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Original Article

Disease and Drug Related Ocular Complications of Tuberculosis

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Abstract

Introduction: Tuberculosis continues to be a major health problem in India. Ocular tuberculosis can involve any part of the eye. It can occur with or without active systemic tuberculosis. Among the antitubercular drugs, ethambutol is most commonly associated with ocular toxicity. *Aim:* This study was done to find the incidence of ocular tuberculosis among patients with active systemic tuberculosis and to study the ocular toxicity of antitubercular drugs. *Methods and Materials:* 152 patients of newly diagnosed active systemic tuberculosis (pulmonary and extra-pulmonary) were screened for ocular tuberculosis. A detailed general and ocular examination including visual acuity, slit lamp bio-microscopy, indirect ophthalmoscopy, color vision was done. Specialized investigations including Fundus fluoresce in angiography, Visual fields and VEP were done where indicated. Montoux test, ESR, AFB, Quantiferon TB gold test were done. They were followed up at 2mths and 6mths to look for any ocular toxicity of antitubercular drugs. *Results:* 9 cases (5.9%) were detected to have ocular tuberculosis, of these 5 cases had pulmonary and four cases extra-pulmonary tuberculosis. Of the 52 cases on treatment with ethambutol 2 cases (3.8%) were detected to have ethambutol toxicity. They had constriction of visual fields which recovered 2 months after discontinuing the drug. *Conclusion:* The incidence of ocular tuberculosis in a study of 152 cases of active systemic tuberculosis was 3.28 % and the incidence of ocular toxicity was 3.8 % among patients receiving ethambutol. The ocular toxicity was reversible on discontinuing the drug.

Keywords: Tuberculosis; Choroiditis; Periviascultitis; Optic atrophy; Papilloedema; Ethambutol Toxicity.

Introduction

Tuberculosis is a specific communicable disease caused by Mycobacterium tuberculosis. In India it is a major public Health problem, the incidence being 171 per 1,00,000 population [1]. The prevalence of TB infection (latent infection) in India is about 40% [2]. There is a higher incidence in HIV positive patients.

Ocular tuberculosis can involve all parts of the eye. It normally occurs as part of a post primary infection due to direct haematogenous spread or by hypersensitivity responses [3].

Ocular toxicity has been reported with ethambutol in the form of optic neuritis [4]. It is dose related and usually reversible on cessation of treatment [5]. Till date two types have been reported.

(a) An axial type which manifests with loss of central vision associated with central scotoma and color vision defects.

(b) A paraxial type which manifests peripheral visual field construction [6].

Ocular toxicity is usually dose-related [7].

INH rarely causes optic neurits and atrophy [8].

Methods and Materials

152 patients with active systematic tuberculosis (pulmonary and extra-pulmonary) were examined

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in a tertiary hospital. The patients were predominantly males and their ages ranged from 11 ½–70 years.

They were divided into 2 groups: those with pulmonary and those with extra-pulmonary tuberculosis. Each group was further divided into those on ethambutol and those no on ethambutol.

A detailed general, systematic and ocular examination was done. The diagnosis of tuberculosis and confirmed by a physician by clinical examination and investigations. Investigations included blood ESR, Hb, TLC, DLC, Sputum–acid fast bacilli, Montoux test, X-Ray chest and Quantiferon T.B. gold test. Specialized investigations were done in relevant cases like CSF studies in tubercular meningitis.

Ocular examination was carried out before starting ATT, after 2mths and 6mths. They were asked to report immediately in case of any visual disturbance. History of any ocular complains was taken. Detailed ocular examination included visual acuity for distance and near, color vision, Amsler, anterior segment–slit lamp bio-microscopy, Fundus under full mydriasis with binocular indirect opthalmoscope, Fields – Automated perimetry with Humphery Field Analyzer (24-2 and 60-2). VEP was done in patients who showed evidence suggestive of ethambutol toxicity.

