

OCULAR MANIFESTATIONS OF TUBERCULOSIS AT THE TIME OF DIAGNOSIS OF PULMONARY TUBERCULOSIS

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ABSTRACT

BACKGROUND

Tuberculosis is a very common infectious disease, prevalent in our country caused by Mycobacterium tuberculosis and other members of TB complex. Roughly 60% of patients with extra-pulmonary tuberculosis have no evidence of pulmonary tuberculosis and when it manifests as uveitis, accurate diagnosis becomes increasingly difficult as biopsy samples are not easily available.

MATERIALS AND METHODS

A cross sectional prospective study was undertaken on 167 sputum positive pulmonary TB patients attending the Chest Medicine OPD. Study period was 2 years.

RESULTS

In our study 10 out of 167 patients had ocular manifestations. 6 were male patients and 4 were females.

CONCLUSION

Ocular screening in active pulmonary TB patients will eliminate the risk of preventable blindness. This can be made possible by adequate resources and trained ophthalmic personnel.

KEYWORDS

Tuberculosis, Mycobacterium, Ocular Manifestation, Choroidal Scar.

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BACKGROUND

Tuberculosis (TB) is a very common infectious disease, prevalent in our country caused by Mycobacterium tuberculosis and other members of TB complex. It may present as a mere asymptomatic infection or pulmonary tuberculosis or extra-pulmonary tuberculosis which may ultimately lead to death. Ocular tuberculosis is type of extra pulmonary TB.^{1,2}

Roughly 60% of patients with extra-pulmonary tuberculosis have no evidence of pulmonary tuberculosis and when it manifests as uveitis, accurate diagnosis becomes increasingly difficult as biopsy samples are not easily available.^{3,4} Thus, diagnosis of ocular TB can only be presumed when the patient presents with associated symptoms like chronic evening fever or evidence of other extra-pulmonary tuberculosis, any radiological findings or conversion of Mantoux skin test.^{5,6}

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It is well known that Mycobacterium tuberculosis evolved in human beings from M. Bovis sometime after the domestication of cattle, that is between 4000 and 800 B.C. earliest description of ocular tuberculosis was credited by Maitre-jan in 1711, iris lesion described by him which lead on to corneal perforation.³ Choroidal tubercles in miliary tuberculosis was first described by Gueneau Mussy in 1830.⁴ Anatomical description of the lesion was given by jaeger 1855.⁷ Choroidal tubercles was first demonstrated by Fraenkel with the ophthalmoscope.⁸ Tubercles in the choroid of eye known as choroidal tubercles which was seen clinically by Cohnheim those were identical with tubercles elsewhere in the body, and on injecting the tuberculous material experimentally produced in guinea-pigs.⁹ Von Graefe and Leber in 1868 have given the detailed ophthalmoscopic descriptions. In 1882 Koch discovered the tubercle bacillus, and Von Michel 1883 identified the organism in the eye.¹ Koch's also discovered a fluid medium in which tubercle bacilli could be grown and he designated it as lymph and afterward as tuberculin- a substance he thought might provide a cure for the disease. Later it was thought as a material that contained tuberculo-protein or degradation products of the proteins that were able to elicit hypersensitivity reactions.

The tuberculin which had the most widespread for use was called Koch's Old tuberculin. It was prepared by taking a liquid medium in which tubercle bacilli 3 had been grown,

sterilizing it with heat, producing a bacteria free filtrate, and then concentrating it by evaporation to one-tenth of its original volume.² The first tuberculin test material was prepared by Robert Koch. Its use for detection of tuberculin was first described in 1907 by Von Priquet.² He demonstrated that when tuberculin was injected intradermally in a tuberculous child, a papule 5-20 mm in diameter appeared at the site and then gradually disappeared over a period of 8 days or longer. He also introduced the word "Allergy" to designate this changed or altered state since children who were not infected with tubercle bacilli were found to have a negative response to the allergy test.¹⁰ Tuberculin gradually lost favour as a therapeutic modality and its value to test for allergy to tuberculosis gained recognition. It came to be used in patients with aim of discriminating between various forms of tuberculosis or for use in judging prognosis. This led to the use of intradermal injection of tuberculin as introduced by Mantoux in 1910,¹¹ and this method has stood the test of time because the intra dermal injection of 0.1 ml of a carefully prepared solution of the test material is the most accurate way to perform the tuberculin test. Today, the Mantoux test is the most widely used

Woods’ 4 categories can be summarized as follows

1. Foreign-body like reaction (e.g., miliary tubercles of the iris and choroid)
2. Acute circumscribed inflammation that may recur if the patient’s resistance decreases (e.g., sclerokeratitis, Eales disease)⁴
3. Chronic inflammation with multiple recurrence (e.g., ciliary body tuberculoma)
4. Acute, rapidly spreading inflammation with necrosis, caseation, and occasionally a ruptured globe (tuberculous panophthalmitis)

