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Review

Ophthalmologic aspects of chikungunya infection

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Summary Chikungunya fever, a viral disease epidemic in some parts of the world is newly introduced in the Americas. This is of considerable international concern, with a growing incidence owing to developing urbanization, tourism, and trade. Ocular manifestations of chikungunya fever are not frequent, but of great relevance. Common manifestations include conjunctivitis, optic neuritis, iridocyclitis, episcleritis, retinitis and uveitis. Diagnostic and monitoring investigations would include optical coherence tomography, fundus fluorescein and indocyanine green angiography, visual field analysis, and electrophysiologic tests. There

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have been no prospective, randomized therapeutic trials, and it is unclear if the disease is self-limiting or if treatment is actually beneficial. Prognosis varies, ranging from full resolution to permanent vision loss despite intervention.

1. Introduction

Chikungunya virus (CHIKV) is a mosquito-borne viral disease caused by an arbovirus from the Togaviridae family and transmitted by species belonging mainly to genus *Aedes* [1]. Until December 2013, was endemic in parts of Africa and Southeast Asia and on the Indian subcontinent, but now is also endemic in tropical areas of the Americas [2—4]. This would be inferred given the longtime of transmission occurrence in this region and circulation of two genotypes, one clearly enzootic (East Central South African, ECSA, in Brazil) [1—4].

During 2014—2016, more than 2.0 million cases of chikungunya were reported in the Americas [1,5]. Some countries in the region have presented high incidence rates (>200 cases/100,000 pop) [5] such as Dominican Republic, El Salvador, Venezuela [4], Puerto Rico and Colombia [3]. The typical clinical signs of the disease are acute fever, severe arthralgia, and skin rash [6,7]. Complications include myocarditis, hepatitis, and neurological and ocular disorders, including a variety of anterior and posterior segment manifestations [7—11]. In this review we have addressed major features of the ocular compromise in this emerging arboviral disease, including its implications for travel medicine practitioners.

2. Laboratory diagnosis of systemic illness

Based on guidelines published by the Pan American Health Organization/World Health Organization (PAHO/WHO), polymerase chain reaction (PCR), virus isolation, or detection of viral antigens should be used before the eighth day of illness. After 8 days, chikungunya serologic tests such as IgM ELISA/rapid tests or IgG paired sera should be used because the viral load will have decreased [12].

3. Classification of systemic illness

CHIKV can cause acute, sub-acute, and chronic disease. Acute disease is most often characterized by sudden onset of high fever (typically greater than 102 °F [39 °C]) and severe joint pain. Other signs and symptoms may include headache, diffuse back pain, myalgias, nausea, vomiting, polyarthritis, rash, and conjunctivitis (reported in 3—56% of the cases). The acute phase of CHIK lasts for 3—10 days [1,6,12].

Rarely, severe forms of the disease can occur with atypical manifestations. Fatalities related to CHIKV infection are thought to be uncommon. However, an increase in crude death rates was reported during the 2004—2008 epidemics in India and Mauritius [13—15]. Recently, in Venezuela and Colombia, fatalities have been also reported during the 2014—2015 epidemics, these have occurred in elderly or those with underlying diseases [16,17].

Chronic disease is defined by symptoms that persist for more than three months. The frequency of persons reporting persistent symptoms varies substantially by study and the time that had elapsed between symptom onset and follow-up. Studies from South Africa note that 12—18% of patients will have persistent symptoms at 18 months and up to 2—3 years later [1,12]. Recently, new information pooling studies have provided data regard the post-chikungunya chronic inflammatory rheumatism (pCHIK-CIR) [5]. New models have estimated that the prevalence pCHIK-CIR would be 47.57% (95%CI 45.08—50.13%), with a median time of 20.12 months in which 50% of patients will develop pCHIK-CIR [5]. A recent meta-analysis found that the pooled prevalence of pCHIK-CIR from 18 selected studies among 5702 patients was 40.22% (95%CI 31.11—49.34%) [18]. Nevertheless, beyond the high prevalence of chronic complications is of concern the longtime of persistence, which recently have been shown as high as six years [19].

Ocular manifestations are included among the acute and/or severe forms of disease, but also in the chronic form (with less frequency), clearly deserving more studies, in endemic areas, as well in patients coming or returning from areas with transmission.

4. Ophthalmologic manifestations

Ocular involvement in chikungunya infection includes multiple manifestations ranging from the compromise on anterior segment to the development of lesions in the posterior pole [8,9]. Ocular manifestations can be present at the time of systemic illness or after resolution of systemic disease [8,9]. During the initial phase of the disease, while the systemic symptoms are being established, the first ophthalmological manifestation includes photophobia, conjunctival injection and retroocular pain [10,11,20]. It is common that other symptoms usually appears like blurred vision, floaters, watering, irritation and diplopia after a latent period of a month to a year (during chronic phase) [21—23]. It is difficult to clarify the exact interval between the beginning of fever in the context of the systemic disease and the establishment of eye symptoms, however, awareness about ocular manifestations of chikungunya should be raised. Some retrospective observational case series have made description of these features [24]. For instance, conjunctival injection can appear 10—12 weeks after fever beginning in the cases where this symptom does not appear with the beginning of systemic disease, decrease in vision is demonstrated after 4 weeks, pain and floaters can be present after 12 weeks of the fever beginning [24]. Beyond that, there is a lack of studies following