Fig. 1: Choroidal tubercle in macula

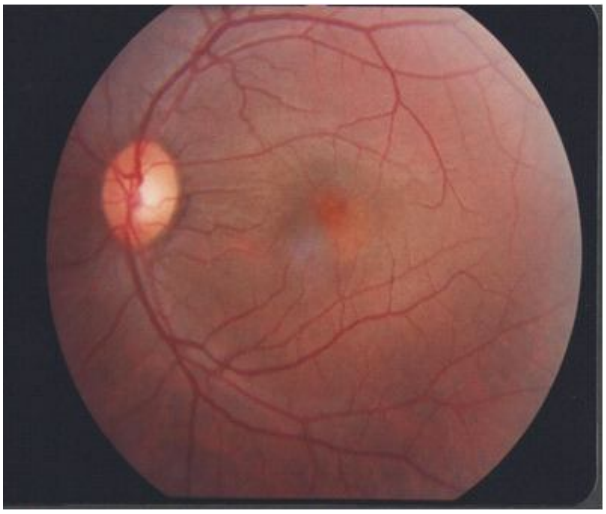


Fig. 2: Choroiditis (old healed) inferotemporally

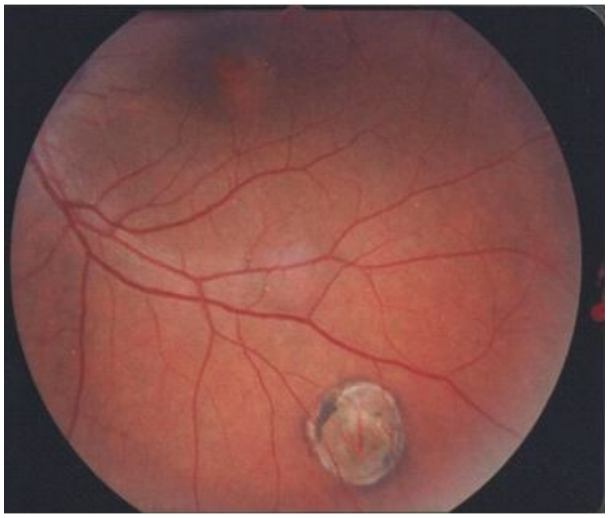
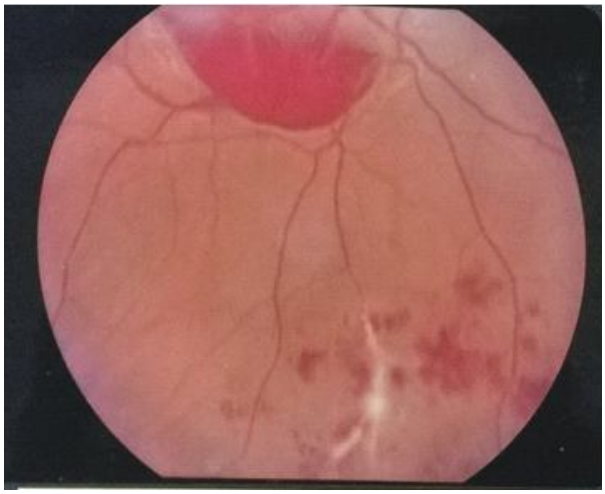


Fig. 3: Subhyaloidhaemorrhage with perivasculitis



Results

A total of 152 cases were studied of these 52 cases (34.2%) were on treatment with ethambutol and 100 cases (65.8%) were not. In the pulmonary tuberculosis group the patients were 115 (75.65%) males and 22 (14.47%) females. Table 1 shows the distribution of cases studied. 17 patients (11.2%) from the ethambutol group and 20 patients (13.1%) from

the non- ethambutol group were sputum positive for AFB. Table 2 shows the distribution of sputum positive cases.

Table 3 shows the incidence of ocular tuberculosis. In sputum AFB+ it is 0.65% and in sputum AFB – patients and in extra-pulmonary tuberculosis patients it is 2.63%. The overall incidence in all groups is 5.9%. Choroiditis was the commonest, it occurred in 3 cases (1.95%) followed by perivasculitis (2 cases), optic atrophy (2 cases) and papilloedema (2 cases). Only one patient had anterior segment involvement in the form of irises.

All patients with pulmonary tuberculosis had radiological evidence of tuberculosis, Montoux test more than 15 mm. All patients except one had high ESR. All patients with extra-pulmonary tuberculosis had raised ESR, positive Montoux (more than 15mm).

Out of 52 patients treating with ethambutol, 2 cases showed ocular toxicity (3.8%) Table 4. Both had constriction of peripheral fields. One case developed symptoms 6 days after starting ethambutol and one case after 6 months. Both cases recovered in 2 months after discontinuing the drug and had complete reversal of the field loss.