The eye can become infected with TB through several different mechanisms

1. The most common form of ocular involvement is from haematogenous spread. The uveal tract (composed of the iris, ciliary body, and choroid) is the coat of the eye most frequently involved, presumably because of its high vascular content.
2. Primary exogenous infection of the eye, can occur in the lids or in the conjunctiva. Other external tissues more rarely infected include the cornea, sclera, and lacrimal sac.
3. Secondary infection of the eye may occur by direct extension from surrounding tissues or by contamination with the patient’s own sputum.
4. Additionally, some forms of ocular TB, such as phlyctenular disease and Eales disease, are thought to be the result of a hypersensitivity reaction.⁷
5. Rich’s law states that the extent of a tuberculous lesion is proportionate directly to virulence and number of tuberculous bacilli and also nature of hypersensitivity of that infected tissue.

Aims and Objectives

To evaluate the prevalence of ocular manifestations in pulmonary TB patients at the time of diagnosis, who attended the Chest Medicine Out Patient Department (OPD) of Stanley medical college and hospital for early definitive diagnosis and treatment.

MATERIALS AND METHODS

A cross sectional prospective study was undertaken on 167 sputum positive pulmonary TB patients attending the Chest Medicine OPD. The study period was 2 years. Consent in patient’s own language was obtained from all those who were willing to take part in the study. Patients with suspected lesions were referred for complete systemic and laboratory work up.

Inclusion Criteria

Sputum positive pulmonary TB patients of all age groups, both males and females were included.

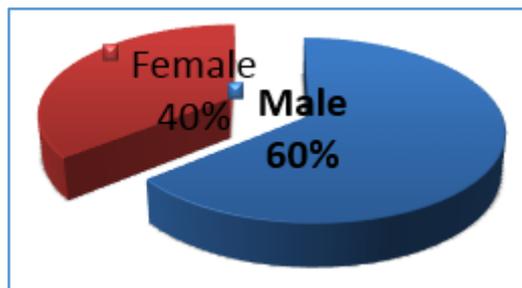
Exclusion Criteria

- Sputum negative pulmonary TB cases.
- HIV patients.
- Patients with history of other granulomatous disease.
- Patients with history of ocular trauma.
- Patients with history of other systemic diseases.

RESULTS

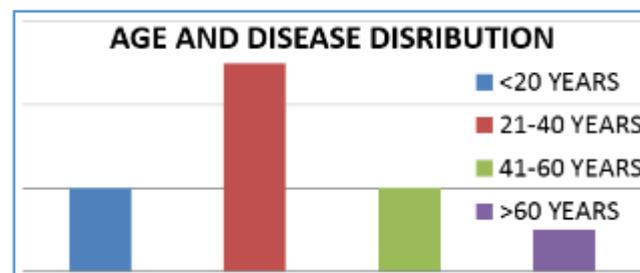
In our study 10 out of 167 patients had ocular manifestations, 6 were male patients and 4 were females.

Gender Distribution



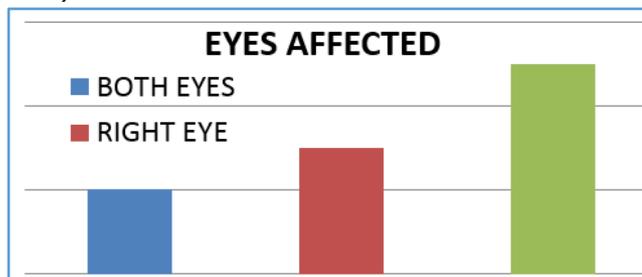
Graph 1. p Gender Distribution

Age Distribution- In our study out of 10, 5 patients were between 21-40 years. 2 patients were less than 20 years and 2 patients were between 41-60 years. One patient was 67 years of age.



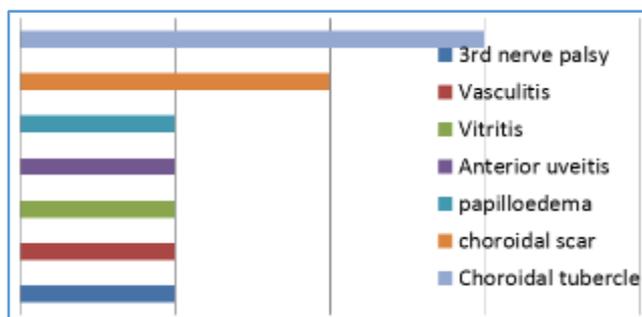
Graph 2. Age Distribution

Laterality- We had 2 patients with bilateral presentation, rest 8 had unilateral presentation (3 right sided and 5 left sided).



Graph 3. Laterality

Ocular Findings- 3 out of 10 patients had choroidal tubercle. 2 cases presented with choroidal scar. Third nerve palsy, retinal vasculitis, vitritis, anterior uveitis, and papilloedema was present in one patient each.



Graph 4. Ocular Findings

Visual Acuity- Patients with anterior uveitis, vitritis and vasculitis showed drastic reduction in vision.

