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The impact of ocular tuberculosis on vision after two months of intensive therapy

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ABSTRACT

Tuberculosis (TB) is an infectious disease of global importance with major economic and social burden accounting for 25% of all avoidable deaths in developing countries. Extrapulmonary involvement may occur either in association with clinically apparent pulmonary tuberculosis or in isolation. This cross-sectional descriptive study aimed to evaluate the impact of ocular tuberculosis in visual acuity at baseline and after two months of intensive anti-tuberculous therapy. A sample of 133 pulmonary TB patients, seven disseminated TB, and three pleural TB patients was evaluated. All patients underwent routine ophthalmic evaluation, including assessment of visual acuity, biomicroscopy, applanation tonometry, indirect ophthalmoscopy, and fluorescent angiography as appropriate. None of the patients had impaired visual acuity due to TB. A rate of 4.2% (6/143) of ocular involvement was found. None of the patients with ocular involvement were HIV-infected. Of the six patients with ocular involvement, five met the diagnostic criteria for probable and one for possible ocular lesions. As for the type of ocular lesions, two patients had bilateral findings: one had sclerouveitis and the second had choroidal nodules. The other four patients presented with unilateral lesions: peripheral retinal artery occlusion in the right eye (one case), choroidal nodules in the left eye (one case), and choroidal nodules in the right eye (two cases). Patients progressed favorably after two month of intensive therapy, with no significant reduction in vision.

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Introduction

Tuberculosis (TB) is an infectious disease of global importance with major economic and social burden, accounting for 25% of all avoidable deaths in developing countries.[1] The main clinical form is pulmonary TB, but extrapulmonary disease occurs at varying frequencies in both immunocompetent and immunocompromised patients.[2,3] Extrapulmonary involvement, including skin, kidney, central nervous system, and eyes may occur either in association with clinically apparent pulmonary TB or in isolation, with no clinical or bacteriological evidence of pulmonary infection. Ocular TB may result from hematogenous, primary exogenous, or direct contiguity dissemination. Hematogenous origin is the most common mode of infection. Ocular TB may involve ocular adnexa (orbit, eyelids, tear glands) as well as the eye globe.[4,5]

It can be especially difficult to identify. The current limitations of diagnostic criteria and lack of accurate information on eye disease could be attributed to several factors: (a) technical difficulties and risks of visual impairment involved in clinical specimen collection for definitive microbiological diagnosis; (b) inaccurate diagnostic criteria used in some studies, including presumptive diagnosis based on treatment response or strong tuberculin test reactors; (c) timing of ophthalmic examination and TB treatment (before or after starting treatment) as ocular lesions may regress or heal within weeks after anti-TB treatment initiation; and/or (d) the presence of comorbidities leading to an immunocompromised state, which undermines an effective inflammatory response and lesion development.[6]

The prevalence of ocular TB varies widely around the world. Few well-designed and controlled studies on ocular TB have been conducted, but still little is known about its impact on vision. Studies to date have only reported the frequency of ocular TB and its clinical manifestations without assessing visual acuity or have examined a single assessment of visual acuity without monitoring the effects of treatment.[7–10] This study aimed to assess visual acuity of TB patients before and after two months of treatment with anti-tuberculous therapy.

Patients and methods

This was a cross-sectional descriptive study approved by the institutional review board of the Universidade Federal do Espírito Santo (UFES). A total of 177 bacteriologically confirmed pulmonary and/or extrapulmonary TB patients were enrolled in the study. Patients were interviewed, examined and demographic, epidemiologic and clinical information was recorded in a standardized questionnaire. Informed consent was obtained from all participants included in the study. At the hospital's Ophthalmology clinic, two ophthalmologists examined all patients. Newly diagnosed and bacteriologically confirmed TB patients of any sex, age, or HIV status were included in the study. Patients with a prior history of TB, old chorioretinitis lesions observed during fundoscopic eye examination, or self-reported treatment with anti-tuberculous medications during the previous six months were excluded.

All 177 patients underwent the following ophthalmic evaluation: (1) inspection and examination of ocular adnexa and orbit; (2) visual acuity for each eye using a Snellen chart; (3) biomicroscopy with a slip lamp (Carl Zeiss SL 120 Biomicroscopic Slip amp) for examination of the anterior chamber of the eye; (4) tonometry with a tonometer (Goldmann Tonometer, Carl Zeiss AT 020); (5) binocular indirect ophthalmoscopy with a HEINE Binocular Indirect Ophthalmoscope (after mydriasis with 1% tropicamide eye drops). In addition to the tests described above, one patient also underwent fluorescent angiography (AFG) due to the presence of retinal vasculitis.

Diagnosis of ocular tuberculosis

The diagnosis of ocular TB was made based on the criteria for "probable" and "possible" disease according to Bousa, Merino, Sanchez-Munoz and Carrillo classification (1997). This diagnostic classification uses a three-level probability scheme: (1) definitive diagnosis – isolation of *Mycobacterium tuberculosis* from eye specimens; (2) probable diagnosis – isolation of *M. tuberculosis* from extraocular tissues or fluids when there are ocular lesions consistent with TB infection in one or both eyes (which cannot be attributed to other causes and there is adequate clinical response to anti-TB treatment); (3) possible diagnosis – same criteria as "probable" diagnosis, but with the inability to evaluate treatment response due lack of clinical follow-up of the patient. Intraocular biopsy specimens were not obtained as the patients enrolled in the study had been previously diagnosed with TB. As such, no definitive diagnosis was made in our sample; only "probable" and "possible" levels were used for the diagnosis of ocular TB.

All ocular lesions consistent with TB were photographed, and the patients were reassessed within 60 days. At that time, new photographs were taken so that pre- and post-treatment photos could be compared and response to TB treatment could be ascertained. An HIV test was offered to all patients during the study period. Those patients with ocular lesions in the anterior chamber were also tested for syphilis using treponemal and nontreponemal serologic tests (Fig. 1). Q3

Patient treatment

The study treatment regimens for pulmonary TB consisted of two months of daily isoniazid (H), rifampin (R), pyrazinamide (Z), and ethambutol (E), followed by four months of daily HR (6-month standard short-course chemotherapy).[22] Q4 At least five of the seven weekly doses of anti-tuberculosis treatment were administered by directly observed therapy. Patients with ocular TB followed official Brazilian guidelines for treating tuberculosis,[22] which recommend that all forms of extrapulmonary TB (except meningitis) should be treated for six months, as well as patients coinfected with HIV. The primary ophthalmologic outcome was evaluated after two-months of anti-TB treatment based on previous studies that suggested a favorable therapeutic response by the end of intensive treatment phase.[5,7]

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