**Original Article**

# Clinical profile of intraocular tuberculosis patients and its relationship with pulmonary tuberculosis

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**Objective:** To describe the clinical profile of intraocular tuberculosis (TB) patients and its relationship with pulmonary TB.

**Methodology:** This cross-sectional descriptive study was conducted in ophthalmology department of district headquarter teaching hospital, Sahiwal Medical College, Sahiwal, Pakistan from January 2016 to December 2019. There were 48 patients with intraocular TB. History of past TB or contact with TB was recorded. Detailed ocular examination was performed. All patients were also examined by pulmonologist. Anti-tuberculosis therapy comprising of Isoniazid, Rifampicin, Pyrazinamide and Ethambutol was given to all the patients. Systemic corticosteroids were given to selected patients with intense intraocular inflammation involving macula, disc or blood vessels.

**Results:** Mean age of patients was 33.04±13.66 years. Male were 31(64.6%). Out of 48 cases, 42(87.5%) had bilateral intraocular TB. Presenting complaints were decreased vision (81.3%), floaters (12.5%) and pain (6.3%). T-spot test was positive in 44(91.7%) cases. X-ray chest showed abnormal findings in 30(62.5%) cases. Anti-tuberculosis therapy resulted in complete resolution of intraocular inflammation in 93.7% cases. There was significant improvement in visual acuity after treatment.

**Conclusion:** Intraocular TB is not common in cases of active pulmonary TB. In most cases ophthalmologist was the first to make a diagnosis. Anti-tuberculosis therapy should be started in cases of intraocular inflammation where positive immunological laboratory tests and suggestive radiological findings were present. Management of intraocular inflammation with anti-tuberculosis therapy results in visual improvement, resolution of the disease and less frequent recurrences. (Rawal Med J 202;46:822-825).

**Keywords:** Choroiditis, endemic, tuberculosis, uveitis.

## INTRODUCTION

Tuberculosis (TB) has been a global health challenge from ancient times. Poverty, overcrowding and malnutrition are risk factors for disease.[1] Immunosuppression due to AIDS, chemotherapy or ageing has an important bearing in the development of new infection or reactivation of the latent infection. It is estimated that about one-third of the world's population is harboring the infection; 10% of these develop clinical disease.[2,3] Pakistan ranks 5th in the number of TB patients. It can involve any organ of the human body. Isolation of bacteria from the eye is challenging. Specimens obtained from the eye are often not enough to perform routine laboratory tests.[4,5]

Although TB most commonly affects lungs, in most cases of extra pulmonary TB there is no evidence of pulmonary involvement. It is uncommon for intraocular TB to present in clinical active pulmonary TB. There is a varied clinical presentation of the intraocular TB in different geographical and ethnic regions.[2,3] Objective of this study was to find the clinical profile of intraocular TB and its relationship with pulmonary TB in Punjab, Pakistan, where no previous study could be found on this particular topic.

## METHODOLOGY

This cross-sectional descriptive study was conducted in ophthalmology department of district headquarter teaching hospital, Sahiwal Medical College, Sahiwal, from January 2016 to December 2019. Patients with intraocular TB were selected by

non-probability purposive sampling. Based on suggestive clinical findings and laboratory investigations results of T-spot test and findings on X-ray chest, diagnosis of intraocular TB was established. The study institutional review board approval was obtained and Informed consent was taken from all participants.

Ocular examination including visual acuity measurement and slit-lamp examination for anterior and posterior segment was performed to record the signs of inflammation. Fundus fluorescein angiography and optical coherence tomography were performed in cases of retinal and choroidal inflammation. Laboratory investigations were performed for workup of intraocular inflammation. Patients were also examined by pulmonologist.

Anti-tuberculosis therapy was started to all the patients. For initial two months isoniazid, rifampicin, pyrazinamide and ethambutol were given. Afterwards, isoniazid and rifampicin were continued for four to seven months depending on the clinical response. Oral prednisolone in dose of 1 mg/kg body weight was added in selected patients with intense intraocular inflammation. Intraocular inflammation was considered intense when vitritis was grade 2 or above and/or macula, disc or blood vessels were inflamed. Oral steroids were tapered off after control of inflammation. All patients were followed up by ophthalmologist and pulmonologist for observing treatment response.

**Statistical Analysis:** Data were analyzed using SPSS version 23. Chi-square test was used to find difference between presenting visual acuity and final visual acuity at the commencement of anti-tuberculosis therapy. $p<0.05$ was considered significant.

## RESULTS

Forty-eight patients of intraocular TB were studied. In 42(87.5%) patients, intraocular TB was bilateral. Mean age of patients was 33.04±13.66 years (range 16-76). Thirty-one (64.6%) were males and 17 (35.4%) females. Presenting and final visual acuity at the commencement of anti-tuberculosis therapy is given in Table 1. There was a statistically significant difference between presenting and final visual acuity ($p<0.05$). Presenting visual complaints were decrease in vision in 39(81.3%) cases, floaters in 06(12.5%) cases and pain in 03(6.3%) cases. Choroiditis was present in 25(52.1%) cases. Distribution of cases according to type of uveitis is given in Table 2. Twenty-seven (56.3%) cases had history of contact with TB patients. T-spot test was positive in 44(91.7%) cases while x-ray chest demonstrated suggested findings in 30(62.5%) cases. Six (12.5%) cases were positive for sputum for gene-expert.

