

Chikungunya Virus Uveitis during French Polynesia Outbreak, 2014-2015

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Abstract

Chikungunya virus (CHIKV) is an emerging arthropod-borne virus (arbovirus) of the genus Alphavirus in the family *Togaviridae*. CHIKV is transmitted by the bite of infected mosquitoes; materno-foetal transmission and transmission via corneal graft have been reported. During the past decade, the status of chikungunya has changed, from a relatively uncommon and poorly documented disease, to an emerging disease, and now to a global public health concern. CHIKV now circulates in all inhabited continents. From 2011, CHIKV emerged in the Pacific region and was responsible for a massive outbreak in French Polynesia in 2014-2015 affecting about 25% of the population in a context of co-circulation with dengue virus (DENV). CHIKV mainly causes acute fever and severe and persistent polyarthralgia. Ocular involvement has been described during chikungunya fever but few were well-documented. We herein report a laboratory-confirmed case of CHIKV-associated uveitis during the French Polynesia outbreak.

Keywords: Chikungunya virus; CHIKV; Anterior uveitis; Outbreak; French polynesia

Case Report

In January 2015, a 67-year-old woman sought medical care for right eye myodesopsia, decreased visual acuity, and blurred vision since 2 weeks. At the end of November 2014, she had history of acute febrile polyarthralgia syndrome compatible with chikungunya infection: she had suffered from fever (38°C), asthenia, headache, rash in the back and severe polyarthralgia affecting her wrists, fingers, knees and toes. The symptoms lasted few days and the patient complained of persisting asthenia and wrist arthralgia. She had a history of old bilateral cataract surgery. No eye traumatism or previous inflammation was reported. Right eye examination showed slight inflammatory with circumlimbal injection of the conjunctiva (Figure 1a). Her best corrected right eye visual acuity was 5/10 and right eye intraocular pressure was slightly elevated (18 mmHg). Slit-lamp photography of the right eye in slit illumination showed mutton fat keratic precipitates (Figure 1b-1d) collected in a base down triangle (Arlt's triangle) and a Tyndall effect in the anterior chamber with moderate aqueous flare. In total, right eye examination was in favor of a granulomatous anterior uveitis of probable infectious origin. Left eye examination was normal. A sample of aqueous humor was drawn through paracentesis from

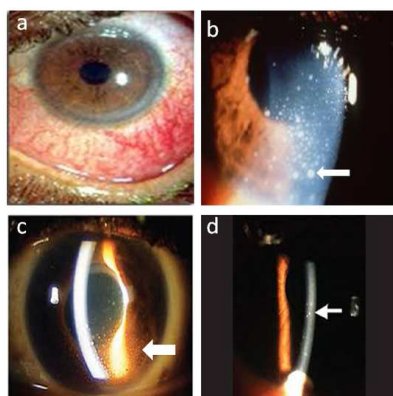


Figure 1: (a) Circumlimbal injection of the conjunctiva. (b-d) Slit-lamp photography of the right eye in slit illumination showing mutton fat keratic precipitates (arrows b, c and d) collected in a base down triangle (Arlt's triangle) and a Tyndall effect in the anterior chamber with moderate aqueous flare; in favor of a granulomatous anterior uveitis.

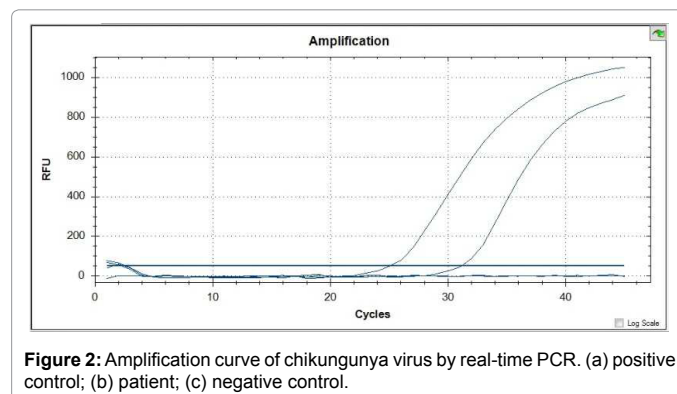


Figure 2: Amplification curve of chikungunya virus by real-time PCR. (a) positive control; (b) patient; (c) negative control.

the right eye, together with blood samples. A specific CHIKV reverse transcription real-time polymerase chain reaction (RT-PCR) was performed on all samples as previously reported [1-7]. CHIKV RNA was detected in the aqueous humor (Figure 2) but not in blood, excluding the contamination of the ocular sample by blood. Anti-CHIKV immunoglobulin class M antibodies were detected in the serum using Novalisa Chikungunya IgG/IgM μ -capture ELISA kit (NovaTec Immundiagnostica GmbH, Germany). Aqueous humor was inoculated on Vero cells in order to detect replicative CHIKV in cell culture as previously described by detection of CHIKV in culture fluids using the specific RT-PCR [8]. No replicative CHIKV was detected. As the patient presented a “chikungunya like syndrome” two months ago in a context of chikungunya outbreak, as ocular involvement of CHIKV infections has been reported and as CHIKV RNA was detected in the aqueous humor, other etiologies of uveitis were not investigated. The patient fully recovered after 2 months of topical treatment including steroids, cycloplegic and hypotonic agents [1-3].

