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A Review on Outbreak of Zika Virus

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ABSTRACT

Zika virus is an arbovirus in the flavivirus family. Zika virus was discovered in a seninel monkey in Uganda in 1947. Consequently this virus was detected over the year in Africa and Asia. Human to human transmission of zika virus was described in the USA, from a scientist who contracted the infection in Senegal in 2008. Zika virus is an emerging pathogen and the point of this analysis is to highlight its epidemiology clinical feature, and molecular biology. The discoveries of zika virus demonstrate involvement with the other related viruses that are more pathogenic. Although zika virus is a relatively non lethal virus. It is potentially dangerous as it is genetically associated to more virulent and perilous viruses: yellow fever, West Nile, dengue, and Japanese, encephalitis, it could conceivably mutate into a more pathogenic form.

Keywords: Zika virus, arbovirus, disease.

1. INTRODUCTION

Zika virus is a disease caused by a virus transmitted by aedes virus. Other transmission modes are still under investigation. People with zika disease usually have a mild fever, skin rashes (exanthema), and conjunctivitis. These symptoms normally last for 2-7 days. At present there is no specific treatment or vaccine available. The best form of preservation is protection against mosquito's bites. Zika virus is known to circulate in Africa, Asia, and the pacific region. Zika virus is known to cause sporadic infections in humans until 2007, when an outbreak in Micronesia infected 31 people. . Zika virus is an emerging pathogen and the point of this review is to highlight its epidemiology clinical feature, and molecular biology.^{1,2}

Zika virus (ZIKV) is a member of the virus family *Flaviviridae* and the genus *Flavivirus*, transmitted by daytime-active *Aedes* mosquitoes, such as *A. aegypti* and *A. albopictus*. Its name comes from the Zika Forest of Uganda, where the virus was first isolated in 1947. Zika virus is related to dengue, yellow fever, Japanese encephalitis, and West Nile viruses. Virus particles are 40 nm in diameter, with an outer envelope and a dense inner core.

In January 2016, the U.S. Centers for Disease Control and Prevention (CDC) issued travel guidance on affected countries, including the use of enhanced precautions, and guidelines for pregnant women including considering postponing travel.³ Other governments or health agencies soon issued similar travel warnings, while Colombia, the Dominican Republic, Ecuador, El Salvador, and Jamaica advised women to postpone getting pregnant until more is known about the risks.⁴

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2. MICROCEPHALY AND CONGENITAL CENTRAL NERVOUS SYSTEM MALFORMATIONS

Microcephaly is an uncommon condition where a baby's head circumference is less than expected based on the average for their age and sex. The condition is usually a result of the failure of the brain to develop properly, and can be caused by genetic or environmental factors such as exposure to toxicins, radiation, or infection during development in the womb. Microcephaly can be present as an isolated condition or may be associated with other symptoms such as convulsions, developmental delays, or feeding difficulties.⁵

3. DATA BY THE BRAZILIAN AUTHORITIES

Between 22 October 2015 and 30 January 2016, Brazilian authorities received 4,783 notifications of microcephaly or central nervous system (CNS) anomalies. Investigation and classification of these cases are in progress. So far, 404 cases from 156 municipalities in nine Brazilian states have been confirmed to have microcephaly and/or CNS anomalies suggestive of congenital infections. Pernambuco, the first state to identify an increase of microcephaly, has reported the highest number of confirmed cases (153, 37.9%), followed by Bahia (99, 24.5%), Rio Grande do Norte (63, 15.6%), Paraíba (37, 9.2%), Alagoas (15, 3.7%), Ceará (7, 1.7%), Rio de Janeiro (2, 0.5%) and Rio Grande do Sul (1, 0.2%) for seventeen (4.2%) of the 404 cases, an infection with Zika virus was confirmed by serology or PCR. Studies to examine a possible causal association between Zika virus infection during pregnancy and congenital CNS malformations are ongoing.

