Zika virus: An update on epidemiology, clinical manifestations, diagnosis and management

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Abstract

In 2016, the World Health Organization (WHO) presented the Zika virus as a public health emergency of international concern. In this review article epidemiological factors, transmission ways, clinical manifestations, neurological complications, diagnostic methods, management, and preventing ways of Zika virus are discussed.

Keywords: Zika virus, flavivirus, microcephaly, Guillain-Barre syndrome

Introduction

In 2016, the World Health Organization (WHO) presented the Zika virus as a public health emergency of international concern (1, 2). Although Zika outbreak occurred in the United States, Caribbean, and Pacific, it has quickly become an international health concern, due to the spread of its many cases around the world (3-6).

Zika virus is from the family of flavivirus and arthropod-borne. The virus is transmitted by the mosquito (7-9).
In terms of clinical symptoms, the Zika virus can cause nonspecific symptoms including fever, arthralgia, conjunctivitis, and pruritic maculopapular rash (1, 10-12). These symptoms occur in about 20% of patients. In addition, neurological symptoms have been reported for the virus, which include congenital microcephaly in children born to mothers with Zika virus, Guillain-Barre syndrome, and meningoencephalitis (13-17).

Epidemiology
The outbreak of the Zika virus has occurred in Africa, South Asia, the Americas, the Caribbean, and the Pacific. The virus was first isolated in 1947, and in 1952 the first human cases of this virus were reported in Uganda and Tanzania. The first outbreak of the Zika virus in 2007 was in Yap Islands, followed by French Polynesia from 2013 to 2014. In 2016, the first child with congenital microcephaly associated with the Zika virus was reported in Hawaii. In February of the same year, the first case of sexually transmission of Zika virus was reported. Infection of women to Zika virus during pregnancy is associated with the congenital microcephaly risk (18-22). Therefore, from an epidemiological point of view, it is recommended to know about the high-risk areas of the world regarding the Zika virus and avoid traveling to these areas during pregnancy.

Transmission ways
Being aware of the ways of transmission of this virus is important for preventing its spread. Most important and proven ways of transmitting this virus include mosquito biting, transmission from the mother, sexual transmission, transmission by blood products, by transplantation, and contact in the laboratory.

In people who are not pregnant, the RNA of Zika virus can be detected in their blood even 81 days after the onset of the disease. This period is even longer during pregnancy.
Also, Zika virus can be found in the patient's urine, and the virus's RNA can be positive for several months after the onset of symptoms (23-25). Zika RNA may also be detected in semen even when it is not detectable in the blood. Viral load in semen may be high and this could lead to sexually transmission of the virus (26-28). In addition to the mentioned ways, Zika virus RNA has also been reported in salivary and secretions of the female genitalia. Although the sexually transmission of this virus has been reported, it is unclear what kind of mechanism is involved and what factors affect it.

Clinical manifestations
Symptoms of Zika virus occur about 2 days to 14 days after the mosquito bite. Symptoms of the disease are not usually severe and are followed by an immune response. Symptoms usually take less than a week. Mortality and need for admission because of the virus infection are rare. All people with the virus are not symptomatic and symptoms occur in about 20% of the people.

The most common symptoms of this disease are fever, rash, itching, arthralgia, and conjunctivitis. Rash in this disease is maculopapular and appears on the face, the trunk, and organs. In addition, symptoms like myalgia and headache have also been reported in these patients, which are non-specific (1, 11, 12). Less common complications include myocarditis, thrombocytine, gastrointestinal symptoms, and mucosal ulcers.

Fever, myalgia, thrombocytine, and malfunction of the transplanted organ have been reported in those who were infected to Zika virus by transplantation. Rash and conjunctivitis, which are common symptoms of the Zika virus, seems to have been reported less frequently in people who were infected by transplantation (29, 30).

Symptoms of postnatal children with Zika virus are similar to those seen in adults. Fever, rash, and conjunctivitis are recognizable, but symptoms such as arthralgia may not be
easily detected in young children (31). Therefore, physical examination is more important in suspected people. In these children, conditions such as restlessness, lameness and pain in active and passive joints can help the diagnosis of the disease.

**Neurological complications of Zika virus infection**

Among the neurological complications of the Zika virus, Guillain-Barre Syndrome (32-36), Meningoencephalitis (37), and Myelitis (38) are noted. This virus also causes microcephaly in new born babies whose mothers were infected to Zika. In some patients, cognitive symptoms have also been reported.

**Diagnosis**

Diagnosis of Zika virus infection should be considered in all those who have symptoms of the disease, along with an epidemiologic history of exposure to it. Based on the available resources, the ways of diagnosis of Zika virus may vary from place to place (10, 39, 40). The definitive diagnosis of Zika virus is done through the real-time reverse transcription polymerase chain reaction (rRT-PCR). It is possible to perform rRT-PCR on blood, urine and serum samples.

It is recommended that rRT-PCR be performed on serum, blood, and urine in people whose symptoms started less than 14 days ago. If positive, the result is a definitive diagnosis. But, the negative results do not rule out the diagnosis. In those whose symptoms started less than 14 days ago, if the rRT-PCR results are negative, serologic tests for the Zika virus should be performed.

If the test results are positive or inconclusive, a plaque reduction neutralization test (PRNT) is required to identify false positives. The results of laboratory tests should be interpreted according to the epidemiological findings and clinical findings of the patient as there is a possibility of cross-reactivity with other viral infections of flaviviruses.
In those whose symptoms started more than 14 days ago, serological tests for Zika virus including the IgM and PRNT should be used.

In the case of children or infants who are infected to Zika virus postnatally, the diagnostic procedures are similar to those of adults.

In the case of asymptomatic individuals, diagnostic measures are valuable only in pregnant women. In other people, if they are asymptomatic, diagnostic measures are not required.

**Management**

Treatments for Zika virus are limited to supportive measures and fluid therapy (41, 42).

In the treatment of fever, the use of acetaminophen is preferable because aspirin and NSAIDs can be associated with the risk of bleeding in dengue infection and Reye's syndrome in children.

**Prevention**

One of the most important ways of transmitting the Zika virus is mosquito bites. Therefore, protection measures against mosquito bites can prevent the transmission of this disease. These measures are recommended to both those who live in places with high risks of Zika virus transmission and those who have already been infected to it.

The other way is to transfer the Zika virus through unprotected sex. Therefore, it is recommended that people who travel to high risk areas and are exposed to mosquito bites, even in the absence of the symptoms, to prevent unprotected sex for 6 months. The Zika virus can remain in the semen and vaginal secretions of the female genitalia.

The Zika virus can also be transmitted through blood transfusion, so those who have been exposed to the Zika virus (whether through mosquito bites, sexually transmitted
infections, or traveling to high risk areas) should not be considered as candidates for organ transplantation and blood donation.

Transmission of virus in the hospital and to the staff who treat the patient does not occur, but standard precautions for all patients need to be observed.

References


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