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Discussion

If CHIKV has been involved in a wide range of ocular manifestations, anterior uveitis (non-granulomatous and granulomatous variants) is the most common manifestation of ocular involvement of CHIKV [4-7]. Most of the studies reporting ocular manifestations of chikungunya were based only on the detection of CHIKV RNA or specific antibodies in blood. CHIKV circulates in blood during the first week on the disease and specific antibodies are detected from the second week [8-11].

During outbreaks, diagnosis of late ocular complications of chikungunya by serology is not reliable because most of the population has antibodies against CHIKV. In this setting, only detection of CHIKV or its RNA in ocular tissues is conclusive of ocular involvement. Detection of CHIKV in ocular fluid by RT-PCR has been reported in only two cases of Fuchs' heterochromic iridocyclitis [10,11] and from four eye tissues and ocular fluids from potential corneal donors with detection of infectious CHIKV in culture [3]. Detection of replicative CHIKV and CHIKV antigens in eye tissue specimen [3] suggested ocular replication of the virus. CHIKV uveitis clinical presentation is non-specific and is seen in other viral anterior uveitis, including dengue [12], the most common arboviral disease in French Polynesia. Mechanisms of ocular complications of CHIKV infections can be direct involvement of eyes by the virus or by an immune mediated reaction as for joint reactions [6]. Late involvement of ocular tissue usually suggests a delayed immune response [6].

In this observation, ocular manifestation of chikungunya occurred in the late stage of the disease as demonstrated by the detection of CHIKV RNA in aqueous humor while negative in blood and the presence of specific CHIKV antibodies in blood. This observation suggests that ocular manifestation of chikungunya during the late stages of the disease can also be linked to a direct effect of CHIKV. Detection of viruses from organs or body fluids while the virus cleared from blood has been reported for other arboviruses as for West Nile Virus which is capable of long persistence in urine suggesting ongoing viral replication in renal tissue [13]. To our knowledge CHIKV has been detected in saliva but from patients with hemorrhagic CHIKV manifestation during acute phase of the disease [14], CHIKV RNA was also detected from eye tissue of one non viremic corneal donor [3]. Treatment of CHIKV ocular infections usually resolves with topical treatment, sometimes associated with systemic steroids [6].

Conclusion

This observation highlights practitioners' awareness concerning CHIKV as a potential etiologic agent of uveitis in endemic areas. The

interest of anterior chamber paracentesis to confirm the diagnosis of CHIKV ocular involvement is to be considered in this context. As differential diagnosis of anterior uveitis includes non infectious, as ankylosing spondylitis and systemic diseases, and infectious etiologies, as herpetic infection, syphilis and tuberculosis [11-15], establishing the precise etiology is important in order to introduce adapted therapeutics and avoid unnecessary treatment with potential deleterious effects.

References

1. Caglioti C, Lalle E, Castilletti C, Carletti F, Capobianchi MR, et al. (2013) Chikungunya virus infection: an overview. *New Microbiol* 36: 211-227.
2. Gérardin P, Barau G, Michault A, Bintner M, Randrianaivo H, et al. (2008) Multidisciplinary prospective study of mother-to-child chikungunya virus infections on the island of La Réunion. *PLoS Med* 5: e60.
3. Couderc T, Gangneux N, Chrétien F, Caro V, Le Luong T, et al. (2012) Chikungunya virus infection of corneal grafts. *J Infect Dis* 206: 851-859.
4. Nhan TX, Musso D (2015) The burden of chikungunya in the Pacific. *Clin Microbiol Infect* 21: e47-48.
5. Weaver SC, Lecuit M (2015) Chikungunya virus and the global spread of a mosquito-borne disease. *N Engl J Med* 372: 1231-1239.
6. Mahendradas P, Avadhani K, Shetty R (2013) Chikungunya and the eye: a review. *J Ophthalmic Inflamm Infect* 3: 35.
7. Pastorino B, Bessaud M, Grandadam M, Murri S, Tolou HJ, et al. (2005) Development of a TaqMan RT-PCR assay without RNA extraction step for the detection and quantification of African Chikungunya viruses. *J Virol Methods* 124: 65-71.
8. Musso D, Roche C, Robin E, Nhan T, Teissier A, et al. (2015) Potential sexual transmission of Zika virus. *Emerg Infect Dis* 21: 359-361.
9. Lalitha P, Rathinam S, Banushree K, Maheshkumar S, Vijayakumar R, et al. (2007) Ocular involvement associated with an epidemic outbreak of chikungunya virus infection. *Am J Ophthalmol* 144: 552-556.
10. Babu K, Murthy GJ (2012) Chikungunya virus iridocyclitis in Fuchs' heterochromic iridocyclitis. *Indian J Ophthalmol* 60: 73-74.
11. Mahendradas P, Shetty R, Malathi J, Madhavan HN (2010) Chikungunya virus iridocyclitis in Fuchs' heterochromic iridocyclitis. *Indian J Ophthalmol* 58: 545-547.
12. Gupta A, Srinivasan R, Setia S, Soundravally R, Pandian DG (2009) Uveitis following dengue fever. *Eye (Lond)* 23: 873-876.
13. Murray K, Walker C, Herrington E, Lewis JA, McCormick J, et al. (2010) Persistent infection with West Nile virus years after initial infection. *J Infect Dis* 201: 2-4.
14. Gardner J, Rudd PA, Prow NA, Belarbi E, Roques P, et al. (2015) Infectious Chikungunya Virus in the Saliva of Mice, Monkeys and Humans. *PLoS One* 10: e0139481.
15. Yeh S, Forooghian F, Suhler EB (2014) Implications of the Pacific Ocular Inflammation uveitis epidemiology study. *JAMA* 311: 1912-1913.