Original Article

Manifestations of Pulmonary Tuberculosis in the Eye

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Purpose: To study the manifestations of pulmonary tuberculosis in the eye.

Material and Methods: A prospective study was conducted at department of Ophthalmology PGMI / LGH Lahore from April 2006 to July 2007. Patients with established diagnosis of Pulmonary Tuberculosis were recruited from the TB DOTS programme. Complete ocular examination including best corrected visual acuity (BCVA) anterior segment and dilated posterior segment examination was carried out on all patients.

Results: BCVA was 6/24 or better in 59% patients and 6/36 or worse in 41% patients. Color vision was defective in 24 patients (12 %). Interstitial keratitis was found in 2 (1%) patients, anterior uveitis in 9 (4.8%), periphlebitis in 17 (9%), choroiditis in 26 (14%), vitritis in 16 (8.6%), vitreous hemorrhage in 8 (4%), NVE in 14 (7.4%), and optic atrophy in 7 (3.7%) patients.

Conclusion: Significant proportion of patients on treatment for Pulmonary Tuberculosis showed signs of present or past ocular inflammation.

Tuberculosis (TB) is a chronic infection caused by Mycobacterium tuberculosis and is a leading cause of death worldwide. About 2 billion people are affected by tuberculosis of which 95% of tuberculosis cases and 98% of tuberculosis deaths occur in Asia[1].

TB may affect the eye by direct invasion of the tubercle bacillus following haematogenous dissemination with local destruction and inflammation, or via a hypersensitivity reaction to the bacillus located elsewhere in the body. Ocular TB has several potential manifestations[3]. It can appear on the external eye as a lid abscess or manifest as chronic blephritis or atypical chalazia. It can present as a mucopurulent conjunctivitis with regional lymphdenopathy. It can also present as a phylectenular conjunctivitis, infectious keratitis, interstitial keratitis, or as an infectious scleritis. All of these presentations are rare and are easy to diagnose as material can be obtained for culture and biopsy. Rarely, orbital disease can also occur.

The greater challenge is in the more common but difficult to diagnose TB uveitis. Uveitis from TB involves delicate structures that are difficult or impossible to biopsy or culture. It may present as an iritis, which may be Granulomatous (mutton fat keratic precipitates, or Koeppe or Busacca nodules) or as Intermediate uveitis is distinguished by the presence of cells in the anterior and mid-vitreous with sometimes `snowball' opacities and deposits over the inferior junction of the retina and cillary body. More commonly, intraocular TB presents with Choroidal lesions including granulomas[3,4]. It can also present as an optic neuritis or papillitis.

This study was undertaken with the primary intention of evaluating frequency of various ocular signs associated with the pulmonary tuberculosis.

MATERIAL AND METHODS

A prospective study was conducted at Department of ophthalmology PGMI/ Lahore General Hospital, Lahore. A total of 187 patients were included in the study. All the patients with confirmed diagnosis (sputum AFB+ve and positive signs in chest X-ray) of pulmonary tuberculosis referred to eye OPD of Lahore General Hospital, by pulmonologist at Lahore General

Hospital and Gulab Devi Chest Hospital, Lahore. Ocular examination including BCVA, Anterior Segment Slit lamp examination and dilated fundus examination were carried out. Evidence of both active or healed uveitis were included in the study.

While every patient had his visual acuity recorded, we were not looking for a casual link between TB and reduced vision.

The method of sampling was Purposive, non probability.

RESULTS

Total 187 patients were included in the study. 118 (63%) patients were male and 69 (37%) patients were female.

BCVA vision was 6/24 or better in 59% of patients and 6/36 or worse in 41% of patients. Color vision was defective in 24 patients (12 %).

DISCUSSION

Tuberculosis can affect practically any structure of the eye and its adnexae. Ocular manifestations in TB may be attributed to either infection or non-infections immunologic reactions. Hematolgenous dissemination may result in involvement of the uvea due to its great vascularity, while immunological reactions to tuberculo-protein may cause interstitial keratitis and retinal vasculites.

The Ministry of Health of Pakistan began implementing DOTS (the internationally recommended strategy for TB control) in 1995, with Balochistan selected as a pilot province. Much progress has been made over the past five years. The case detection rate for Pakistan rose from 13 percent in 2002 to 67 percent in 2007, close to WHO's target of 70 percent. Pakistan ranks eighth on the list of 22 high-burden tuberculosis (TB) countries in the world, according to the World Health Organization's (WHO's) Global Tuberculosis Control 2009. In 2007, an estimated 297,108 people in Pakistan (primarily adults in their productive years) developed TB. The emergence of multidrug-resistant (MDR) TB and TB-HIV co-infection is a growing concern in the country.

