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Jacobs Journal of Community Medicine

Mini Review

Zika Virus: Time to be Concerned but not Worried

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Received: 03-03-2016

Accepted: 03-10-2016

Published: 03-11-2016

Abstract

Zika Virus has suddenly out struck the world with its rapid spread. It is an emerging arthropod-borne virus belonging to Flaviviridae family which is transmitted by Aedes mosquitoes. It is very similar to other viruses from Flaviviridae family like dengue, yellow fever and West Nile viruses. It was first noticed in 1947, since then, it has been observed on and off in different countries at different intervals.

It is very clear that Zika virus infection is in progress to become pandemic from epidemic and hence, it is a matter of concern. But scientist-physicians like us should not be worried because such infections are bound to occur at any time Zika virus infection is just like any other viral infection which is not going to get eliminated very soon, even after, implementing great vector control programs. The only way to curb this spread is by trying to address this issue by broadening the scope of Research and developing a vaccine urgently.

At this point of time, we can only try to reduce the further spread of Zika virus infection by increasing the evident based surveillance, finding out risk factors associated with it and reducing the vector density by prevention and control measures until a vaccine is developed.

Keywords: Zika Virus; Epidemic; Pandemic; Management; ZikV; ZIka Virus Transmission; Epidemiology; Pathogenesis; Prevention

Introduction & Distribution

Zika virus (ZikV) is an enveloped, nonsegmented, positive-sense single-stranded RNA arbovirus belonging to Flaviviridae family which also includes several other arboviruses of major clinical importance, such as yellow fever virus, West Nile virus, tick-borne encephalitis virus and dengue virus [1].

Zika Virus was first discovered from a Macaca monkey in Zika forest of Uganda in 1947 [2]. The first human case was detected in 1952 which later started spreading to Sub-Saharan region and South East Asian countries including India by mid-20th-century [3-5,7]. In 2007 and 2013, an epidemic

of Zika virus was observed at Yap Island in Micronesia and French Polynesia respectively [5,8-10]. In 2015, it was seen in Brazil which rapidly progressed northwards reaching Mexico in 2015 [11,12].

Figure 1. Countries with reported confirmed autochthonous cases of Zika virus infection in 2015, as of 4th December. **Courtesy:** RAPID RISK ASSESSMENT Zika virus in the Americas: microcephaly and Guillain–Barré syndrome – 10 Dec 2015 from ECDC.

Transmission

Zika virus is transmitted by mosquito bites and has been isolated from a number of species of the genus Aedes. It possibly enters the body and passes on to the blood stream as depicted in figure 2 and may divide in the nucleus of the infected cells rather than cytoplasm as seen in other flaviviruses (depicted in figure 2) [6].

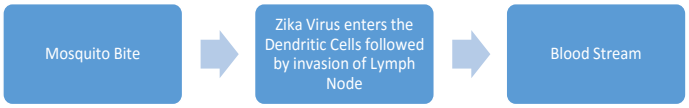

Figure 2. Possible Pathogenesis.

Previous studies have shown that the extrinsic incubation period in mosquitoes is about 10 days [7].

Zika virus can also spread to humans through blood transfusion and sexual contact (the virus has been isolated in the semen) [13]. It is observed that it can spread from mother to child through the placenta, affecting an unborn fetus [14,15]. There's currently no evidence of Zika virus transmission via breast feeding according to ECDC [12].

Travelling to epidemic countries can be a major risk of contracting the disease.Pregnant women who have travelled to Zika virus infected countries should mention it during ante-natal visits so proper monitoring can be done.

Clinical Manifestations & Complications

The clinical presentation of Zika Virus infection is very non-specific (mild fever, arthralgia, maculopapular rash and conjunctivitis being the most common symptoms followed by rare symptoms such as a headache, nausea, vomiting and edema) which can be confused with other diseases such as dengue and chikungunya. The disease is acute but self-limiting.

