

Case Study

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## Orbital Tuberculosis in a 65 Year Old Female: A Case Report and Review of the Literature

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### ABSTRACT

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Tuberculosis is a systemic disease caused by mycobacterium tuberculosis killing up to 3 million people in the world every year. Nigeria is ranked as number ten among twenty-two high burden countries in the world. Ocular involvement is an extrapulmonary manifestation of tuberculosis which has become more common with the advent of human immunodeficiency virus (HIV) infection. We hereby report a case of a 65 year old woman in the middle socioeconomic class who presented to the eye clinic with a 3 week history of progressive protrusion of the left eye. Pain and loss of vision in the same eye were later findings in course of the disease. Orbital tuberculosis is rare even in endemic areas leading often to miss diagnosis. Tuberculosis should always be considered in the differential diagnosis of unilateral orbital mass particularly in endemic countries.

### Introduction

Tuberculosis is a systemic disease caused by mycobacterium tuberculosis. The organism that causes tuberculosis infection and disease infects an estimated 20–43% of the world's population. Each year, 3 million people worldwide die from tuberculosis. Tuberculosis occurs disproportionately among disadvantaged populations such as the malnourished, homeless, and those living in overcrowded and substandard housing. There is an increased occurrence of tuberculosis among HIV-positive individuals.

The most common manifestation of the disease is pulmonary tuberculosis.

Extrapulmonary involvement, including lesions of the gastrointestinal tract, genitourinary tract, cardiovascular system, skin, central nervous system, and eyes may occur in association with clinically apparent pulmonary tuberculosis or in isolation, with no clinical or laboratory evidence of pulmonary infection. Ocular involvement is an uncommon extra pulmonary manifestation of tuberculosis (1-2%) (Demirci *et al.*, 2004).

Orbital tuberculosis (OTB) represents a rare form of extra pulmonary TB, which arises either by hematogenous spread to orbital periosteum or soft tissues, or by direct spread

from the paranasal sinuses. The disease process may involve the bony orbital walls, soft tissue, or both; the nasolacrimal apparatus and overlying skin may also be affected. Destructive lesions are common, with many of those afflicted being disfigured or disabled, and death has also been reported (Agrawal and Agarwal, 2012; Sen, 1980).

Synchronous clinical evidence of systemic infection is not uncommon, although smear-positive pulmonary disease is rare (Massie, Burgner, and Isaacs, 1997). The diagnosis is usually made after orbital (or other tissue) biopsy, which yields suggestive histopathology and or definitive microbiological evidence of infection. Treatment involving oral antituberculous chemotherapy (ATT) with or without surgery is usually successful.

Here we report one case of an unusual presentation of orbital TB

### **Case report**

A 65 year old woman in the middle socioeconomic class presented to our clinic with a 3 week history of protrusion of the left eye which was initially painless with no associated reduction in vision. The above symptoms gradually worsened over a two week period such that at presentation, the eye was red and painful with significant diminution in vision.

There was no preceding history of ocular trauma, neck mass or heat intolerance, low grade fever and any other systemic symptoms. There was no exposure to any persons with tuberculosis.

On examination visual acuity was OD 6/9 and OS HM. There was protrusion of the left eye as shown in figure 1, with exophthalmometric readings of 25mm compared to 13mm on the

right eye. A mass was palpable under the left upper eyelid along the full extent of the superior orbital margin. It was irregular in shape, measuring about 8×6cm in its widest diameter and unattached to the eyelid. It was firm to hard in consistency with erythema of overlying skin. There was marked resistance to retropulsion and restriction of eye movement in all directions of gaze. There was lagophthalmos and evidence of exposure keratopathy.

On systemic examination there were features of systemic hypertension with no features suggestive of systemic tuberculosis. A clinical working diagnosis of orbital non-Hodgkin's lymphoma was initially made.

The full blood count revealed Hb-15.6gm%. Differential white blood cell picture showed lymphocytes - 29%, Neutrophils - 68%, Eosinophils -03%. ESR using the Westergren method was 22mm in the 1<sup>st</sup> hour. The chest x-ray was normal and an abdominal ultrasound scan showed no abnormalities.

An orbital CT scan showed a huge soft tissue mass arising from the supero-lateral aspect of the left orbit with lucency similar to surrounding muscle with no retro bulbar extension or bony erosion.

An incisional biopsy of the mass under Local anaesthesia (LA) was performed.

The Hematoxylin and Eosin stained section on histology showed sections of tissue showing a dense fibrous stroma with scattered numerous granulomata and focal areas of caseation. Both foreign body and Langerhans type giant cells were seen (Figure 2). A diagnosis of Orbital Tuberculosis was made.

The patient was lost to follow up. Efforts to contact the patient proved abortive.

## Results and Discussion

The world prevalence of tuberculosis is still high, mainly due to inadequate control in developing countries and to its association with HIV infection. In 2012, an estimated 8.6 million people developed TB and 1.3 million died from the disease (WHO, 2013).

Nigeria ranks number 10th among the 22 high-burden TB countries in the world. WHO estimates that 210,000 new cases of all forms of TB occurred in the country in 2010, equivalent to 133/100,000 population and there were an estimated 320,000 prevalent cases of TB in the same year, equivalent to 199/100,000 cases (*Nigeria Tuberculosis Fact Sheet*, 2012).