In this study we have found significant evidence of involvement of the retinal vasculature or the uveal tract in patients with overt pulmonary tuberculosis.

All the cases in our study had established diagnosis of pulmonary TB according to the criteria set by the WHO TB DOTS program. Most of the patients were already on anti tuberculous therapy. We were looking for signs of active as well as healed granulomata, to remove the bias that may develop from initiation of therapy.

Donahue reviewed the ophthalmic records of over 10,000 patients with primary pulmonary TB and found 1.4% incidence of ocular TB[5]. As a fraction of uveitis cases, the prevalence of ocular TB varies by area. In isolated descriptive studies, it has been estimated to be under 1% in the USA[6], 4% in China[7], 6% in Italy[8], 7% in Japan[9], and 16% in Saudi Arabia[10]. Kontas KA (1958) found abnormalities of fundus in 43 (13%) out of 318 patients with pulmonary TB[11].

In our study 99 (52.9%) of the 187 patients had ocular findings that could be attributed to tuberculosis (Tables 1-2). This is a much higher incidence and maybe linked to a high prevalence of systemic disseminated tuberculosis in our population, 11 patients had anterior segment findings and in 88 patients posterior segment was affected.

Table 1: External eye and anterior segment findings

External and anterior segment findings	No. of Patients n (%)
Interstitial Keratitis	2 (1.06)
Anterior Uveitis	9 (9.81)

Table 2: Posterior segment findings

Posterior segment findings	No. of Patients n (%)
Periphlebitis	17 (9.09)
Choroiditis	26 (13.9)
Vitritis	16 (8.55)
Vitreous hemorrhage	8 (4.27)
NVE	14 (7.4)
Optic atrophy	7 (3.7)

A study of 158 patients with intraocular TB in India over 10 year period revealed that 42% showed posterior uveitis 36% had anterior uveitis, and 11% had intermediate uveitis[12]. Bouza E et al found choroiditis in almost all (17 of 18) Patients; with other lesions being papillitis, retinitis, vitritis, vasculitis, dacryoadenitis and scleritis[13]. Salit Mehta reported

83% incidence of choroidal tuberculosis and 16% retinal vasculites in her study, which evaluated ocular involvement in patients with mycobacterium sepsis. [14] In our study 13.9% patients had choroiditis. Much higher incidences than our study have also been reported. In Malawi Africa 92.8% incidence of choroidal granuloma was reported in 109 patients with fever and tuberculosis, in a prospective study in 2002[15].

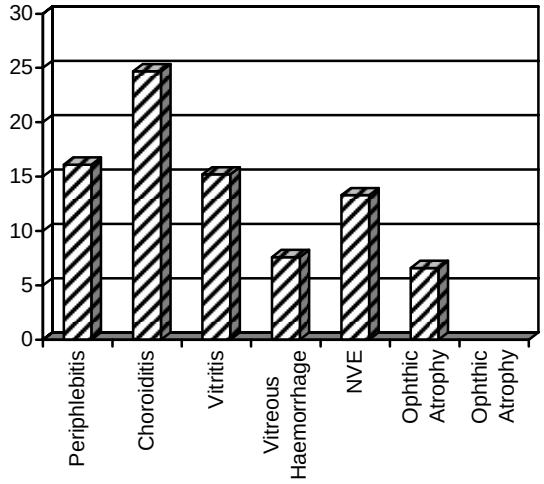

Fig. 1: Relative frequency of various ocular findings

Our study is in agreement with the above mentioned studies in that posterior segment involvement is more common. 13.9% cases showed choroiditis at multiple sites followed by periphlebtitis (9.09%) and vitritis (8.5%). Other significant findings included neovascularization (NVE) in 7.4% cases. Neovascularization may have the cause of vitreous haemorrhage seen in 4.27% patients. Patients with neovascularization did not have any other systemic disease that could account for initiation of the neovascular process.

Optic atrophy occurred in 3.7% of cases. Optic atrophy may occur due to anti tuberculosis drugs, or other causes. In TB optic nerve may be affected directly, as part of tuberculous posterior uveitis or through direct infiltration as part of tuberculous meningitis.

CONCLUSIONS

A high frequency of patients with Pulmonary TB had ocular signs that could be attributed to tuberculous infection. Patients with proven pulmonary TB should have ocular examination including a dilated fundus examination.

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