Editorial

Global emergence of Zika virus

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Editor

Zika virus (ZIKV) belongs to the flaviviruses (family Flaviviridae), which includes dengue, yellow fever, West Nile, and Japanese encephalitis viruses. Zika virus was isolated in 1947, in the Zika forest near Kampala, Uganda, from one of the rhesus monkeys used as sentinel animals in a yellow fever research program.[1]

Previous to 2007, ZIKV was present in Africa and Asia (India, Malaysia, the Philippines, Thailand, Vietnam, and Indonesia) without causing outbreaks. Since then ZIKV has caused a number of outbreaks, the first occurring in 2007 on Yap Island in the Federated States of Micronesia, followed in 2013-2014 by outbreaks in French Polynesia, New Caledonia, the Cook Islands, and Easter Island, and finally spreading in 2015-2016 to Central and South America. A number of the patients in French Polynesia had severe disease with neurological symptoms, such as the Guillain-Barré syndrome.[1-3]

In Brazil, there were an estimated 440,000 to 1.3 million cases of autochthonous ZIKV infection up to December 2015.[4] Up to this time ZIKV disease appeared to be a mild illness,[2] but the Brazilian ZIKV cases were reportedly associated with microcephaly in fetuses born to ZIKV-infected mothers.[4]

The above-mentioned clusters of microcephaly, Guillain-Barré syndrome, and other neurological disorders associated in time and place with ZIKV have been declared by the WHO to constitute a Public Health Emergency of International Concern (PHEIC), based on the advice of an Emergency Committee of the International Health Regulations and other experts. In this connection, the emergency committee has explained that the advice was made "on the basis of what is not known" about the neurological findings associated with ZIKV, since ZIKV disease itself is relatively mild and 80% of infected persons are asymptomatic.[5]

Three recommendations were made by the committee, as follows: to conduct standardized and enhanced surveillance of microcephaly in areas of known Zika virus transmission; to investigate the etiology of confirmed clusters of microcephaly and neurological disorders and to determine any causative association with ZIKV, other factors, and cofactors; to take precautionary measures for the prevention of arboviral infection, which should also result in the prevention of chikungunya and dengue outbreaks.[5]

Concerning ZIKV susceptibility to desinfectants, the virus cannot be neutralized by 10% ethanol, but is killed by potassium permanganate, ether, and temperatures above 60°C.[1] As to the clinical picture, the majority of persons infected with ZIKV are asymptomatic. If symptoms develop, the most common are fever, headache, myalgia/arthralgia, edema of extremities, maculopapular rash, retro-orbital pain, conjunctivitis, lymphadenopathy. Some patients may have vertigo or digestive disorders.[1,3] There is no specific treatment or vaccine.[1,3] The only treatment is supportive (rest, fluids) and symptomatic (analgesics, antipyretics).[1,3] It should be noted that the fever may be subjective, the patient having a normal temperature as measured with a thermometer.[2]

Prevention of ZIKV infection is by personal protection against mosquito bites and eradication of mosquitoes (anti-vectorial prevention). At the community level, prevention consists in decreasing the number of egg-laying sites by drying, isolating, or treating with insecticides.[3] .Diagnostic tests for ZIKV include PCR for viral RNA, immunoassays such as ELISA to detect specific antibody, and the plaque reduction neutralization assay. In general, in diagnostic testing for flavivirus infections, two serum samples should be collected, one sample collected in the acute phase and one sample collected 2 to 3 weeks afterwards. For PCR, the samples should be collected within 10 days of onset. An ELISA developed by the Centers for Disease Control and used on Yap Island sera from patients with previous flavivirus infections, yielded more frequent cross-reactivity with dengue virus than with yellow fever, Japanese encephalitis, Murray Valley encephalitis, or West Nile viruses. The plaque reduction neutralization assay is more specific than immunoassays, but may still show cross-reactive results in secondary flavivirus infections.[1]

As observed by Hayes[1] in 2009, travel and commerce may spread the virus across large distances, as witnessed by the 2007 outbreak on Yap Island, an isolated spot in the Pacific, far to the North of Indonesia. The medical community, especially public health officers, should never relax their efforts at surveillance. Already in 2009, in connection with the Yap Island outbreak, Duffy[2] stated that "clinicians and public health officials should be aware of the risk of further expansion of Zika virus transmission." Hayes in 2009 also warned against complacency, citing the case of the West Nile virus, previously regarded as relatively benign, before causing large outbreaks of neuroinvasive disease in Romania and North America.[1]

The brain lesions in microencephalic infants are probably associated with the highly neurotropic character of ZIKV in young mice, in whom there is neuronal degeneration, cellular infiltration, and softening of the brain.[6]

From the medical practitioners point of view, ZIKV disease should now be included in the differential diagnosis of dengue. Zika virus disease is also epidemiologically similar to dengue, therefore control and prevention of the disease should be performed by avoiding mosquito bites and reducing the numbers of mosquito vectors, as recommended by the emergency committee.[5]

In conclusion, the Zika pandemic has emphasized the fact that the impact of human behaviors such as air travel on ecologic balance can result in the unexpected emergence of many infectious agents that are now lying dormant, necessitating integrated research into their ecosystems.[7]

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