Pars plana vitrectomy and visual stimulation for treatment of vitreomacular traction secondary to toxoplasmosis retinochoroiditis in a 5-year-old child

Vitrectomia via pars plana e estimulação visual para tratamento da tração vitreomacular secundária à retinocoroidite por toxoplasmose em criança de 5 anos

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ABSTRACT

Objective: A unusual case of ocular toxoplasmosis with significant vitreomacular traction is reported. The patient improved significantly following pars plana vitrectomy combined with visual stimulation and occlusion therapy.

Methods: The case of a 5-year-old girl with significant unilateral vision loss associated with vitreous condensation and macular traction is described.

Results: Pars plana vitrectomy was carried out for vitreomacular traction release. This was followed by visual stimulation and occlusion therapy. Significant improvement was observed.

Conclusion: Despite structural damage, the combination of properly indicated surgery and amblyopia management strategies allowed the achievement of maximum vision goals in this case, suggesting structural damage may be associated with functional amblyopia.

RESUMO

Objetivo: Relata-se um caso de apresentação atípica de toxoplasmose ocular, com importante tração vitreomacular. A paciente apresentou melhora significativa após vitrectomia via pars plana, com estimulação visual e oclusão.

Métodos: Descreve-se o caso de uma menina de 5 anos, com importante perda de visão unilateral associada à condensação vítrea e à tração macular.

Resultados: Foi realizada vitrectomia via pars plana para alívio da tração vitreomacular, seguida de estimulação visual e oclusão. Foi observada melhora significativa.

Conclusão: Apesar dos danos estruturais, a combinação de cirurgia bem indicada com estratégias de tratamento da ambliopia permitiu alcançar o máximo do potencial visual nesta paciente, sugerindo que os danos estruturais podem estar associados à ambliopia funcional.

INTRODUCTION

Toxoplasma gondii has a worldwide distribution, toxoplasmic retinochoroiditis being the most common form of posterior uveitis in healthy individuals.[1] Retinochoroiditis is the major ocular manifestation of toxoplasmosis and macular involvement is common.[2]

Vitreous haze and cells may sometimes be seen at the site of inflammation, However, these tend to resolve spontaneously, with no negative impacts on the vitreoretinal interface.[3]

An unusual manifestation of ocular toxoplasmosis, resulting in significant vitreomacular traction, is reported herein. Significant improvement was obtained after pars plana vitrectomy (PPV) combined with visual stimulation and occlusion therapy.

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CASE REPORT

A 5-year-old girl presented with a history of visual acuity impairment in the left eye (OS) . Her mother had developed symptomatic systemic toxoplasmosis, which was serologically confirmed (immunoglobulin M – IgM positive test results) 3 months after delivery.

She had 20/20 vision in the right eye (OD) and could count fingers at 1 m with the OS. Left eye fundus imaging revealed a flat atrophic chorioretinal scar with hyperpigmented edges at the temporal periphery (Figure 1A) and vitreous condensation at the posterior pole. The condensed vitreous was attached to the macula and caused vitreomacular traction (Figure 1B). No overlying vitreous haze or cells were seen. Right eye fundoscopic imaging findings were unremarkable.

Left eye optical coherence tomography (SD-OCT) revealed significant foveal traction and increased retinal thickness. The external retina could not be seen on optical coherence tomography due to a shadowing effect caused by hyper-reflective distortion of the inner retina (Figure 1C).

The most likely differential diagnoses were ocular toxocariasis and Zika virus retinopathy, followed by birth trauma sequelae, ocular syphilis and choroidal tuberculosis granuloma. Laboratory workup included serological confirmation of prior toxoplasmosis infection (positive immunoglobulin G – IgG and negative IgM test results). Other suspected infections were ruled out by negative tests results. No abnormalities were found on neurological and radiological assessment. Based on clinical and laboratory findings, a diagnosis of congenital or acquired

