Australia’s experiences on primary prevention and secondary prevention via vaccination and screening. Australia is now moving towards gender neutral vaccination.

Dr KM HO, Consultant-in-Charge, Social Hygiene Service, Public Health Service Branch, CHP gave a talk on HPV vaccination in Hong Kong. It was interesting to note that the public was now becoming aware of the benefits of HPV vaccination. Started in 2016, the Community Care Fund piloted for three years a free HPV vaccination scheme for targeted recipients. The fruitful local experience coupled with overseas recommendations would serve to inform application of HPV vaccine for cervical cancer prevention in Hong Kong.
CA-MRSA cases in May 2018

In May 2018, CHP recorded a total of 125 cases of community-associated methicillin resistant Staphylococcus aureus (CA-MRSA) infection, affecting 79 males and 46 females with ages ranging from seven months to 100 years (median: 33 years). Among them, there were 92 Chinese, 8 Filipinos, 6 Indian, 6 Pakistani, 5 Caucasian, 2 Malaysian, 1 African, 1 Japanese, and 4 of unknown ethnicity.

One hundred and twenty-three cases presented with uncomplicated skin and soft tissue infections while the remaining two cases had severe CA-MRSA infections. The first severe case affected a 44-year-old man who presented with fever, right facial swelling and lip blisters since April 24. He was admitted to a public hospital on April 26. His blood specimen collected on the same day was cultured positive for CA-MRSA. His clinical diagnosis was right facial cellulitis complicated with sepsis and he was treated with antibiotics. He remained stable and was discharged on May 21. The second severe case affected a 100-year-old woman with underlying illnesses. She had a pressure sore over right ankle since February. She developed fever and worsening of right ankle wound infection on May 12, and was admitted to a public hospital on the same day. X-ray of her right foot showed signs of osteomyelitis. Wound swab collected from her right ankle on May 13 was cultured positive for CA-MRSA. She was diagnosed with right foot ulcer complicated with osteomyelitis. She was treated with antibiotics and remained in a stable condition.

Among the 125 cases, one was a nurse working in a public hospital. Investigation did not reveal any epidemiologically linked cases. Besides, five clusters, with each affecting two to three persons, were identified in May. Four clusters occurred in households while the remaining one occurred in a student dormitory.

Scarlet fever update (May 1, 2018 – May 31, 2018)

Scarlet fever activity in May increased as compared with that in April. CHP recorded 168 cases of scarlet fever in May as compared with 124 cases in April. The cases recorded in May included 105 males and 63 females aged between seven months and 35 years (median: five years). There were three institutional clusters occurring in two kindergartens and a primary school, affecting a total of eight children. No fatal cases were reported in May.