

## Anterior scleritis treated with systemic corticosteroids in Chikungunya infection

João Carlos Gonçalves Cruz<sup>\*</sup>, Celso Busnelo Moreno, Guilherme Novoa Colombo-Barboza, Marcello Novoa Colombo-Barboza

Department of Ophthalmology, Hospital Oftalmológico Visão Laser, 11015-003, Avenida Conselheiro Nébias, 355, Santos, SP, Brazil

### ARTICLE INFO

#### Keywords:

Arboviruses  
Chikungunya virus  
Hyperemia  
Scleritis

### ABSTRACT

**Background:** Chikungunya is a matter of grave concern in Brazil. This case report describes a rare ocular manifestation in a patient with chikungunya.

**Case report:** A 49-year old male diagnosed with chikungunya one month previously was being treated and followed up by a rheumatologist. He presented with complaints of pain and hyperemia in both eyes over the preceding seven days. Biomicroscopy of both eyes revealed bulbar conjunctival hyperemia 3+/4+ with 360° of ciliary injection, and no other abnormalities. The patient was prescribed 1 drop of loteprednol etabonate every 4 h, tapering every three days, and nimesulide 100 mg every 12 hours for 7 days. One week later, however, scleritis was worse and the medial sclera was elevated, particularly in the right eye. Intraocular pressure remained normal, and hyperemia increased to 4+/4+ in the right eye. Supplementary tests revealed positive serology for chikungunya IgG and IgM antibodies and other etiologies were ruled out. Treatment was then changed to oral prednisone 60 mg/day, tapering every three days. The patient was pain-free three days later with all signs and symptoms having disappeared within five days.

**Conclusion:** Ocular abnormalities resulting from chikungunya virus infection require careful monitoring even after the acute phase of chikungunya infection has passed. The fact that patients usually stop being followed-up after they have been symptomless for some time delays diagnosis and the appropriate treatment of ocular manifestations. Consequently, chikungunya should be included in the differential diagnosis of ocular pathologies wherever the infection is endemic or epidemic.

### 1. Background

Chikungunya is caused by an RNA virus belonging to the *Alphavirus* genus of the family *Togaviridae*. The disease is transmitted to humans by female *Aedes aegypti* and *Aedes albopictus* mosquitoes infected by the chikungunya virus (CHIKV). Time of disease onset may vary but usually occurs 4–8 days after the patient has been bitten by an infected mosquito<sup>1</sup>. In general, the acute phase of the disease begins 1–10 days after incubation, with the abrupt onset of fever, headache, fatigue, gastrointestinal symptoms with nausea and vomiting, skin rash, myalgia and severe arthralgia.<sup>2</sup> Ophthalmological complications may develop during any phase of the disease; however, photophobia and retro-orbital pain are more commonly seen during the acute phase.<sup>3</sup> In addition, both the anterior and posterior segments of the eye can be involved. In the cornea, the epithelial and endothelial cells are the preferred targets of CHIKV, while in the connective tissue of the sclera the fibroblasts are

affected, potentially leading to episcleritis and scleritis.<sup>4</sup>

Chikungunya constitutes a matter of grave concern in Brazil. Between January and May 2021, the country recorded a total of 36,242 probable cases of chikungunya, with the southeastern region having the second highest incidence (20 cases per 100,000 habitants). Such transmission levels made the state of São Paulo, and specifically the *Baixada Santista*, one of the epidemic regions within the country with the highest mortality rates.<sup>5</sup>

The objective of this case report is to describe a rare ocular manifestation in a patient with chikungunya. Since this complication has seldom been reported in the literature, this report should serve to alert healthcare professionals to the possibility, improving recognition of the condition and ensuring adequate treatment, particularly in regions in which this disease is endemic.

This report received approval from the institution's internal review board. The patient provided written informed consent for publication of

<sup>\*</sup> Corresponding author. Hospital Oftalmológico Visão Laser, Brazil.

E-mail address: [joacgc@gmail.com](mailto:joacgc@gmail.com) (J.C.G. Cruz).

