

# Optic neuritis secondary to chikungunya virus infection

## *Neurite óptica secundária a infecção pelo Chikungunya Vírus*

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### ABSTRACT

*We present a case of optic neuritis secondary to Chikungunya virus infection. Male, 46 yo, initial symptoms were pain and low visual acuity in the right eye associated to fever and symmetrical polyarthralgia one week ago. At the examination the visual acuity was 20/60 in the right eye and 20/20 in the left eye, fundoscopy showed papillo edema on the right eye. Immediately initiated pulse therapy with methylprednisolone for 7 days and improvement of the neuritis was observed in the follow-up of 1, 3 and 12 months, but partial improvement of the visual acuity. Among the investigated causes, Chikungunya IgM positive serology was identified.*

**Keywords:** Chikungunya virus; Optic neuritis; Arbovirus infections

### RESUMO

Apresentamos um caso de um paciente de 46 anos, sexo masculino com diagnóstico de neurite ótica em olho direito associado a infecção aguda por Chikungunya. Os sintomas iniciais eram dor e baixa acuidade visual em olho direito associado a febre e poliartralgia simétrica há uma semana. Ao exame a acuidade visual era de 20/60 em olho direito e 20/20 em olho esquerdo, fundoscopia evidenciou edema de papila à direita. Foi iniciado imediatamente pulsoterapia com metilprednisolona por 7 dias e foi observada melhora do quadro de neurite no seguimento de 1, 3 e 12 meses, porém melhora parcial da acuidade visual, Dentre as causas investigadas identificou-se sorologia anti Chikungunya IgM positivo.

**Descritores:** Vírus Chikungunya; Neurite óptica; Infecções por arbovírus

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## INTRODUCTION

**C**hikungunya is an emerging arbovirus disease caused by the Chikungunya virus (CHIKV) and transmitted mainly by the infected *Aedes* mosquito.<sup>(1-7)</sup> Alfavirus is a virus belonging to the family *Togaviridae*, originating in tropical Africa and Asia<sup>(2-5,7-9)</sup>, currently endemic in tropical areas of the Americas.<sup>7</sup> More than 2 million cases of chikungunya were reported between 2014-2016 in the American continent.<sup>(7)</sup>

CHIKV infection can cause acute, subacute and chronic disease.<sup>(7)</sup> The systemic involvement of the disease includes fever, headache, fatigue, myalgia, diffuse maculopapular eruption, epistaxis, gingival hemorrhage, peripheral edema, neurological signs, acute liver failure, and multiple organ failure.<sup>(1,3-5,6,9, 10)</sup> The most characteristic symptom is disabling polyarthralgia.<sup>(2,4)</sup> Ophthalmologic symptoms can be observed in the acute or chronic phases.<sup>(7)</sup> However, photophobia and retro-orbital pain are more characteristic of the acute phase of chikungunya.<sup>(8)</sup>

Epithelial and corneal endothelial cells as well as corneal and scleral keratocytes are described as preferential targets of CHIKV. But fibroblasts of the sclera, ciliary body and iris stroma are infected by the virus due to high rate of cellular replication.<sup>(7)</sup>

Ocular involvement is common and may manifest as episcleritis, conjunctivitis, keratitis, panuveitis<sup>(8)</sup>, paralysis of cranial nerves (fifth,<sup>(5)</sup> sixth,<sup>(3,7)</sup> ninth, tenth<sup>(5)</sup>), secondary glaucoma<sup>(3)</sup>, anterior uveitis, lagophthalmos, retinitis, retinochoroiditis, mild vitreitis, occlusive vasculitis, central retinal artery occlusion, exudative retinal detachment, and optic nerve involvement.<sup>(1,6,7,10)</sup> Anterior, granulomatous or non-granulomatous uveitis is the ocular symptom most commonly associated with the disease. On the other hand, optic nerve disorders are less common, and have poor prognosis when compared to the prognosis of anterior segment affections.<sup>(8)</sup>