**Table 1. Presenting and final best corrected visual acuity.**

| Best corrected visual acuity | Number of eyes at presentation | No of eyes at treatment |
|---|---|---|
| 6/6 to 6/12 | 33 (34.4%) | 60 (62.5%) |
| 6/18 to 6/60 | 27 (28.1%) | 15 (15.6%) |
| Less than 6/60 | 30 (31.3%) | 15 (15.6) |

**Table 2. Distribution of cases according to type of uveitis.**

| Type of uveitis | Number (%) |
|---|---|
| Anterior uveitis | 6 (12.5%) |
| Intermediate uveitis | 3 (6.3%) |
| Posterior uveitis | 30 (62.5%) |
| Pan uveitis | 9 (18.8%) |

Systemic steroid therapy was given for four weeks in 15(31.3%), for eight weeks in 12(25%) and twelve weeks in 6(12.5%) cases depending upon the involvement of disc, macula and blood vessels. Duration of systemic steroid therapy was tailored according to the inflammation resolution. Anti-tuberculosis therapy was given for six months in 27(56.3%) and nine months in 21(43.8%) cases. After completion of anti-tuberculosis therapy, ocular disease recurred in 03(6.3%) cases. Thirty-nine (81.3%) cases had no history of pulmonary or extra-pulmonary TB. Four (8.33%) cases had pulmonary and five (10.42%) cases had extra-pulmonary TB before presentation to ophthalmologist.

## DISCUSSION

In our study, mean age of patients was 33.04±13.66 years. Thirty-one (64.6%) patients were male. Four (8.33%) cases had pulmonary and 5(10.42%) cases had extra-pulmonary TB. Twenty-seven (56.3%) cases had history of contact with TB patients. In a study from Pakistan, mean age of patients was 36±3 year, 24(60%) cases were female, and 12 (30%) cases had history of systemic TB while in 24 (60%) cases

history of contact with TB patients was present.[2] Contact history of TB in our study was higher than that described in study of Shakarchi where contact history was positive in 37.5% cases.[7] This difference may be due to high endemicity of TB in Pakistan.

Intraocular inflammation may be the result of hypersensitivity reaction to the mycobacterial infection elsewhere in the body. Helper T cells recognize ocular antigens as mycobacterium antigen and initiate an immune response against the ocular antigen resulting in intraocular inflammation.[5] In present study, majority of cases (87.5%) of intraocular TB had bilateral presentation. A study reported a similar finding where majority (67%) involved both eyes.[7]

A study found that anti-tuberculosis therapy should be started in cases of intraocular inflammation where positive immunological laboratory tests and suggestive radiological findings were present. In the presence of serpiginous choroiditis, even one positive immunological laboratory test is sufficient to start systemic anti-tuberculosis therapy. Our results are similar to the results of the study by Ghauri et al where visual acuity improved after treatment.[2]

Steroid treatment without anti-tuberculosis therapy may aggravate TB infection in undiagnosed active infection cases or reactivate the latent infection. Resolution of intraocular inflammation was higher in our study than the results shown in other studies. In one study, 80% of patients showed complete resolution.[2] Another study demonstrated a 75% reduction in recurrence of choroiditis after anti-tuberculosis therapy. Kee et al review of literature showed non-recurrence of intraocular inflammation in 84% of patients who were treated with anti-tuberculosis therapy for tuberculosis uveitis.[16]

Anti-tuberculosis therapy reduces or eliminates the intraocular or extra ocular source of ocular inflammation. In our study, 4(8.33%) cases had pulmonary and 5(10.42%) cases had extra-pulmonary TB. Bhatta et al reported an incidence of 2.6% of ocular TB in patients with systemic TB.[18] Ocular involvement by TB was more frequent in extra pulmonary TB than pulmonary TB. In a study by Ishaq et al, TB was the most frequent cause of infectious uveitis.[19]

Number of mycobacteria in ocular samples is small and volume of ocular specimen is not sufficient to carry out routine laboratory tests. Suggestive clinical findings along with laboratory investigations help in reaching a conclusion that is presumptive most of the times. In the current study, T-spot test was used to detect exposure to the mycobacterium tuberculosis and that test was positive in 44(91.7%) cases. Positive interferon-gamma release assay test like T-spot test is related to favorable treatment outcome for intraocular TB. Medical specialist should be taken on board where suggestive clinical signs or investigations are pointing to a systemic involvement or cause of the intraocular inflammation.

In the present study, 31 (81.3%) cases were first time diagnosed for intraocular TB by an ophthalmologist before a diagnosis of systemic TB was made. This highlights the importance of an ophthalmologist being aware of ocular and systemic features of tuberculosis.

Small number of patients is a limitation of our study. To be certain about the diagnosis was always challenging. In future, studies with large number of patients should be conducted to find the pattern of intraocular inflammation by TB, especially in countries where TB has high prevalence.

## CONCLUSION

Intraocular tuberculosis is not common in cases of active pulmonary tuberculosis. In most of the cases, ophthalmologist was the first to make a diagnosis. Anti-tuberculosis therapy should be started in cases of intraocular inflammation where positive immunological laboratory tests and suggestive radiological findings were present. Anti-tuberculosis therapy results in visual improvement, resolution of the disease and less frequent recurrences.

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