	6/6-6/12	6/18-6/24	6/36-6/60	<6/60
Vasculitis				1
Choroidal tubercle	3			
Choroidal scar	2			
Third Nerve Palsy		1		
Papilloedema		1		
Anterior Uveitis				1
Vitritis				1

Table 1. Visual Acuity

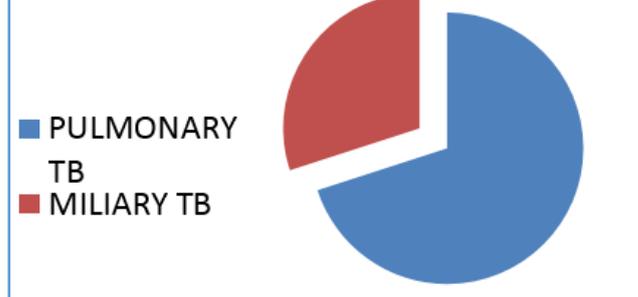
Out of 10 patients with ocular findings 3 had ocular symptoms, rest 7 were asymptomatic.

Ocular Findings	Ocular Symptoms		Total
	Present	Absent	
Present	3	7	10
Absent	0	157	157
Total	3	164	167

Table 2. Ocular Symptoms

Systemic History of Tuberculosis- Among ten patients with ocular findings 7 had pulmonary tuberculosis, and 3 patients were diagnosed with miliary tuberculosis.

NUMBER OF PATIENTS



Graph 5. Graph Showing Systemic Involvement

All the 10 patients diagnosed with ocular TB were started on ATT. In addition, patients with choroidal tubercle were started on systemic steroids and patients with anterior uveitis on topical steroids. Patients with Vitritis and Vasculitis were started on both topical and systemic steroids. Papilloedema, choroidal scar and 3rd nerve palsy were kept on ATT alone.

DISCUSSION

In a similar study conducted by GN SAHU ET AL majority of patients with ocular manifestations were in the age group of 21-40. Similar findings were seen in our study (50%).

Age (Years)	G.N. Sahu et al	Present Study
<20	40%	10%
21-40	43%	50%
41-60	16.36%	30%
>60	NA	10%

Table 3. Comparison with Study Conducted by G.N. Sahu et al

In our study six out of ten patients with ocular patients were males (60 %). In a similar study by BOUZA ET AL male predominance was seen (77%).¹²

Ocular Involvement	18	10
Male	14	6
Female	4	4

Table 4. Comparison with Study Conducted by Bouza et al

80% of the patients with ocular findings had unilateral presentation. In similar studies by LEON PAOLO ET AL and G.N. SAHU ET AL majority of the patients had unilateral presentation.

Bouza et al found out that maximum patients with ocular findings were asymptomatic at presentation. In our study 70% had no ocular symptoms during presentation.¹²

30% of the patients with ocular symptoms had choroidal tubercle which was the commonest presentation. In studies conducted by Bouza et al and Leon Paolo et al choroidal tubercle was the commonest finding (66.66% and 42.85%). But in a similar study conducted by Biswas et al choroidal scar was found in 50% of the patients and was the commonest finding.

Clinical Findings	Biswas et al	Bouza et al	Leon Paolo et al	Our Study
Choroidal tubercle		12 (66.66%)	3 (42.85%)	3 (30%)
Choroidal scar	50%	8 (44.44%)	NA	2 (20%)
Vitritis		2 (11.11%)	NA	1 (10%)
Vasculitis		2 (11.11%)	2 (28.57%)	1 (10%)
Anterior uveitis		1 (5.55%)	2 (28.57%)	1 (10%)
Papilloedema		NA	NA	1 (10%)
3 rd nerve palsy		NA	NA	1 (10%)

Table 5. Comparison of the Frequency of Clinical Findings in Various Studies by Biswas, Bouza, Leon Paolo and the Present Study

CONCLUSION

Mycobacterium tuberculosis can cause a wide spectrum of diseases in eye. The clinical diagnosis of ocular tuberculosis is not always easy because the manifestations in the eye are protean and can mimic other conditions. With the introduction of DOTS, the morbidity has decreased and so the life expectancy of the patients has been increased. However, still ocular manifestations persist. In our study, most of the patients were asymptomatic and in these patients, most common involvement is posterior uveitis.

M. Tuberculosis tends to grow successfully in the choroid and ciliary body where the oxygen tension is high compared to other ocular structures. Ocular TB may occur in any age group from childhood to adulthood. Most of the patients were in the age group of 20-60 years. Male gender had a preponderance.

The prevalence in our study is 5.98% which is comparable with other studies. We have only taken the sputum positive pulmonary TB patients for screening. Still, we have to look out for manifestations in cases of relapses, miliary TB etc. It can expand the knowledge base regarding the epidemiology of Ocular TB and can contribute to awareness on this condition.

Ocular screening in active pulmonary TB patients will eliminate the risk of preventable blindness. This can be made possible by adequate resources and trained ophthalmic personnel.

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