On January 29, the US Centers for Disease Control and Prevention (US CDC) and the Ministry of Health Brazil published an assessment of 35 infants with microcephaly born from August to October 2015.⁶ All mothers had lived in or visited Zika virus affected areas during their pregnancies and 26 (74%) reported a rash during the first (n=21) or the second (n=5) trimester of pregnancy. All 27 infants for whom neuro-imaging studies were performed (computed tomography scans and transfontanelar ultrasounds) presented with cerebral abnormalities. Laboratory results of the investigation of cerebrospinal fluid from all babies for Zika infection are pending. Tests for other congenital infections were negative.

The Colombian Ministry of Health is monitoring 2116 pregnant women among whom 205 are suspect cases, 1735 are clinical cases and 176 are laboratory-confirmed cases by RT-PCR according to the Colombian case definition.⁷

Since the last risk assessment, the US reported on a case of microcephaly in a baby born with Zika virus infection in Hawaii. The mother lived in Brazil in May 2015.

On 4 January, French authorities reported 23 pregnant women with Zika virus infection in Martinique, French Guiana and Guadeloupe. These women are the subject of enhanced monitoring and no congenital abnormalities have been detected.

4. GUILLIAN-BARRE SYNDROME

Guillain-Barré syndrome in its typical form is an acute illness of the nerves that produces a lower, bilateral, and symmetrical sensory motor development deficit. In many cases there is a history of infection prior to the development of the Guillain-Barré syndrome. The annual incidence of GBS is estimated to be between 0.4 and 0.4 cases per 100,000 inhabitants per year. In North America and Europe GBS is more common in adults and increases steadily with age. Several studies indicate that men tend to be more affected than women.⁸

Several countries in South and Central America have reported unusual increases in Guillain-Barré syndrome (GBS).

4.1 Brazil

North-eastern states have reported 121 cases of neurological manifestation and GBS with a history of illness with a rash between January and July 2015.

According to a PAHO/WHO alert on 1 December 2015, 76 patients with neurological syndrome had been identified as of 13 July 2015, the majority in the states of Bahia where 42 cases were classified as GBS and five as other neurological conditions. Among the patients with GBS, 62% (26/42) reported symptoms consistent with Zika virus infection preceding the onset of the neurological symptoms.

For 2015, Brazil reported that 1708 cases of GBS were registered nationwide, reporting an overall 19% average increase compared with 2014 (1439 cases of GBS).

4.2 Venezuela

On 13 January, authorities reported 23 cases of GBS. On 29 January, media reports quoting the Ministry of Health reported 255 GBS cases. Among these, 55 were reported as having required admission to intensive care units.

4.3 New Zealand

On January 29, the ministry of health reported one GBS case in an imported confirmed zika virus case that had recent travel history in the south pacific region.

5. INTERIM GUIDELINES FOR PREGNANT WOMEN DURING ZIKA VIRUS OUTBREAK

CDC has developed interim guidelines for health care providers in the United States caring for pregnant women during a zika virus outbreak. These guidelines include recommendations for screening, testing, and management of pregnant returning travelers. Updates on areas with ongoing zika virus transmission are available.

Pregnant women can be infected with zika virus in any trimester (4, 7, and 8). The incidence of zika virus infection in pregnant women is not currently known, and data on pregnant women infected with zika virus are limited.

Maternal-fetal transmission of zika virus has been documented throughout pregnancy (4, 7, and 8). Although zika virus RNA has been detected in the pathogenic specimens of fetal losses, it is not known if zika virus caused the fetal losses.

Zika virus infections have been confirmed in infants with microcephaly, and in the current outbreak in Brazil, a marked increase in the number of infants born with microcephaly (4) and in the current outbreak in Brazil a marked increase in the number of infants born with microcephaly has been reported.

However, it is not known how many of the microcephaly cases are associated with zika virus infection.

5.1 Recommendations for pregnant women considering travel to an area of zika virus transmission

Because there is neither a vaccine nor prophylactic medications available to prevent zika virus infection, CDC recommends that all pregnant women consider postponing travel to areas where zika virus transmission is ongoing. If a pregnant women travel to an area with zika virus transmission, she should be advised to strictly follow steps to avoid mosquito bites. Mosquitoes that spread zika virus bite both indoors and outdoors, mostly during the day time; therefore, it is important to ensure protection from mosquitoes throughout the entire day. Mosquitoes prevention strategies including wearing long – sleeved shirts long pants , using U.S.