<https://doi.org/10.1016/j.ajoc.2022.101555>

Received 18 January 2022; Received in revised form 14 April 2022; Accepted 15 April 2022

Available online 26 April 2022

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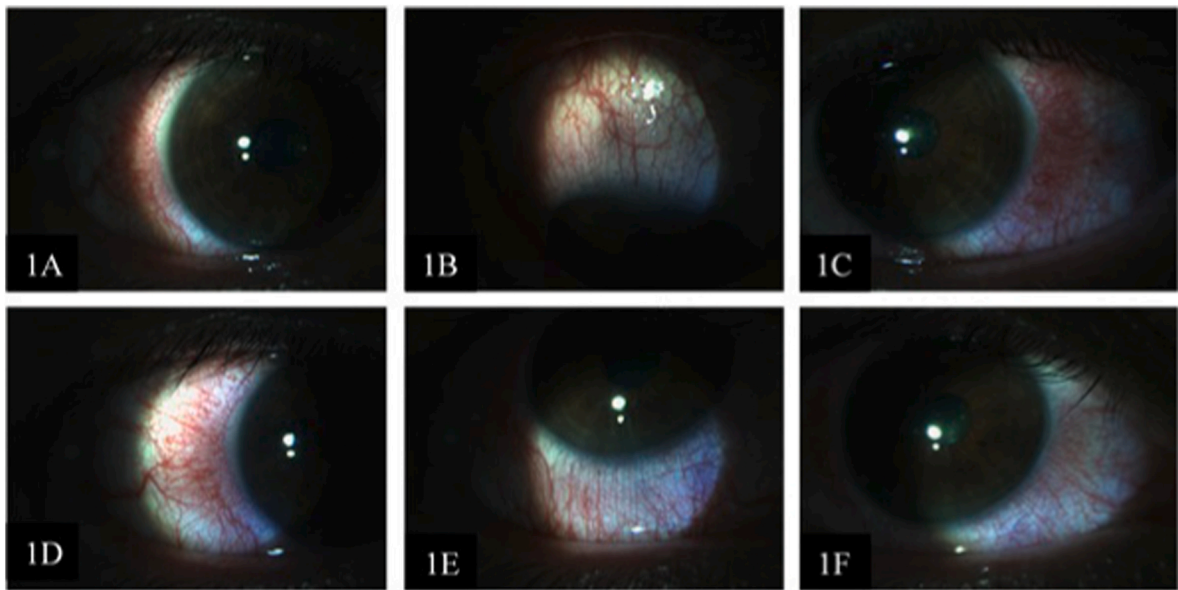


Fig. 1. Hyperemia of the bulbar conjunctiva 3+/4+ in the left eye (1A, 1B and 1C) and in the right eye (1D, 1E and 1F).

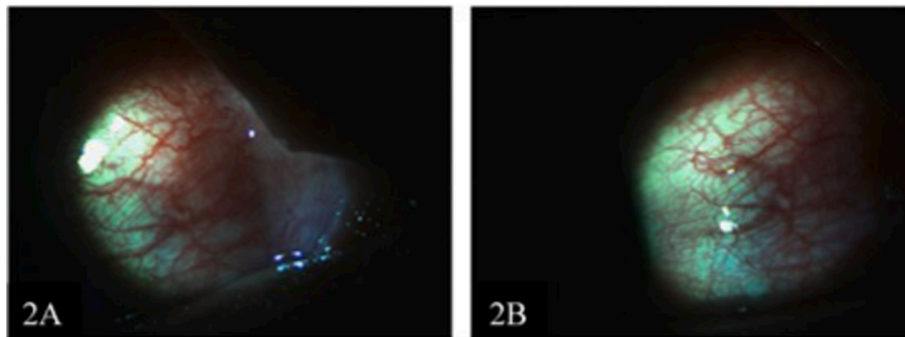


Fig. 2. Elevation of the medial sclera of the right eye (2A and 2B).