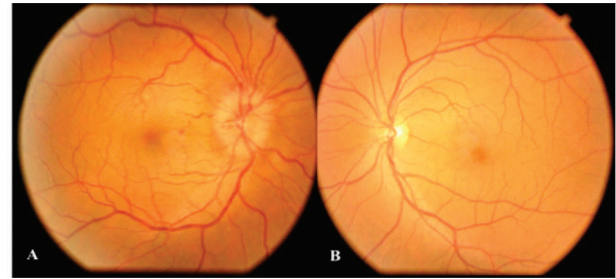
Optic neuropathy is one of the most important causes of acute vision loss in patients with Chikungunya. It can occur simultaneously to systemic infection suggesting a direct viral mechanism<sup>(1)</sup>, or later in the course of the disease suggesting an immune-mediated reaction.<sup>(1,2,6,10)</sup> Optic neuritis is characterized by acute or sub-acute loss of vision, pain during ocular movements, and defects in color vision.<sup>(7)</sup>

Several clinical forms of optic neuropathy have been described, including unilateral or bilateral papillitis, retrobulbar neuritis and neuroretinitis.<sup>(1,4)</sup> The visual prognosis of optic neuritis caused by Chikungunya is good, and corticosteroid therapy seems to accelerate recovery when initiated at an early stage of the disease.<sup>(1,6)</sup> There is no specific antiviral drug available to treat the infection<sup>(8)</sup>, or even a vaccine to prevent the disease.<sup>(7)</sup>

The present report describes a case of optic neuritis secondary to Chikungunya virus infection, a rare finding and little described in the literature.

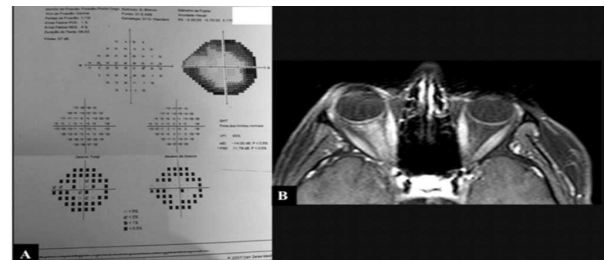
## CASE REPORT

AAN, male, 46 years old, farmer, from Maranhão (northeast of Brazil), hypertensive, sought the ophthalmology service due to pain and low visual acuity (LVA) in the right eye (RE) for 3 days. He also reported fever and symmetrical polyarthralgia for 15 days. At the examination, he presented corrected visual acuity of 20/60 in RE and 20/20 in left eye (LE), anterior segment biomicroscopy and tonometry within normality, and funduscopy with disc edema in RE (Figure 1) and without alterations in LE.



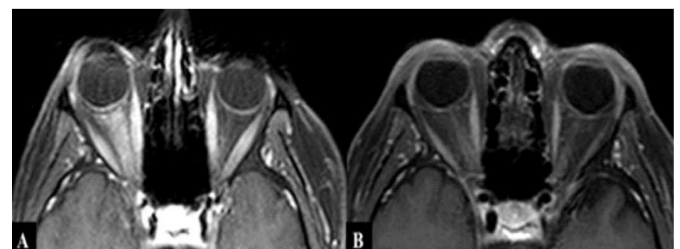
**Figure 1:** Retinography of both eyes. A. Right eye retinography showing optic disc edema; B. Left eye retinography without alterations.

The computerized visual field (SITA-Standard 24-2) demonstrated a general reduction of sensitivity with inferior and superior arcuate scotoma in RE (Figure 2). Nuclear magnetic resonance imaging (MRI) of the orbit showed right optic nerve with increased caliber and marked diffuse enhancement, denoting an inflammatory process (Figure 2). Among the serologies requested, evidence for Chikungunya IgM antibody was positive. Other serological tests, including anti-HIV antibody, anti-dengue IgG and IgM, Fta-Abs, VDRL and anti Chikungunya IgG were negative.