Environmental Protection Agency (EPA)- registered insect repellents, using permethrin-treated clothing and gear and staying and sleeping in screened –in or air –conditioned rooms.

5.2 Recommendations for pregnant women with history of travel to an area of zika virus transmission

Health care providers should ask all pregnant women about recent travel. Women who travelled to an area with ongoing zika virus transmission during pregnancy should be evaluated for zika virus infection and tested in accordance with CDC Interim Guidance (figure). Because of the similar geographic distribution and clinical presentation of zika, dengue, and chikungunya virus infection patients with symptoms consistent with zika virus disease should also be evaluated for dengue and chikungunya virus infection, in accordance with existing guidelines.

Zika virus testing of maternal serum includes reverse transcription- polymerase chain reaction (RT-PCR) testing for symptomatic patients with onset of symptoms within the previous week. Immunoglobulin M (IgM) and neutralizing antibody testing should be performed on specimens collected ≥ 4 days after onset of symptoms.

Cross-section with related flavivirus (Example, dengue or yellow fever) is common with anti-body testing, and thus it might be difficult to distinguish zika virus infection from other flavivirus infection consultation with state or local health departments might be necessary to assist with interpretation of results. Testing of asymptomatic pregnant women is not recommended in the absence of fetal microcephaly or intracranial calcifications.

Zika virus RT-PCR testing can be performed on amniotic fluid currently; it is unknown how sensitivity or specific this test is for congenital infection. Also, it is unknown if a positive result is predictive of a subsequent fetal abnormality, and if so, what proportion of infants born after infection will have abnormalities. Amniocentesis is associated with an overall 0.1% risk of pregnancy loss when performed at less than 24 weeks of gestation amniocentesis performed ≥ 15 weeks of gestation is associated with lower rates of complications than those performed at earlier gestation ages, and rarely amniocentesis (≤ 14 weeks of gestation) is not recommended healthcare providers should discuss the risk and benefits of amniocentesis with their patients.

A positive RT-PCR result on amniotic fluid would be suggestive of intrauterine infection and potentially useful to pregnant women and their health care providers.⁹

6. RECOMMENDATIONS BY WHO EMERGENCY MEETING

6.1 Reducing populations of mosquitoes

Aedes Mosquitoes spreading zika virus, also transmit dengue, chikungunya, and yellow fever. Mosquitoes control programme includes the use of larvicide (insecticide that kills the mosquitoes in its larval stage) to tract standing-water sites that cannot be treated in other ways (cleaning, emptying, or covering).

6.2 Personal and household proection

WHPO recommends people protect themselves from mosquito bites by

- Using insect repellent
- Wearing clothes (preferably light colored) that covers as much body as possible
- Using physical barriers such as screens, closed doors and windows;
- Sleeping under mosquito nets , especially during the day, when Aedes mosquitoes are most active and
- Emptying or covering containers that can hold water, such as buckets, flower pots and tyres, so that mosquitoes cannot use them to breed.

6.3 Pregnant women and women planning to become Pregnant

Pregnant women who feel they may have been exposed to zika virus may wish to consult with their health- care provides for close monitoring of their pregnancies.

6.4 Travel recommendations

The committee found no justification for restrictions for restriction on travel of trade. However, travelers to area where zika virus cases have been found are urged to protect themselves from mosquito's bites. Pregnant women considering travel to affected areas may wish to consult their health- care provider prior to travel and after return. They should also practice personal and household steps and household steps to prevent mosquito's bites.

6.5 Response

A global response is needed to monitor and assesses the likely continued spread of zika across regions. The responses will support countries in risk communication on zika virus and possible association with microcephaly and other neurological disorders, build capacity for preservation and control , and outbreak response provide support and care for those suffering with serious complications , build consensus on the scientific evidence , and encourage and guidance countries to conduct studies to reduce knowledge gaps.

Because the science , and therefore the risk , is not well – understood, the global responses needs to be coordinated and adequately –resourced with rapid investigations to understand and then mitigate the impact of zika virus disease , particularly neurologist or auto – immune syndrome and other complications.

WHO has activated an incident management structure across the organization to help coordinate the global response.

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