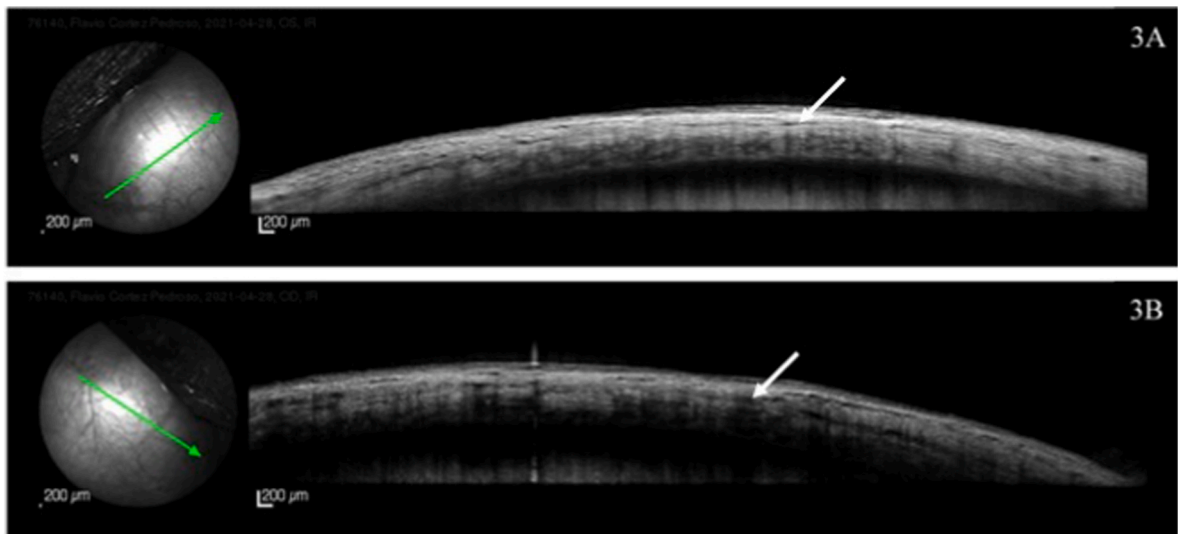


Fig. 3. Edema space detected between the layers of the sclera (white arrows) in the left (3A) and right eye (3B).

the case.

## 2. Case report

A 49-year old male systems analyst presented with complaints of pain and hyperemia in both eyes over the preceding seven days, increasing at movement and touch. One month previously, the patient had been diagnosed with chikungunya, and was being treated and followed up by a rheumatologist. He reported no comorbidities or any family history of ophthalmological disease. Ophthalmic examination showed 20/20 vision in both eyes. Biomicroscopy of both eyes revealed bulbar conjunctival hyperemia 3+/4+ with 360° of ciliary injection, and no other abnormalities (Fig. 1A–F). Fundoscopy detected no abnormalities in either eye. Intraocular pressure at 09:00 hours was 13 and 14 mmHg, respectively. The patient was submitted to a phenylephrine test (1%), with the response being negative after 10 minutes, that is, the hyperemia remains, indicating scleritis, not episcleritis. Consequently, he was prescribed 1 drop of loteprednol etabonate every 4 h, tapering every three days, and nimesulide 100 mg every 12 hours for 7 days.

The patient returned one week later. Scleritis was worse and the medial sclera was elevated, particularly in the right eye (Fig. 2A and B), as also revealed by optical coherence tomography (Fig. 3A and B). Hyperemia increased to 4+/4+ in the right eye. Intraocular pressure at 17:00 hours was 16 and 15 mmHg. The following supplementary tests were then obtained: hemoglobin 15.1 g/dl, hematocrit 43.8%; total leukocytes 10,120 mm<sup>3</sup>, platelets 318,000/mm<sup>3</sup>, C-reactive protein 10.63 mg/dl, erythrocyte sedimentation rate 25 mm/hour, aspartate aminotransferase 35 U/l, alanine aminotransferase 105 U/l, urea 35 mg/dl, and creatinine 0.8 mg/dl. Negative serology for HIV-1 and HIV-2, HTLV-1 and HTLV-2, hepatitis B and C, and toxoplasmosis; negative VDRL and fluorescent treponemal antibody-absorption (FTA-ABS) test; purified protein derivative (PPD) test 5 mm (BCG vaccinated); negative RT-PCR for Covid-19 infection; positive serology for dengue IgG antibodies and negative serology for dengue IgM antibodies; and positive serology for chikungunya IgG and IgM antibodies. Rheumatology screening, including rheumatoid factor, ANA, anti-CCP, anti-DNA, anti-Sm, anti-Ro, anti-La, ANCA, HLA-B27, revealed negative markers, and also, C3 and C4 components of the complement system came back negative.

A decision was made to treat the patient with oral prednisone 60 mg/day, tapering every three days. The patient returned pain-free three days later and all signs and symptoms had disappeared within five days.