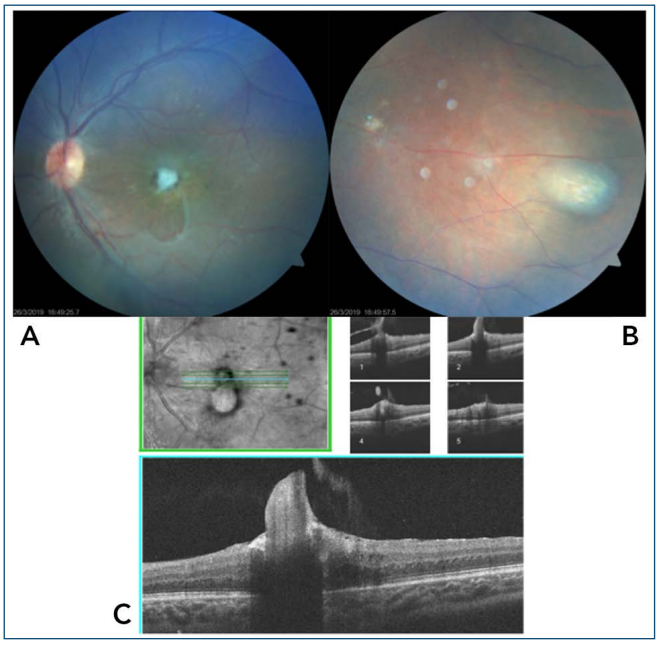

Figure 1. Fundus image showing a flat atrophic chorioretinal scar with hyperpigmented edges at the temporal periphery (A) and vitreous condensation at the posterior pole, which was attached to the macula and caused vitreomacular traction (B). No overlying vitreous haze or cells were seen. (C) Left eye optical coherence tomography revealed significant foveal traction and increased retinal thickness. The external retina could not be seen on optical coherence tomography due to a shadowing effect caused by hyperrreflective distortion of the inner retina .

toxoplasma retinochoroiditis with secondary foveal traction was made.

After informing parents of potential primary foveal damage and amblyopia, PPV was indicated for vitreomacular traction release. Intense post-operative visual stimulation was also recommended.

Lens sparing 23-G PPV was performed. The posterior hyaloid was removed and the internal limiting membrane spared.

Complete vitreous interface traction release was achieved with surgery, leaving a scar in the fovea (Figure 2A). At this point, occlusion therapy and visual stimulation were introduced to manage amblyopia, despite structural changes. Right eye patching (3 hours per day for 12 months) was prescribed. Visual stimulation was achieved using high contrast (black, white and primary colors). The patient attended regular ophthalmology visits. Visual acuity improvement was detected during the first 10 months, with no further improvement thereafter. Therefore, eye patching was discontinued. The final assessment revealed 20/70 vision in the OS with eccentric fixation (fifth esotropia). A flat atrophic, pigmented scar was seen on fundoscopic imaging. Optical coherence

tomography revealed complete resolution of vitreous macular traction and reduced foveal thickness, in spite of the remaining hyperreflective distortion of the inner retina (Figure 2B).

Figure 2. Complete vitreous interface traction release was achieved after surgery, leaving a scar in the fovea (A). Optical coherence tomography revealed complete resolution of vitreous macular traction and reduced foveal thickness, in spite of the remaining hyperreflective distortion of the inner retina (B).

DISCUSSION

In this article, a case of vitreomacular traction secondary to toxoplasmic retinochoroiditis was described. This is an atypical presentation in such a young patient. Significant visual improvement was obtained using pars plana vitrectomy, occlusion therapy and visual stimulation, among other measures.

Ocular toxoplasmosis often affects intraretinal structures and the choroid at the posterior pole, resulting in acute localized foci of necrotizing inflammation and localized destruction of retinochoroidal tissues. Inflammation of some adjacent structures may lead to pathological changes in retinal vessels and resultant breakdown of the inner blood-retinal barrier.[2]

Posterior hyaloid thickening and adhesion may develop in response to acute inflammation, leading to vitreomacular traction and even retinal detachment in some cases. Spontaneous detachment of the posterior hyaloid is common. However, significant vitreomacular traction with retinal distortion was observed in this case.

Surgical treatment of macular complications of posterior uveitis has been discussed by many authors. Sousa et al.[4] described a surgical case series including 11 patients submitted to PPV due to toxoplasmosis-related macular hole (TMH) and suggested this is a safe and effective therapeutic alternative. Raval et al. [5] reported four cases of surgically treated epiretinal membrane. Postoperative anatomical and visual improvement in that series suggested PPV is beneficial in eyes with well resolved toxoplasmosis.

Foveal chorioretinal scar formation caused significant visual loss in this case. However, amblyopia may also play an important role in permanent vision loss.[6]

In 1981, Kushner reported improved visual outcomes in thirteen patients with structural disease, who were treated for amblyopia, suggesting attempts should be made to rule out functional amblyopia in these cases.[7]

More recently, Reynolds et al. published a case series describing eight patients with congenital macular lesions attributed to toxoplasmosis who were treated for amblyopia. Occlusion therapy led to visual acuity improvement in 6 out of 8 patients. Therefore, eye patching for a few months should be recommended to all patients with foveal toxoplasmosis and proper age for amblyopia treatment in order to ensure maximum visual acuity. Despite the striking appearance of these lesions, visual acuity potential may be better than expected.[7]

It is well known that defined windows exist in early life, when neural circuits can be robustly restructured in response to experience.[8] Plasticity, or the ability of neurons to adapt and change in response to stimuli, is highest in young children, a period known as "the critical period" of vision development.[9] Occlusion therapy and visual stimulation during in this period is aimed at improving neuronal adaptation in order to achieve maximum visual acuity.

The case presented illustrates the importance of combining properly indicated surgery and amblyopia treatment strategies, regardless of structural damage. Surgical treatment was vital to alleviate foveal traction and allowed eccentric fixation. Occlusion therapy and visual stimulation were also fundamental for achievement of vision goals in this case, suggesting structural damage may be associated with functional amblyopia.

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