

Editorial



From the Editor's Desk

The Eye in Zika: What an Ophthalmologist Must Know ?

Recent reports have highlighted the rapid spread of Zika virus in India, with 100 cases being confirmed from the state of Rajasthan. This is the third outbreak of Zika in India since 2017 when it was first reported from Ahmedabad, Gujarat where 3 cases of laboratory confirmed cases were documented.¹ Thereafter, a second outbreak was reported in Tamil Nadu. The recent outbreak in Rajasthan has sent alarm bells ringing and the Government has swung into action to contain the spread of infection. While the authorities are leaving no stone unturned to deal with the outbreak, it is important for doctors to be vigilant and aware about the disease and its clinical manifestations, particularly for ophthalmologists, who can play a critical role in diagnosis and treatment.

History and Current Scenario

Interestingly, Zika virus was identified in the Zika forest of Uganda. In 1947, Alexander Haddow and George Dick first identified Zika virus in a rhesus monkey. Blood samples revealed an unknown virus that was named Zika after the forest in which it was first identified.² The first case of human infection was reported in 1954 in Nigeria.³ In 2007, the first Zika outbreak occurred in the Yap Islands with the clinical presentation comprising of a triad of acute onset of generalized maculopapular rash, arthritis or arthralgia, and non-purulent conjunctivitis.⁴ Thereafter, outbreaks occurred in various parts of the world, including Africa, Southeast Asia and the Pacific islands, but no major complications were associated until an extensive outbreak was reported from Brazil in 2015.⁵ By 2018, the US Centers for Disease Control and Prevention estimated there were at least 90 countries with active Zika virus transmissions.

Mode of transmission

The Zika virus is a flavivirus which is primarily transmitted through the bite of an infected female mosquito of Aedes species, such as *Ae. aegypti* and *Ae. albopictus*.⁶ Although mosquitos are considered the main mode of transmission, other modes include congenital infection, sexual transmission, blood transfusion, organ transplantation and laboratory exposure.^{6,7}

Clinical Features

The clinical presentation depends on whether the infection is acquired or congenital. A variety of ocular findings have been reported in adults and in newborns infected with the virus.

Acquired Infection

Most patients (around 80%) with acquired infection are asymptomatic. Symptoms, if present, typically appear a few days to a week after the exposure and can last upto a week. They include low-grade fever, rash, myalgia and headache.^{4,6} Non-purulent conjunctivitis is one of the three features of the clinical triad of generalized maculopapular rash, arthritis or arthralgia, and conjunctivitis which is found in less than 20% of the infected population.⁴ Among other ocular symptoms, uveitis has been described, with an intraocular inflammation associated with conjunctivitis, hypertensive iridocyclitis, unilateral acute maculopathy and a bilateral posterior uveitis.⁸⁻¹¹ Therefore, ophthalmologists must bear in mind that a new differential diagnosis of Zika virus should be considered in adults who present with uveitis. Fortunately, severe disease and fatalities due to Zika virus are rare. Guillain-Barre' syndrome is a rare complication.²

Congenital Zika Syndrome

In newborns, infection with the Zika virus can result in serious neurological, ophthalmological, audiological, and skeletal abnormalities. The distinct features of this novel entity, named congenital Zika syndrome (CZS), include severe microcephaly with partially collapsed skull, brain abnormalities, including thin cerebral cortices and subcortical calcifications, macular scarring and focal pigmentary retinal mottling, congenital contractures, including arthrogyriposis and clubfoot, marked early hypertonia and symptoms of extrapyramidal involvement and hearing loss.¹²

Studies have revealed that between 21.4% and 55.0% of infants with CZS present with ocular findings.¹³⁻¹⁶ Eye abnormalities may be the only initial finding in congenital Zika virus infection. Although CZS can present with a diversity of ocular features, the most typical findings are the pigment mottling and chorioretinal atrophy that are commonly seen in the macular region, resembling toxoplasmosis.¹³⁻¹⁶ The majority of studies have shown that Zika virus can affect the posterior segment of the eye including the retina, optic nerve, and retinal vessels.^{17,18} Other ocular findings may be seen in the form of iris coloboma, lens subluxation, cataract, intraocular calcifications, microphthalmia, congenital glaucoma and optic nerve hypoplasia. There can be associated paresis of the oculomotor and abducens muscles with convergent strabismus, nystagmus and loss of pupillary responses.^{14,19} The main risk factors for ocular abnormalities are infants whose mothers reported symptoms during the first trimester of pregnancy and in those who were born with more severe microcephaly.²⁰ Optical Coherence Tomography features in babies with chorio-retinal scars are discontinuation of the ellipsoid zone and hyper-reflectivity underlying the retinal pigment epithelium, retinal thinning, choroidal thinning, and colobomatous-like excavation.²¹

In cases of suspected CZS, it is important for neonates to undergo a meticulous systemic evaluation, including ophthalmologic examination. They should be kept under regular follow-up as delayed manifestations may occur months later. All infants with potential maternal Zika virus exposure during pregnancy should undergo screening eye examinations regardless of the presence or absence of central nervous system abnormalities.²²

Diagnostic Tests and Treatment

In cases of acquired infection, the patient is often asymptomatic and the symptoms, when present, are usually non-specific. Therefore, laboratory tests are required to confirm the infection. The tests that are available include molecular tests to identify the presence of viral RNA by polymerase chain reaction technology, serology for detection of immunoglobulin M [IgM], and plaque-reduction neutralization.²³

Currently, there is no specific anti-viral treatment for Zika and no effective vaccine to prevent the infection. For systemic infection, symptomatic management is advised, if needed. Nonsteroidal anti-inflammatory drugs should be avoided until dengue fever is ruled out. Niclosamide has been identified as a possible treatment because it may reduce Zika virus transmission and potentially prevent Guillain-Barre' syndrome and other ZIKV-related complications in humans.²⁴

In cases of ocular involvement during the acute phase, topical steroids, cycloplegics, and hypotensive agents may be needed; however, it has been reported that ocular findings in acquired disease usually resolve completely regardless of treatment.^{8,9,11} Children with CZS are at an increased risk of presenting with visual disabilities because of the neurologic abnormalities.²⁵ Such cases should be treated by a multidisciplinary team, of which ophthalmologists form an important part in addressing the specific ocular abnormalities. They are responsible for detecting ocular lesions and initiating early intervention for visual development during the critical period of neuroplasticity.²⁶

To summarize, a better understanding and insight into the clinical manifestations of the Zika virus will help ophthalmologists be aware of the key role they can play in identifying and managing the disease.

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