## 3. Discussion

Since the emergence of CHIKV infection in the Americas at the end of 2013,<sup>6</sup> the importance of this disease has consistently increased over time. CHIKV is a virus capable of causing epidemics and, moreover, it may affect different organ systems. Symptoms such as fever and debilitating polyarthralgia of rapid onset are predominant during the acute phase, while the ocular symptoms that appear in this phase include photophobia, conjunctival hyperemia and retro-orbital pain.<sup>7</sup>

The exact mechanism behind ocular involvement following chikungunya infection has yet to be completely clarified. Nevertheless, the simultaneous occurrence of systemic and ocular disease suggests the possibility of direct viral involvement. The fact that antigens of CHIKV are detected in the corneal stroma, sclera and iris-ciliary bodies gives further weight to this hypothesis whenever these sites are affected.<sup>8</sup> Notwithstanding, involvement of the ocular tissue may occur later, suggesting a delayed immunological response in cases of episcleritis, retinitis, panuveitis and optic neuritis.<sup>9</sup>

In this report, the temporal association between the primary symptoms, ocular manifestations and positive IgM serology led to a diagnosis of nodular scleritis associated with chikungunya, with all other etiologies having been ruled out.

Scleritis is an uncommon manifestation in CHIKV infection, as

highlighted in the literature review conducted by Merle et al.,<sup>7</sup> corroborating previous findings by Martínez-Pulgarín et al.<sup>10</sup> Although there are no reports on the treatment used for this ocular pathology in cases of CHIKV infection, corticosteroids were raised as a possible strategy since they have been successfully used to treat anterior uveitis, and the prognosis of manifestations in the posterior segment such as optic neuritis has improved with early use of the medication. We therefore inferred that the treatment proposed for these ocular manifestations of the virus could be extrapolated to scleritis, and that it should preferably be initiated as early as possible following diagnosis to prevent the disease from progressing. Indeed, treatment with oral prednisone proved vital to the satisfactory outcome of the patient in the present study.

## 4. Conclusions

Based on the aforementioned scientific evidence and considering the number of individuals currently being infected, it is extremely important to be aware of the ocular abnormalities resulting from CHIKV infection. Healthcare professionals need to monitor patients carefully even after the acute phase of chikungunya infection has passed, to avoid delaying diagnosis of ocular manifestations and their appropriate treatment. Consequently, wherever chikungunya is endemic or epidemic, it should be included in the differential diagnosis of ocular pathologies.

## Patient consent

Consent to publish this case report has been obtained from the patient(s) in writing. This report does not contain any personal identifying information.

## Acknowledgements and disclosures

Funding: No funding or grant support.

## Authorship

All authors attest that they meet the current ICMJE criteria for Authorship.

## Declaration of competing interest

The following authors have no financial disclosures: JCGC, CBM, GNCB, MNCB.

## Acknowledgements

None.

## References

- Horwood PF, Buchy P. Chikungunya. *Rev Sci Tech*. 2015;34:479–489.
- Staples JE, Breiman RF, Powers AM. Chikungunya fever: an epidemiological review of a re-emerging infectious disease. *Clin Infect Dis*. 2009;49:942–948.
- Mahendradas P, Avadhani K, Shetty R. Chikungunya and the eye: a review. *J Ophthalmic Inflamm Infect*. 2013;3:35.
- Couderc T, Chrétien F, Schilte C, et al. A mouse model for Chikungunya: young age and inefficient type-I interferon signaling are risk factors for severe disease. *PLoS Pathog*. 2008;4:e29.
- Ministry of Health (Brazil). *Monitoramento dos casos de arboviroses urbanas causados por vírus transmitidos pelo mosquito Aedes (dengue, chikungunya e zika), semanas epidemiológicas 1 a 21, 2021. [Monitoring of cases of urban arboviruses caused by viruses transmitted by the Aedes mosquito (dengue, chikungunya and zika), epidemiological weeks 1 to 21, 2021].* Brasília: Ministério da Saúde; 2021.
- Leparc-Goffart I, Nougairede A, Cassadou S, et al. Chikungunya in the Americas. *Lancet*. 2014;383:514.
- Merle H, Donnio A, Jean-Charles A, et al. Ocular manifestations of emerging arboviruses: dengue fever, Chikungunya, Zika virus, West Nile virus, and yellow fever. *J Fr Ophthalmol*. 2018;41:e235–e243.

8. Couderc T, Gangneux N, Chrétien F, et al. Chikungunya virus infection of corneal grafts. *J Infect Dis.* 2012;206:851–859.
9. Mittal A, Mittal S, Bharati MJ, et al. Optic neuritis associated with Chikungunya virus infection in South India. *Arch Ophthalmol.* 2007;125:1381–1386.
10. Martínez-Pulgarín DF, Chowdhury FR, Villamil-Gomez WE, et al. Ophthalmologic aspects of chikungunya infection. *Trav Med Infect Dis.* 2016;14:451–457.