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Case Report

Presumed Bilateral Ocular Tuberculosis in a Young Patient - Diagnostic Approach and Follow-Up: Case Report

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Abstract: Ocular tuberculosis is a rare extrapulmonary manifestation of Mycobacterium tuberculosis infection, which may occur even in the absence of other apparent foci of the disease. Early diagnosis is crucial to prevent irreversible visual complications, especially in young patients. To report a case of presumed bilateral ocular tuberculosis in a young patient without prior history of tuberculosis or other evident foci, highlighting clinical, laboratory, therapeutic, and follow-up aspects. A qualitative and descriptive case report based on retrospective analysis of medical records, ophthalmic imaging, and laboratory results. The patient underwent fundus photography, optical coherence tomography (OCT), and laboratory testing including serologies for toxoplasmosis, syphilis, and IGRA. The patient presented with bilateral granulomatous chorioretinal lesions morphologically consistent with choroidal tuberculomas. Based on compatible clinical findings, exclusion of other etiologies, and a positive IGRA, a diagnosis of possible intraocular tuberculosis was established. She was started on the WHO-recommended four-drug antituberculosis regimen (isoniazid, rifampicin, pyrazinamide, and ethambutol) without adjuvant corticosteroids. After six months of follow-up, uncorrected visual acuity (UCVA) in the right eye improved from 20/200 to 20/40, with partial regression of the lesion adjacent to the optic disc on OCT. The left eye maintained 20/20 UCVA with stable perimacular findings. This case highlights the importance of considering presumed ocular tuberculosis as a diagnostic possibility even in the absence of pulmonary foci or prior history of the disease. Early diagnosis and appropriate multidisciplinary follow-up were essential for controlling intraocular inflammation and preventing permanent visual sequelae.

Keywords: Ocular Tuberculosis; Presumed Ocular Tuberculosis; Uveitis; Differential Diagnosis; Optical Coherence Tomography; IGRA; Young Adult; Case Report; Ophthalmology.

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1. Introduction

Ocular manifestations associated with systemic infectious diseases have been increasingly recognized for their ability to compromise sensitive intraocular structures. Among these conditions, tuberculosis stands out; it may be primary (with the eye as the focus of infection) or secondary (due to hematogenous dissemination), leading to a broad spectrum of clinical presentations collectively known as ocular tuberculosis. This extrapulmonary form of *Mycobacterium tuberculosis* infection represents a diagnostic and thera-

peutic challenge, as patients with latent infection are usually asymptomatic but may develop clinical disease at any point in life, manifesting as chorioretinitis, retinal vasculitis, or most commonly uveitis.

Uveitis can be stratified into anterior, intermediate, posterior, or panuveitis. Anterior uveitis is a chronic granulomatous disease, unilateral or bilateral, and may present with keratic precipitates on the corneal endothelium. Intermediate uveitis primarily involves the vitreous, leading to inflammation and opacification. Posterior uveitis is the most prevalent form in ocular tuberculosis, causing focal, multifocal, or serpiginous-like choroiditis; choroidal tuberculomas represent another well-described phenotype. Panuveitis may affect the entire uveal tract. The main infectious cause of uveitis in Brazil is toxoplasmosis; syphilis is another highly prevalent cause and may present with any form of uveitis. These facts underscore the importance of rigorous clinical investigation in a condition with complex differential diagnosis and potentially severe visual sequelae.

In this context, the present report describes a young patient diagnosed with presumed bilateral ocular tuberculosis who developed chorioretinitis in the setting of bilateral tuberculous uveitis. We discuss the specific lesion morphology in relation to known ocular tuberculosis phenotypes, pathophysiological mechanisms, therapeutic planning, and functional outcomes.

2. Case Report

A 28-year-old female patient presented to the ophthalmology emergency department of a tertiary hospital with gradually decreased visual acuity in the right eye. Symptoms had begun approximately one year prior to this visit. During this period, she had sought initial care at a general emergency service, where she was empirically treated with trimethoprim-sulfamethoxazole for four weeks without clinical response, no improvement in visual acuity or reduction of fundus lesions was observed, and no clinical worsening was documented. She was subsequently referred to our service. No pain, photophobia, or floaters were reported. She denied relevant ophthalmologic history, ocular trauma, or chronic use of topical medications. She had no prior history of tuberculosis, no known contact with confirmed cases, and no previous treatment for the disease.