Post Zika epidemic in French Polynesia, 72 cases of patients developed neurological symptoms, 40 of them were diagnosed with Guillain-Barré syndrome. However, no virus was isolated, the association was suggested on the basis of clinical and epidemiology features. Seventy other cases are under investigation. Hence, it was suggested that Zika Virus might have an association with Guillain-Barre syndrome [10,16].

Recently, on 21st November 2015, the WHO notified the unusual presence of 739 cases or 20 fold annual increase of microcephaly in the north-east region of Brazil which was also a region of Zika Virus outbreak [17]. The European Centre for Disease Prevention and Control suggested a possible association of Zika virus infection with congenital microcephaly [12].

Ventura et al. documented 1 case of a well-defined macular neuro-retinal atrophy in a child who possibly got infected with Zika virus during the intra-uterine phase. They also reported brain calcification in 3 neonates suffering from microcephaly due to Zika virus [18].

On 30th November 2015, three deaths (2 adults and 1 Neonate) have been reported by the COES (Centro de Operações de Emergências em Saúde Pública sober microcephalics) in association with Zika virus infection. Seven deaths were also reported in relation to Zika virus infection which is now being investigated by the Brazilian ministry of health in the Rio Grande do Norte (n=5), Ceará (n=1) and Piauí (n=1) [19].

How can we manage?

Since 1 out of 5 people shows clinical features, it is rightly said that Zika virus infection has been underdiagnosed or underreported in disease-endemic settings [7].

The specific investigations to detect Zika virus are not yet commercially available but detection of viral RNA in serum and urine by RT-PCR (Reverse Transcriptase-Polymerase Chain Reaction) and virus isolation can help in detecting Zika virus infection and eliminating other diseases which also presents with same clinical features. The serological tests like ELISA or immunofluorescence also seem to be promising for detecting specific IgM or IgG antibodies against Zika virus but can only be positive after 5 to 6 days following the onset of symptoms according to Pan American Health Organization / World Health Organization (PAHO/WHO) [20].

CDC has also released interim guidelines and was posted on MMWR website for health care providers in the US who are taking care of the mothers who have visited Zika virus infection-prone area [21].

Specific treatment for Zika virus infection is yet very far. No medicines or vaccine are even in the advanced phase of development. Thus, Symptomatic and supportive treatment should be given which includes rest and the use of acetaminophen or paracetamol to relieve fever [20].

Anti-histamines can also be given to control pruritus which is usually associated with the maculopapular rash. Aspirin should not be prescribed without ruling out Dengue, due to its side effects of bleeding and Reye's syndrome in children below 12 years of age. Nonsteroidal anti-inflammatory drugs are also not advised either since the cause of the clinical symptoms could be dengue or chikungunya, in which they are contra-indicated [20].

Patients should be advised to drink plenty of fluids to replenish fluid lost from vomiting. Pregnant women who are diagnosed with Zika virus infection should be monitored every third or fourth week to rule out any fetal growth related anomaly [20].

Advancement in Vaccination Trials

Bharat Biotech International, an Indian company, reported that it is developing vaccines for the Zika virus and the animal trials would commence by February end, 2016. It is working on two approaches (recombinant and inactivated) [22,23]. Similarly, work has also begun in the USA in developing a vaccine, but according to Nikos Vasilakis of the Center for Biodefense and Emerging Infectious Diseases, it may take up to two years to develop a vaccine and 10 to 12 years extra may be needed before an effective Zika virus vaccine is approved by regulators for public use [24,25].

Should we be Worried?

It is very clear that Zika virus infection is in progress to become pandemic from epidemic and hence, it is a matter of concern. But scientist-physicians like us should not be worried because such infections are bound to occur at any time. Zika virus infection is just like any other viral infection which is not going to get eliminated very soon, even after, implementing great vector control programs. The only way to curb this spread is by trying to address this issue by broadening the scope of Research and developing a vaccine urgently.

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