Extrapulmonary tuberculosis has become more common since the advent of HIV infection (Golden and Vicram, 2005; Rieder *et al.*, 1990) and may be seen in greater than 50% of patients with synchronous TB and AIDS. Orbital involvement by tuberculosis, even in endemic areas, is rare. It can present as periostitis of orbital margin, tuberculoma of orbital tissues or tuberculoma of lacrimal gland. Whereas periostitis is the most common form till the second decade of life, orbital tuberculoma is more frequent in middle-aged women without evidence of systemic disease

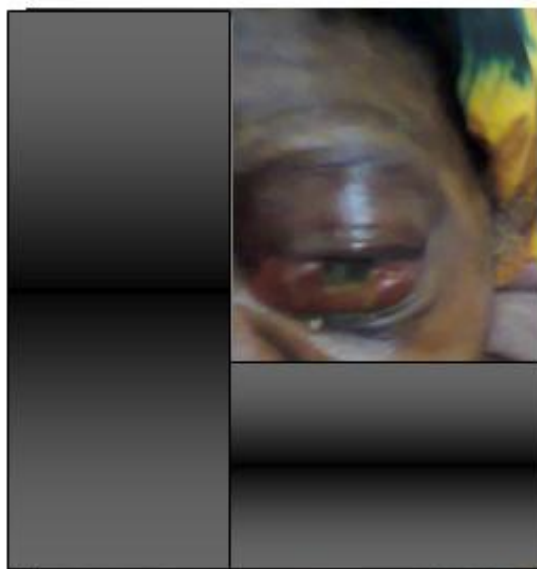
The most common clinical manifestations of orbital tuberculosis are insidious and progressive unilateral proptosis, a cold, painless eyelid swelling, chemosis and conjunctival hyperemia; in some cases there may be limitation of ocular movements and also loss of visual acuity or visual field in a

few. Diagnoses of TB are often based on the clinical likelihood of disease, rather than a definitive diagnosis. The recommended initial investigation in all patients presenting with orbital signs and symptoms is imaging, preferably with computed tomography. Computed Tomography shows non-specific signs like proptosis and alterations in soft tissues, including orbital fat. The histological hallmark of TB is the epithelioid granuloma, with Langhans giant cells and caseous necrosis. The presence of acid fast bacilli (AFB) is often missed or underestimated in formalin fixed or paraffin-embedded tissue (Butt, Ahmad, Rafi, and Kazmi, 2003) Immuno histo-chemical methods may increase the specificity of histopathological techniques.

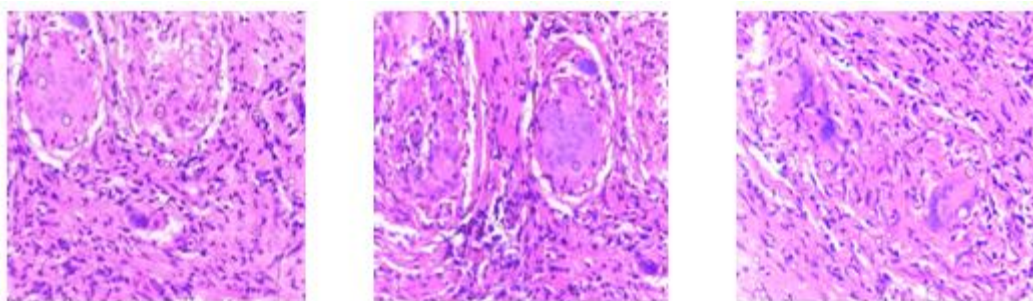
Culture of mTB remains the gold standard for diagnosis (National Institute for Health and Clinical Excellence, 2006) and also allows the sensitivity of the organism to be characterized; however, particularly where the mycobacterial load is low, false negatives do occur. In contrast to traditional culture media that required several weeks to show bacterial growth, automated commercial broth culture systems, with colorimetric or radiometric methods of mycobacterial growth detection, enable positive results to be available in 1–3 weeks (Powell and Hunt, 2006).

PCR is a rapid technique for TB diagnosis, with a high specificity for pulmonary (98% if AFB positive, 40–77% if AFB negative) (Butt *et al.*, 2003) and extrapulmonary (93.7–100%) disease (Cheng *et al.*, 2005). However, its sensitivity is lower, with figures varying from 27–100% in published studies (Cheng *et al.*, 2005).

**Fig.1** Clinical photograph of patient showing protrusion of the left globe with Conjunctival chemosis and prolapsed



**Fig.2** Photomicrograph of Hematoxylin and Eosin stained histological sections of tissue showing dense fibrous stroma with scattered numerous granulomata and focal areas of caseation



Another test employed in tuberculosis research is PPD (purified protein derivative) test. However it is not a conclusive test because a positive PPD does not indicate active disease, only previous contact with the *M. tuberculosis*

In Sen's (1980) series of Ocular TB, it was suggested that the diagnosis could be established by one or more of the following criteria:

Clinical, radiological, and histological features of the orbital lesion together with the

presence of a tuberculous lesion elsewhere in the body (and exclusion of other diseases to which the orbital lesion may be attributed).

#### **Demonstration of AFB**

Positive culture/guinea pig inoculation for mTB using either fluid discharge or resected tissue (Sen, 1980).

To these criteria, PCR evidence of mTB should perhaps also be added

The differential diagnosis of orbital

tuberculosis includes diseases that cause unilateral proptosis. In adults, one should consider pseudotumor of the orbit (Pillai et al., 1995), lymphoma, cavernous hemangioma, among others.

In general, the recommendations for the treatment of non-respiratory forms of TB are the same as the respiratory forms generally comprising a two-month initial phase [rifampicin, isoniazid, pyrazinamide, and ethambutol (less commonly streptomycin)] and a four-month continuation phase (rifampicin and isoniazid) (Golden and Vicram, 2005; Powell and Hunt, 2006).

In conclusion, Involvement of the orbits is a rare manifestation of tuberculosis. Even in a tertiary hospital, few cases, if any, are diagnosed per year. However, tuberculosis should be considered in the differential diagnosis of unilateral orbital mass, especially in the Nigerian setting where the disease still remains a main cause of morbidity.

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