Zika virus: An overview

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ABSTRACT

Today the world has suffered to the Zika virus (ZIKV) is a flavivirous related to yellow fever, dengue, West Nile and Japanese encephalitis virus. Zika virus causes acute, serious illness which is often fatal if it is not treated. Its name comes from the Zika forest of Uganda. Zika is a mosquito born disease. Zika virus causes acute, serious illness which is often fatal if not treated. The disease may be spread from mother to child in the womb and cause microcephaly. Diagnostic test for ZIKAV infection include PCR tests on acute phase serum samples.

Keywords: Zika virus, Aedes Aegypti mosquito, PCR test, microcephaly.

History:
Zika virus causes acute, serious illness which is often fatal if it is not treated. Its name comes from the Zika forest of Uganda. The virus was first isolated in April 1947 from rhesus macaque, a monkey that has been placed in a cage of the Zika forest of Uganda near Lake Victoria, by the scientist of yellow fever research institutes. [01] The first virus isolated from human in 1968 at Nigeria.

Virus classification:
Group: Group IV (+ss RNA)

Family: Flaviviridae

Genus: Flavivirus

Species: Zika virus

Zika virus is a member of the virus family, Flaviviridae and the genus transmitted by a daytime active ‘Aedes’ mosquito such as A. Egyptian A. Albopictus. Zika virus is related to dengue, yellow fever, Japanese encephalitis and West Nile viruses.

Transmission:
Zika is a mosquito born disease and possibly transmitted by a sexual transmitted infection. The Aedes Aegypti mosquito usually bites in the morning and afternoon hours, and can be identified by the white strips on its legs.
It is reported that the Zika virus transmitted via sexual intercourse. In such cases, Zika virus may have been sexually transmitted from male partners ill with the disease.

It is believed that the disease may be spread from mother to child in the womb and cause microcephaly. [03] The ultrasound finding showed that babies had a smaller head circumference (microcephaly) due to destruction of different parts of the brain. Some fetuses also found to have calcification in their eye and microphthalmia. Another study in an autopsy of a micro cephalic fetus found Zika virus DNA as well as pathological in only the brain no other organs, suggesting that the virus has neurotropic. Symptoms of microcephaly are seizures, small head size, backward sloping forehead, hyper reactivity, facial distortion, delay in speech and movement and dwarfish.

Zika virus RNA was detected in the amniotic fluid of pregnant women whose fetus had microcephaly, indicating that the virus had crossed placenta and could have caused a mother to child infection. Brain tissue from two miscarriages (11 and 13 week) from Rio Grande do Norte in Brazil tested positive for Zika virus. [04]

In new born baby Zika virus may also cause ocular disorders. About 40% of babies with Zika related microcephaly also had scarring of the retina with spots or pigment alteration.

**Sign and Symptoms:**
The most common sign and symptoms of Zika fever, rash, conjunctivitis (red eyes), muscle, joint pain and headache.[02]

Other less common symptoms include loss of appetite, diarrhea, constipation, abdominal pain, and dizziness. Some people may have only very mild or no symptoms of infection. In general the disease symptoms are mild and short lasting (2-7 days).

**Diagnosis:**
Diagnostic test for ZIKAV infection include PCR tests on acute phase serum samples, which detect viral RNA, and tests to detect specific antibody against ZIKAV in serum. An ELISA has been developed in the Arboviral Diagnostic and Reference Laboratory of the Centers for Disease Control and prevention (USA) to detect immunoglobulin (Ig) M to ZIKV.

**Screening in pregnancy:**
The CDC recommends screening some pregnant women even if they do not have symptoms of infection. Pregnant women who have travelled to affected areas should be tested between two and twelve weeks after their return from travel. Women with positive test results for Zika virus infection should have their fetus monitored by ultrasound every three to four weeks to monitor their anatomy and growth.