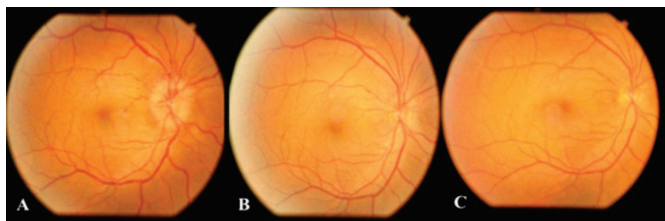


**Figure 2:** A. Computerized campimetry of the right eye showing inferior and superior arcuate scotoma. B. Nuclear magnetic resonance of the orbit showing increased caliber of the optic nerve to the right with diffuse enhancement.

At the time, methylprednisolone 1.5mg/day for 3 days, albendazole 400mg/day for 3 days, and prednisone 1mg/kg/day for 7 days were prescribed. One month after the onset of the proposed treatment, the patient evolved with improvement of pain and optic disk appearance, still with temporal and inferior blurring. He presented a slight improvement of corrected VA (20/40 in RE), and optic nerve with preserved caliber and absence of hyperrelevant contrast in new orbit MRI (Figure 3). After three months of follow-up, there was complete remission of optic disc edema in RE (Figure 4), and the last VA in RE was maintained even after 1 year of treatment.



**Figure 3:** Nuclear magnetic resonance of the orbit. A. Initial MRI; B. MRI after 1 month of treatment;



**Figure 4:** Retinography of the right eye. **A.** Initial Retinography; **B.** Retinography after 1 month of treatment; **C.** Retinography after 3 months of treatment;

## DISCUSSION

A wide variety of infectious disorders is capable of causing optic nerve involvement and visual impairment. Such a condition may present as anterior optic neuritis (papillitis), retrobulbar optic neuritis (normal optic disc), neuroretinitis (optic disk edema with a macular star), anterior ischemic optic neuropathy, or as another form of optic neuropathy.<sup>(1,11)</sup> In view of the increasing incidence of Chikungunya, this has become an important differential diagnosis in cases of optic nerve involvement.

The most common ocular manifestations of Chikungunya virus infection are anterior granulomatous and non-granulomatous uveitis.<sup>(2)</sup>

In the case presented, the patient showed fever and symmetrical arthralgia associated with optic neuritis, without other symptoms. Similar cases were found in the study by Mittal et al.<sup>(4)</sup> in 2007 in South India, where the same symptoms were associated with optic nerve involvement.

According to an observational study developed by Rose et al.,<sup>(6)</sup> the majority of patients with optic nerve involvement secondary to Chikungunya develops unilateral optic neuritis. Such evidence corresponds to the condition described in the present report of optic neuritis in RE without contralateral eye involvement.

Steroid therapy is used to control inflammation in posterior uveitis, panuveitis, and optic neuritis. In some cases of chikungunya fever with ocular manifestations involving the posterior segment, aciclovir and systemic steroids were empirically used, although the efficacy of acyclovir is dubious. There is no specific antiviral drug against the Chikungunya virus yet.<sup>(7,8)</sup> However, it is known that the early use of the corticosteroid is related to a better prognosis.<sup>(3,7)</sup> The visual recovery also depends on the location of the ocular affection, and those of the posterior segment are of worse prognosis when compared to the anterior segment.<sup>(7)</sup>

In the case reported, corticotherapy with methylprednisolone 1.5mg/day for 3 days and prednisone 1mg/kg/day for 7 days at the time of diagnosis was performed, which allowed improvement

of the inflammatory optic nerve appearance seen in MRI, improvement of the optic disc edema seen in fundoscopy, and partial improvement in VA.

We emphasize the immediate approach of optic neuropathies with the exclusion of infections, giving due importance to arboviruses, mainly chikungunya. Attention should be paid to the need for systemic anamnesis, epidemic questioning, focal neurological examination, serology and imaging tests, in order to diagnose and treat early, allowing better visual prognosis.<sup>(5)</sup>

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