Table 1: Treatment Groups

	Pulmonary		Extrapulmonary		Total
	♂Male	♀ Female	♂ Male	♀ Female	
Ethambutol	42	6	2	2	52
	27.6%	3.9%	1.3%	1.3%	34.2%
Non-Ethambutol	73	16	4	7	100
	48%	10.5%	2.6%	4.6%	65.8%
Total	115	22	6	9	152
	75.65%	114.47%	3.9%	5.9%	

Table 2: Sputum positivity for AFB

Treatment Group	Number of cases	AFB+	AFB
Ethambutol	48	17	13
	31.5%	11.2%	20.4%
Non-Ethambutol	89	20	69
	58.5%	13.1%	45.3%
Total	137	37	100
	90%	24.3%	65.2%

Table 3: Incidence of Ocular Tuberculosis

	Pulmonary		Extrapulmonary	Total
	AFB+	AFB-		
Number of Cases	1	4	4	9
	0.65%	2.63%	2.63%	5.9%

Table 4: Incidence of Ocular Toxicity to ATT

Treatment Group	Number of cases	Cases Showing Ocular Toxicity	Percentage
Ethambutol	52	2	3.8%
Non-Ethambutol	100	0	0%

Discussion

In the present study, 152 cases of systemic tuberculosis (pulmonary and extra-pumlmonary) were evaluated for ocular tuberculosis and ocular toxicity to anti tuberculosis drugs.

9 patients (5.9%) were found to have ocular findings known to be associated with tuberculosis, of these 5 had pulmonary and 4 had extra-pulmonary tuberculosis.

Donahue (1940–1966) [9], Lal and Gupta (1985) [10], Biswas (85–86) [11], BouzaEMerino (1997) [12], and BeareNAKublin et al [13], studied 10254, 3064, 1005, 100 and 109 cases respectively and found an incidence of ocular tuberculosis of 1.4%, 5.74%, 1.4%, 18% and 2.8% respectively. The high incidence (18%)

in the study by BouzaEMerino et al is because of co-infection with HIV in 60% of cases.

Of the 9 patients with ocular tuberculosis, 1 patient (0.72%) had Panuveitis, 2 patients (1.45%) had old healed choroiditis, 2 patients (1.45%) had perivasculitis, 2 patients (1.45%) had optic atrophy and 2 patients (1.45%) had papilloedema. 1 patient with choroiditis also had a choroidal tubercle. There was no case of orbital, lid, and lacrimal gland, conjunctival or corneal tuberculosis.

In other studies Golden Burg and Fabricant [14] (1930), Donahne (1940-66), Lal and Gupta (1985) and Biswas (1985-86) found an incidence of 0.6%, 0.27% 0.68% and 0 of irises respectively. 2.1%, 0.44%, 0.09% and 1.2% of choroiditis respectively.

Biswas reported a 0.1% incidence of chorodial tubercle. Illingrowth and Wright [15] (1948) have reported a 60% and 5.5% of chorodial tubercle with miliary tuberculosis and tuberculosis meningitis respectively.

All the 9 patients with ocular tuberculosis had a positive Montoux test and had a high ESR. Only 1 patient of the 9 patients of ocular tuberculosis was sputum positive for acid fast bacilli, ocular findings in this case were old healed choroditis.

Of the 52 patients on treatment with ehtambutol, only 2 patients (3.8%) were detected to have ethambutol toxicity. Both the patients had peripheral constriction of visual fields. 1 patient had a delayed VEP. One of the patients developed symptoms with 6 days of treatment and the other 6 months after starting antitubercular treatment. Both recovered 2 months after discontinuing ethambutol. No patient had color defect, central fields defect, papillary abnormality or papillitis. No toxicity was noted to other anti tubercular drugs.

The remaining 100 patients who were not on ethambutol were taken as a control. None of them showed constriction of fields or any other changes suggestive of ehtmabutol toxicity. Previous studies have shown ethambutol toxicity ranging from 0.5 – 6.6% as compared to our study showing 3.8%.

The limitations of this study are that the sample size is small compared to studies by Donahne (1940-66), Lal, Gupta (1985) and Biswas (1985-86). However it is larger than studies by BouzaEMerino (1997) and BeareNAKublin et al (2002). HIV status of the patients was not taken into account in this study.

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