On initial ophthalmological examination, UCVA was 20/200 in the right eye and 20/20 in the left eye. Extraocular motility was preserved, and pupillary reflexes (direct, photomotor, and chromatic) were normal. Optic disc excavation was symmetric. Slit-lamp biomicroscopy revealed no anterior chamber cells, no keratic precipitates, and no posterior synechiae. Fundus examination of the right eye revealed a whitish, elevated lesion in the superior portion of the optic disc, with other parameters within normal limits (Figure 1). In the left eye, a similar whitish lesion was identified in the perimacular region, with remaining findings preserved (Figure 2).

OCT confirmed elevated lesions with granulomatous appearance involving the outer retinal layers and choroid in both eyes, morphologically consistent with choroidal tuberculomas, discrete, dome-shaped choroidal lesions, rather than the geographic, confluent pattern typical of serpiginous-like choroiditis. Complementary tests revealed negative serologies for toxoplasmosis and syphilis (IgG and IgM for *Toxoplasma gondii*; non-treponemal and treponemal tests for syphilis) and a positive IGRA. Chest X-ray showed no findings suggestive of active or prior pulmonary tuberculosis. Based on these findings, bilateral granulomatous chorioretinal lesions morphologically consistent with choroidal tuberculomas, absence of any identifiable alternative etiology, and a positive IGRA in a previously healthy patient, a diagnosis of possible intraocular tuberculosis was established. This represents a rare presentation for the patient's age and epidemiological context.

The patient was started on the WHO-recommended four-drug antituberculosis regimen: isoniazid (300 mg/day), rifampicin (600 mg/day), pyrazinamide (1,500 mg/day), and ethambutol (1,200 mg/day) for two months, followed by isoniazid and rifampicin for an additional four months. Given the absence of severe vitreal inflammation or immediate

foveal threat in the left eye, adjuvant systemic corticosteroids were not initiated. She was referred for joint follow-up with internal medicine for extrapulmonary tuberculosis management and with the uveitis service for specialized ophthalmological monitoring.

Figure 1. Fundus photograph, right eye (OD).

After six months of follow-up, UCVA in the right eye improved from 20/200 to 20/40. Fundus photography and OCT of the right eye demonstrated partial regression of the lesion adjacent to the optic disc, with reduction in lesion height and decreased subretinal fluid. The left eye maintained 20/20 UCVA, with the perimacular lesion showing stable boundaries and no new active satellite lesions. No adverse effects to anti-tuberculosis therapy were recorded. The patient remained under ophthalmological surveillance given the risk of late recurrence.

3. Discussion

Presumed ocular tuberculosis represents a rare but significant extrapulmonary manifestation of Mycobacterium tuberculosis infection. Definitive diagnosis requires microbiological confirmation, isolation of *M. tuberculosis* or positive PCR from ocular fluids, which is rarely achievable due to the low sensitivity of culture and PCR from aqueous or vitreous humor. Consequently, diagnosis in clinical practice is almost invariably presumptive, relying on compatible clinical findings, exclusion of other causes, and indirect immunological evidence such as a positive IGRA.

Figure 2. Fundus photograph left eye (OS).

In the present case, the diagnosis of possible intraocular tuberculosis was supported by: (1) bilateral granulomatous chorioretinal lesions; (2) exclusion of the most common infectious and autoimmune causes; (3) a positive IGRA; and (4) absence of response to trimethoprim-sulfamethoxazole, which further reduced the probability of bacterial or parasitic etiologies. These findings are consistent with isolated ocular tuberculosis, a condition already described in the literature, in which infection is confined to the eye and may occur in the absence of systemic or pulmonary signs.

The morphology of the lesions in this case warrants discussion in relation to established posterior segment phenotypes of ocular tuberculosis. OCT demonstrated discrete, elevated, dome-shaped choroidal lesions in both eyes, adjacent to the optic disc in the right eye and in the perimacular region in the left eye. This appearance is consistent with choroidal tuberculomas, one of the recognized phenotypes of posterior ocular tuberculosis. According to data from the Collaborative Ocular Tuberculosis Study (COTS-1), the most common choroidal presentation is serpiginous-like choroiditis (SLC), characterized by multifocal geographic lesions spreading in a serpiginoid pattern from the posterior pole, often with satellite lesions. This pattern was not observed in the present case. Instead, the discrete, focal, and elevated nature of the lesions on fundoscopy and OCT (Figures 1 and 2) aligns with the tuberculoma phenotype, which carries significant visual implications when located near the optic disc or fovea, as seen in the right eye.