**Infant testing**
For infants with suspected congenital Zika virus disease, the CDC recommends testing with both serology and molecular assay such as RT-PCR, IgM ELISA and plaque reduction neutralization test (PRNT). New born with a
mother who was potentially exposed and who have positive blood tests, microcephaly or intracranial calcification should have further testing, including a thorough physical investigation of neurological abnormalities, dysmorphic features, splenomegaly, hepatomegaly and rash or other skin lesion. Other recommended tests are cranial ultrasound, hearing evaluation and eye examination.

**Prevention**
The virus is spread by mosquitoes, making mosquito avoidance an important element of disease control. Prevention and control relies on reducing mosquitoes through source reduction (removal and modification of breeding sites) and reducing contact between mosquitoes and people.

This can be done by using insect repellent; wearing clothes (preferably light-colored) that cover as much of the body as possible; using physical barriers such as screens, closed doors and windows; and sleeping under mosquito nets. It is also important to empty, clean or cover containers that can hold water, such as buckets, flower pots or trays, so that the places where mosquitoes can breed are removed.

Special attention and help should be given to those who may not be able to protect themselves adequately, such as young children, the sick or elderly.

During outbreaks, health authorities may advise that spraying of insecticides be carried out. Insecticides recommended by the WHO Pesticide Evaluation Scheme may also be used as larvicides to treat relatively large water containers.

Travelers should take the basic precautions described above to protect themselves from mosquito bites.

**Treatment**
Zika virus disease is usually relatively mild and requires no specific treatment. People sick with the Zika virus should get plenty of rest, drink enough fluids, and treat pain and fever with common medicines. If symptoms worsen, they should seek medical care and advice. There is currently no vaccine available.

**Vaccines:**
Effective vaccines exist for several flaviviruses. Vaccines for yellow fever virus, Japanese encephalitis, and tick-borne encephalitis were introduced in the 1930s, while the vaccine for dengue fever only became available for use in the mid-2010s.[07]

Work has begun in the USA towards developing a vaccine for the Zika virus, according to Anthony Fauci, director of the National Institute of Allergy and Infectious Diseases. The researchers in the Vaccine Research Center have extensive experience from working with vaccines for other viruses such as West Nile virus, Chikungunya virus, and dengue fever.

An Indian company, Bharat Biotech International, reported in early February 2016 that it was working on vaccines for the Zika virus. The company is working on two approaches to a vaccine: "recombinant", involving genetic engineering, and "inactivated", where the virus is incapable of reproducing itself but can still trigger an immune response. The company announced animal trials of the inactivated version would commence in late February.[06]

As the world searches for a vaccine and other global companies take the first steps on research, the Bharat Biotech International Limited in Hyderabad says it has patented the Zika vaccine.[06]

1. Hyderabad lab claims to have developed world's first Zika Virus vaccine
2. If approved, the lab says it can make up to 1 million doses in 4 months
3. WHO has declared the Zika Virus a Global Health Emergency.

**WHO response**
WHO is supporting countries to control Zika virus disease through:[12]
- Define and prioritize research into the Zika virus disease by convening experts and partners.
- Enhance surveillance of Zika virus and potential complications.
- Strengthen capacity in risk communication to help countries meet their commitments under the International Health Regulations.
• Provide training in clinical management, diagnosis and vector control, including through a number of WHO Collaborating Centers.
• Strengthen the capacity of laboratories to detect the virus.
• Support health authorities to implement vector control strategies aimed at reducing Aedes mosquito populations such as providing larvicide to treat standing water sites that cannot be treated in other ways, such as cleaning, emptying, and covering them.
• Prepare recommendations for clinical care and follow-up of people with Zika virus, in collaboration with experts and other health agencies.

Research
Some experimental methods of prevention include breeding and releasing mosquitoes that have been genetically modified to prevent them from transmitting pathogens, or have been infected with the Wolbachia bacterium, believed to inhibit the spread of viruses.

REFERENCES
[9] "Countries and territories with recent local Zika virus transmission". European Centre for Disease Prevention and Control. 10 February 2016.
[10] "Zika Virus Infection". Regional Office for the Americas of the World Health Organization.