

REVIEW ARTICLE

A Review on Microcephaly Associated with Zika Fever in New Born Babies

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ABSTRACT:

A widespread epidemic of Zika virus (ZIKV) infection was reported in 2015 in South and Central America and the Caribbean. A major concern associated with this infection is the apparent increased incidence of microcephaly in fetuses born to mothers infected with(ZIKV). In this report, it was described the case of an expectant mother who had a febrile illness with rash at the end of the first trimester of pregnancy living in Brazil. Ultrasonography performed at 29 weeks of gestation revealed microcephaly with calcifications in the fetal brain and placenta. After the mother requested termination of the pregnancy, a fetal autopsy was performed. Microcephaly (an abnormally small brain) was observed, with almost complete agyria, hydrocephalus, and multifocal dystrophic calcifications in the cortex and subcortical white matter, with associated cortical displacement and mild focal inflammation. ZIKV was found in the fetal brain tissue on reverse-transcriptase–polymerase-chain-reaction (RT-PCR) assay, with consistent findings on electron microscopy. The complete genome of (ZIKV) was recovered from the fetal brain.

KEYWORDS: Zika virus (flavivirus) Uganda, microcephaly, reverse-transcriptase–polymerase-chain-reaction (RT-PCR)

INTRODUCTION:

Zika virus (ZIKV) is transmitted by daytime-active aedes mosquitoes, such as *A.aegypti*^{1,2}. Its name comes from the zika forest of Uganda. Zika virus (ZIKV) is a member of the virus family.

Family: Flaviviridae

Group: Group IV (+)ssRNA

Genus : *Flavivirus*

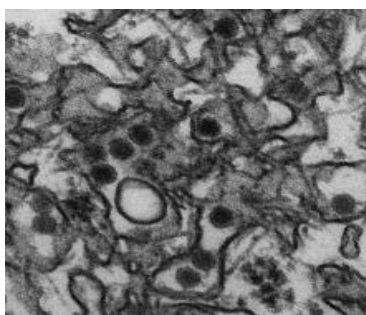


Fig-1 Zika Virus Structure

In1950s it has been known to occur within a narrow equatorial belt from Africa to Asia. In 2014, the virus spread eastward across the Pacific Ocean to french polynesia, then to Easter Island and in 2015 to Mexico, Central America, the Caribbean, and South America, where the Zika outbreak has reached pandemic levels. Zika virus is related to dengue,yellow fever, japanese encephalitis.³

VIROLOGY:

Zika virus is enveloped , icosahedral and has a nonsegmented, single-stranded, positive-sense RNA genome. It is most closely related to the spondweni virus and is one of the two viruses in the Spondweni virus clade^{4,5} There are two lineages of Zika virus, the African lineage and the Asian lineage⁶. Phylogenetic studies indicate that the virus spreading in the Americas is most closely related to the Asian strain, which circulated in

French Polynesia during the 2013 outbreak^{7,8} Recent preliminary findings from sequences in the public domain uncovered a possible change in nonstructural protein 1 codon usage that may increase the viral replication rate in humans⁹

TRANSMISSION:

The vertebrate hosts of the virus were primarily monkeys with only occasional transmission to humans. Rarely, arboviruses become established as a human disease, spread in a mosquito-human-mosquito cycle, having permanently left the enzootic mosquito-monkey-mosquito cycle. Arbo viruses to have done so are the flaviviruses yellow fever and dengue, and the togavirus chikungunya. Before the current pandemic, which began in 2007, Zika virus "rarely caused recognized 'spillover' infections in humans, even in highly enzootic areas"¹⁰ It is spread around like Barbados, Bolivia, Brazil, Colombia, Commonwealth of Puerto Rico, U.S. Territory, Costa Rica, Curacao, Dominican Republic, Ecuador, Salvador, French Guiana, Guadeloupe, Guatemala, Guyana, Haiti, Honduras, Jamaica, Martinique, Mexico, Nicaragua, Panama, Paraguay, Saint Martin, Uruguay, U.S. Virgin Islands, Venezuela, American Samoa, Samoa, Tonga, Cape Verde¹¹

SYMPTOMS:

The most common symptoms of Zika are fever, rash, joint pain, or conjunctivitis (red eyes)¹² Other common symptoms include muscle pain and headache. The incubation period (the time from exposure to symptoms) for Zika virus disease is not known, but is likely to be a few days to a week.¹³ The illness is usually mild with symptoms lasting for several days to a week. Zika virus usually remains in the blood of an infected person for a few days but it can be found longer in some people. Severe disease requiring hospitalization is uncommon. Deaths are rare¹⁴

DIAGNOSIS:

The symptoms of Zika are similar to those of dengue and chikungunya, diseases spread through the same mosquitoes that transmitted Zika.¹⁵ Undergo blood tests to look for Zika or other similar viruses like dengue or chikungunya¹⁶

LABORATORY TESTING:

If laboratory testing is required, the following instructions should be followed:

- 1) IgM, IgG and PCR test for Zika virus.
- 2) Acute serum (taken within 5 days of symptom onset) and convalescent serum (2-3 weeks later) should be taken. The two samples are important to rule out false positive tests due to cross reactivity with similar viruses such as Dengue¹⁷

3) Provide overseas travel details and clinical history including the onset day and patient's DHB. Onset date is extremely important to ensure that the most appropriate test is performed¹⁸

4) The local laboratory will forward samples to ESR who will arrange testing at an Australian Arbovirus Reference Laboratory (no labs in NZ currently test for Zika virus). Note: there is currently no particular action expected following Zika virus confirmation.¹⁹

PREVENTION:

To eliminate and control the mosquito, it is recommended to:

- 1) Avoid allowing standing water in outdoor containers (flower pots, bottles, and containers that collect water) so that they do not become mosquito breeding sites.
- 2) Cover domestic water tanks so that mosquitoes cannot get in.
- 3) Avoid accumulating garbage: Put it in closed plastic bags and keep it in closed containers.
- 4) Unblock drains that could accumulate standing water²¹.
- 5) Use screens and mosquito nets in windows and doors to reduce contact between mosquitoes and people. To prevent mosquito bites, it is recommended that people who live in areas where there are cases of the disease, as well as travelers and, especially, pregnant women should:
- 6) Cover exposed skin with long-sleeved shirts, trousers, and hats
- 7) Use repellents recommended by the health authorities (and apply them as indicated on the label)
- 8) Sleep under mosquito nets.
- 9) People with symptoms of Zika, dengue, or chikungunya should visit a health center²².

TREATMENT:

Zika virus disease is usually relatively mild and requires no specific treatment. People sick with 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 available²³

New Link Between Zika Virus and Microcephaly:

Some of the evidence was identified that there is a direct link between the debilitating birth defect and the Zika virus²⁴. Researchers here tested the spinal fluid of 12 babies with microcephaly, all of whom were born to mothers who reported having symptoms of Zika early in their pregnancies²⁵. Brazilian researchers later found traces of the virus in the amniotic fluid and the brain tissue of a small number of microcephaly babies²⁶. If a baby had been infected with the Zika virus by looking for a specific antibody in the baby's cerebral-spinal

fluid²⁷ They tested samples of 12 babies whose spinal fluid had been collected shortly after birth. They all tested positive.²⁸ This test works better than others because it is looking for an antibody called immunoglobulin M, the largest antibody humans produce. It is too large to pass from mother to child, so researchers can be confident that it is an antibody produced by the baby — and can therefore infer that the baby was infected with Zika while en utero.²⁹ It indicates the virus is making its way into the nervous system, and the baby's immune system is battling it there³⁰. And second, while immunoglobulin M disappears from the blood stream within weeks of an infection, it remains present in the cerebrospinal fluid for months or longer. This means the antibody can be detected at birth³¹ that the virus attack stem cells during early brain development while also causing the general destruction of other brain tissue.

Two ways to Prevent Zika Virus:

The first uses strands of DNA that belong to the Zika virus³². While these so-called recombinant DNA vaccines are easier to create, they don't always produce a strong enough immune response.³³ The second is an inactivated version of the Zika virus, which means the virus is unable to replicate and cause infection, but it is still able to trigger an immune response. Experts believe that this type of vaccine stands a better chance of success³⁴

ZIKA VACCINE:

The Zika virus vaccine developed by Bharat Biotech International Limited, Hyderabad goes well beyond the prime minister's catchy slogans as it is truly a 'made in India'³⁵ by Indians moment and the patent on the product is also Indian. Ella's company also partnered with Indian government to make the first-ever Indian-made vaccine called 'Rotavac', a vaccine against an infectious diarrhoea disease caused by Rota virus that afflicts children³⁶. Bharat Biotech's vaccines now christened 'Zikavac' are ready for pre-clinical trials, this makes these two vaccines head and shoulders ahead of the other international efforts which are still literally efforts on the drawing board.³⁷

DISCUSSION:

The overall review about the microcephaly link between the new born babies are consist of it is spread rapidly in southern America and also spreading all over the world. The most common symptoms are fever, joint pain, rashes. And this can be diagnosed by IgM, IgG, PCR test.

CONCLUSION:

Spreading of Zika virus can be controlled only by prevention. since there is no vaccine scientist of bharath biotechnology in Hyderabad was invented two vaccines

called 'Rotavac' and "Zikavac". these are the two vaccine that prevent the zika vaccines.

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