IGRA positivity, particularly in countries with widespread BCG vaccination such as Brazil, carries greater diagnostic value than the tuberculin skin test (TST) due to its higher

specificity and lack of interference from prior vaccination. IGRA sensitivity in ocular tuberculosis ranges from 64% to 90%, with specificity generally above 90%, especially when combined with compatible clinical and ophthalmological findings. Vasconcelos-Santos et al. emphasized that the combination of a compatible clinical picture, exclusion of other etiologies, and a positive IGRA should be considered sufficient to warrant empirical antituberculosis therapy, even in the absence of systemic evidence of tuberculosis.

The main differential diagnoses were sarcoidosis, syphilis, and toxoplasmosis. Syphilis and toxoplasmosis were excluded by negative serologies. The lack of response to trimethoprim-sulfamethoxazole further supported the exclusion of toxoplasmosis. Regarding sarcoidosis, a common and important cause of bilateral granulomatous uveitis, its exclusion in this case requires careful justification. Sarcoidosis was considered unlikely based on the absence of pulmonary findings on chest X-ray; however, it must be acknowledged that a normal chest X-ray alone is insufficient to definitively exclude sarcoidosis, since elevated serum ACE, lysozyme, or bronchoalveolar lavage data were not reported. Crucially, the same limitation applies to the tuberculosis diagnosis itself: up to 60% of patients with ocular involvement by tuberculosis show no pulmonary radiological findings. In this context, the positive IGRA becomes the critical differentiating element, as sarcoidosis is not associated with IGRA positivity. The combination of bilateral granulomatous uveitis, positive IGRA, negative serologies for syphilis and toxoplasmosis, and absence of response to trimethoprim-sulfamethoxazole collectively supports presumed ocular tuberculosis as the most defensible diagnosis, while acknowledging that sarcoidosis cannot be definitively excluded without a more extensive systemic workup.

Empirical antituberculosis therapy isoniazid, rifampicin, pyrazinamide, and ethambutol for two months, followed by isoniazid and rifampicin for an additional four to seven months, remains the treatment of choice for extrapulmonary tuberculosis, including ocular forms, as recommended by the WHO and supported by several cohort studies. In this patient, the complete six-month regimen was administered without adjuvant corticosteroids, given the absence of severe vitreal inflammation or immediate foveal threat in the left eye. While concurrent systemic or periocular corticosteroids may be considered in cases of severe inflammation, some studies associate this practice with higher recurrence rates when not combined with adequate antimycobacterial therapy. The favorable visual outcome, improvement from 20/200 to 20/40 in the right eye at six months, supports the adequacy of the chosen therapeutic approach, although it is acknowledged that a proportion of the residual acuity deficit may reflect structural damage accumulated during the prolonged pre-diagnosis period.

Finally, despite the limitations inherent to a presumptive diagnosis without direct microbiological confirmation, this case highlights the value of clinical reasoning integrating epidemiology, lesion morphology, immunological evidence, and therapeutic response. Early recognition of presumed ocular tuberculosis and timely initiation of therapy are essential to prevent irreversible visual complications such as macular edema, secondary glaucoma, or optic atrophy.

4. Conclusion

This report describes a rare and diagnostically challenging case of presumed bilateral ocular tuberculosis in a young patient, without prior history of systemic tuberculosis and with normal pulmonary imaging. Bilateral whitish granulomatous choroidal lesions morphologically consistent with choroidal tuberculomas, combined with a positive IGRA, negative serologies for toxoplasmosis and syphilis, and absence of response to trimethoprim-sulfamethoxazole, collectively guided the therapeutic decision toward empirical antituberculosis therapy.

This case underscores the importance of considering presumed ocular tuberculosis in the differential diagnosis of uveitis of uncertain etiology, particularly when fundoscopy and OCT reveal focal, elevated choroidal lesions near the optic disc or macula, even in the absence of pulmonary or systemic disease. Integrated management by ophthalmologists

and infectious disease specialists, supported by OCT and immunological testing, enabled timely diagnosis and initiation of specific therapy, with clinically meaningful visual recovery at six months.

Continuous multidisciplinary follow-up remains essential, as presumed ocular tuberculosis can significantly compromise visual function if not promptly diagnosed and treated. Documentation of cases such as this contributes to expanding clinical recognition of this condition and refining therapeutic strategies in similar epidemiological contexts.

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Conflicts of Interest: All other authors declare no conflicts of interest.

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