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Orbital and external ocular manifestations of *Mycobacterium tuberculosis*: A review of the literature

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ABSTRACT

Tuberculosis (TB) is an airborne infectious disease caused by *Mycobacterium tuberculosis* that most commonly affects the lungs. However, extrapulmonary manifestations of TB can affect the eye and surrounding orbital tissues. TB can affect nearly any tissue in the eye, and a high index of suspicion is required for accurate diagnosis. Systemic anti-tuberculosis treatment is required in cases of ocular TB, and steroids are sometimes necessary to prevent tissue damage secondary to inflammation. Delays in diagnosis are common and can result in morbidities such as loss of an affected eye. It is important for ophthalmologists and infectious disease specialists to work together to accurately diagnose and treat ocular TB in order to prevent vision loss. This article reports the various known presentations of orbital and external ocular TB and reviews important elements of diagnosis and treatment.

Review of the literature

Background

Tuberculosis (TB) is an infectious disease caused by the obligate aerobic, acid-fast bacillus *Mycobacterium tuberculosis* [1]. Transmission is airborne, and the lungs are the most commonly affected organ [2,3]. However, there are many forms of extrapulmonary tuberculosis, including several varieties that affect the eye [4]. This review will focus on orbital and external ocular manifestations of TB.

Literature search strategy

The literature was reviewed using a PubMed search with both Medical Subject Headings (MeSH) and keywords. MeSH terms included tuberculosis, ocular tuberculosis, orbital tuberculosis, eye infections and visual acuity. Keywords included eye, periocular, ocular, eyelid, conjunctiva, cornea, lacrimal gland, tuberculosis, "ocular tuberculosis," and "orbital tuberculosis." Results were limited to available peer-reviewed, English-language journals published between 1930 and 2015. All papers were reviewed, including single case reports.

Epidemiology and pathophysiology

According to the Centers for Disease Control and Prevention (CDC), approximately one third of the world's population is infected with TB. However, only 10% of those infected will develop clinical manifestations of the disease [5]. Of these, 16–27% have extrapulmonary manifestations, which includes those with orbital and external eye disease [6]. The precise incidence of ocular TB is much more difficult to discern, ranging from 1.4% to 18% in various studies [4,7–12]. Risk factors for extrapulmonary TB include age over 40 years, female gender, and HIV infection [4]. Hematogenous spread from the lungs is the primary mechanism by which TB affects the orbit and eyes, but TB can also spread via direct local extension [13–15]. A hypersensitivity response from infection elsewhere in the body can affect the eyes and surrounding tissues as well [13].

External ocular involvement

TB can affect the orbit and external eyes in a wide variety of ways, which are summarized in Table 1.

Orbit

TB involvement of the orbit can present as proptosis secondary to mass effect (Fig. 1) or diplopia from cranial nerve or extraocular muscle involvement [16]. Orbital involvement is usually unilateral and is more common in children, but cases have also been reported in adults [17,18]. Numerous pediatric cases of draining sinus tracts

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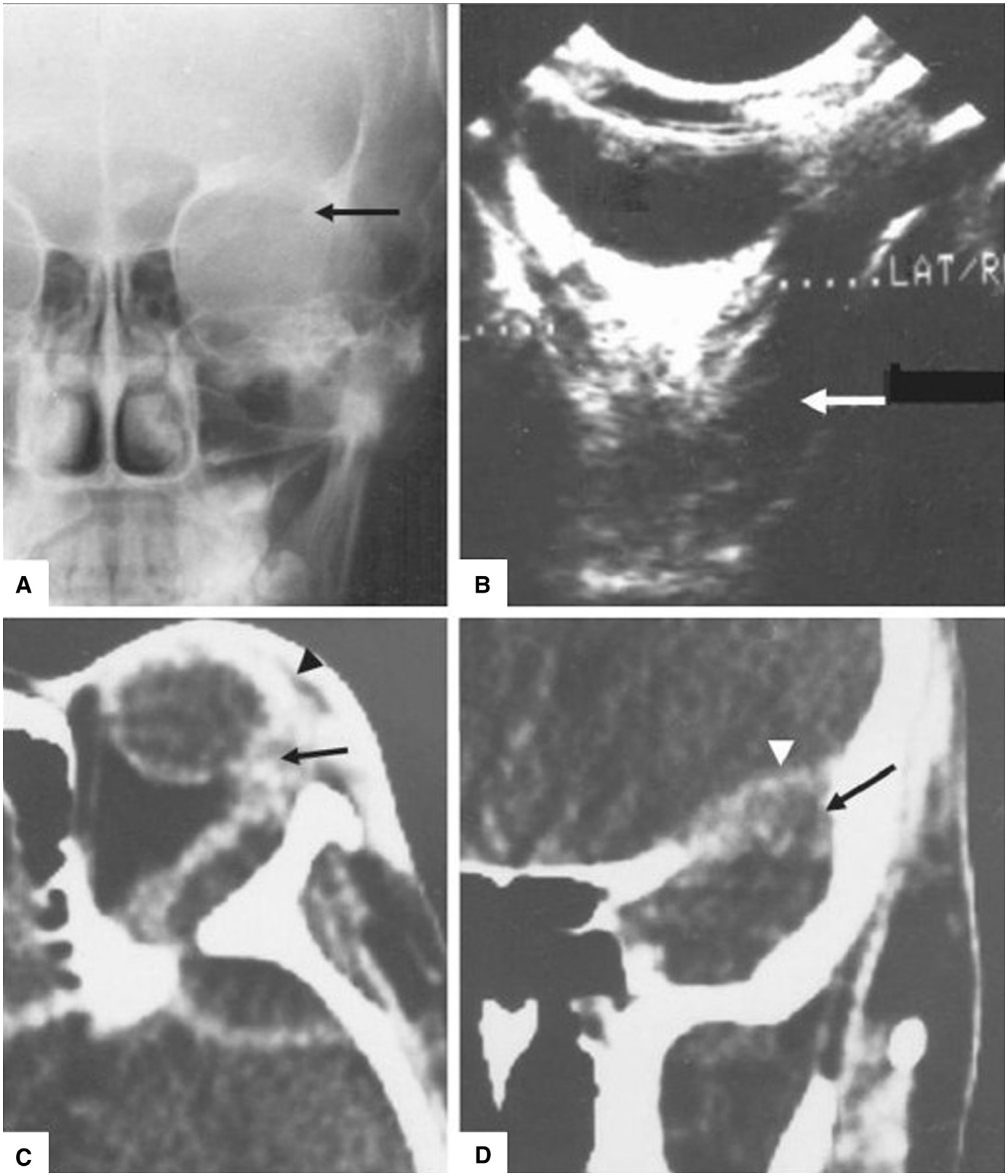

Fig. 1. Orbital tuberculosis presenting as proptosis. (A) Caldwell view x-ray shows bony destruction of the greater wing of the sphenoid (arrow). (B) B-scan ultrasonography reveals a retroorbital hypoechoic area in the extraconal space (arrow). (C) Axial contrast-enhanced CT demonstrates left-sided proptosis, lacrimal abscess (arrow), and preseptal thickening (arrowhead). (D) Coronal, contrast-enhanced CT scan further illustrates destruction of the greater wing of the sphenoid (arrow) and intracranial extension (arrowhead) [18].