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Case Series

Manifestation of ocular tuberculosis in a north Indian tertiary care centre: Case series

Praveen Singh[1], Neha Singh[2]*

[1]*Dept. of Ophthalmology, K.D. Medical College, Hospital and Research, Mathura, Uttar Pradesh, India*
[2]*Dept. of Ophthalmology, All India Institute of Medical Sciences, Gorakhpur, Uttar Pradesh, India*

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ABSTRACT

Background: Ocular tuberculosis acts as a challenge throughout the world, and its pathophysiology, diagnosis, and treatment are a topic for debate. The present case series represents retrospective study focusing on the variable clinical presentations, the diagnostic and therapeutic characteristics of ocular tuberculosis. We report 12 patients of ocular tuberculosis with variable presentations.

Materials and Methods: Retrospective analysis of records of patients diagnosed with ocular tuberculosis from August 2022 till March 2023 was done. Diagnosis of ocular tuberculosis was based on detailed ocular and systemic examination including best corrected visual acuity (BCVA), Slit lamp examination, fundus examination, OCT. The patients presenting with features suggestive of ocular tuberculosis were further investigated with complete blood count (CBC), erythrocyte sedimentation rate (ESR), Monteaux test, Chest X-ray, Cartridge Based Nuclear Amplification Test (CBNAAT) and rheumatological work up.

Results: Out of 12 of ocular tuberculosis patients, 4 were diagnosed with active retinal vasculitis, 3with choroiditis, 3 had panuveitis, and remaining 2 patients had unilateral nodular episcleritis. The diagnosis was based on compatible clinical picture, highly positive Tuberculin skin test and dramatic response to anti-tuberculous drugs. All 12 cases were strongly Mantaux test positive (2 developed injection site ulceration). All cases were started on ATT immediately with pulmonologist consultation and showed clinical improvement after 1 month.

Conclusion: Ocular tuberculosis can have myriad presentations. Positive Mantaux test plays an important role in supporting diagnosis of ocular tuberculosis.

1. Introduction

Tuberculosis (TB) is a chronic and airborne transmissible disease caused by Mycobacterium tuberculosis (Mtb). According to the World Health Organization (WHO) around 10.6 million people were diagnosed with TB in 2021, and 1.4 million deaths occurred in the same year.[1] Ocular TB (OTB) is one of the extrapulmonary manifestations of TB which can cause significant visual loss. The prevalence of OTB ranges from 0.2-2.7% in non-endemic countries such as USA or Japan to 5.6-10.5% in TB endemic countries like India.[2]

OTB can present with myriad symptoms. Primary ocular tuberculosis where the ocular structure is the primary site of infection can present as lid abscess, conjunctival infiltration, phylectenulosis, scleritis and interstitial keratitis. Secondary disease occurs by hematogenous spread or as hypersensitivity response from systemic tuberculosis infection. The clinical manifestations may include acute anterior uveitis, chronic granulomatous anterior uveitis with or without iris or angle nodules (granuloma), intermediate uveitis, vitritis with macular

* *Corresponding author*.
E-mail address: nhsngh.89@gmail.com (N. Singh).

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edema, neuroretinitis, retinal vasculitis, solitary or multiple choroidal tubercles, monocular or binocular multifocal choroiditis, sub retinal abscess, endophthalmitis, and panophthalmitis. The fact that OTB has overlapping signs with various ocular pathologies adds to difficulty in management of patients. Mtb-associated intraocular inflammation can result in moderate to severe visual impairment in at least 40% affected eyes[3] and is being increasingly reported from both TB-endemic and non-endemic countries.[4,5] The disease can affect nearly every tissue in the eye and therefore has varied clinical presentations.[6–9]

In this retrospective case series, we aim to evaluate the various clinical presentations of ocular TB in endemic population in north India. We also demonstrate the use of different investigations for the presumptive diagnosis of OTB in our subjects.

2. Materials and Methods

The study was a retrospective analysis of patients who were diagnosed to have and treated with OTB between August 2022 to December 2023 at our institute.

The data was processed anonymously according to the institution's privacy policy.

OTB diagnosis was made either by:

1. A compatible clinical picture which was suspicious and does not fit in any specific ocular or systemic disease.
2. A highly positive Mantaux (a minimum of 15 mm of induration, reaching up to 40 mm, ulceration at mantoux site).
3. A dramatic response to oral anti-tuberculous drugs within the first month of treatment

Our case series study included 22 eyes from 12 patients with OTB.

All these study patients had data of complete ocular examination including testing of visual acuity by the standard Snellen chart, Intraocular pressure measurement by NCT, slit lamp examination for anterior, and posterior segment with dilated fundus examination. Some cases among these, where the media was clear, had retinal imaging by OCT (optical coherence tomography) and fundus imaging by fundus camera. Blood investigations included CBC (complete blood count), ESR (erythrocyte sedimentation rate) along with Mantoux test, and RA (rheumatoid arthritis) factor. Microbiological investigations included sputum for acid fast bacilli in all these patients. All case records had radiological investigation that include chest X-ray.

3. Results

A total of 12 patients were treated for OTB during the study period. Of the 12 patients 11 were females and 1 was male. Mean age of the patients was 33 years (Range 9-65 years). Out of 12 patients, 4 patients were diagnosed with active retinal vasculitis, 3with choroiditis, 3 had panuveitis, and remaining 2 patients with unilateral nodular episcleritis.

hows a summary of demographics and clinical manifestations of thepatients. Figure 1 shows some clinical phenotypes of OTB seen in our patients.

3.1. Investigations

All 12 cases were strongly Mantoux test positive (>15mm induration).4 patients developed injection site ulceration. 7 patients had induration which measured more than 20mm on Mantoux test. All the patients had raised ESR. Four patients had a history of contact with tuberculosis case. One patient had uncontrolled diabetes at the presentation. Only one patient had respiratory symptoms and was being treated for COPD from outside. Her chest Xray showed features suggestive of TB. In other patients there was no evidence of pulmonary TB on X Ray. Evidence of abdominal tuberculosis was found on ultrasonography in 9-year-old male.

3.2. Treatment and clinical outcome

All patients received ATT from Tb clinic. Significant improvement after initiation of ATT was observed in all patients within one month of treatment. One female of panuveitis had worsening of symptoms after 3 weeks of therapy. Oral steroids were added to her treatment regime after which she improved. One patient had a relapse after stopping ATT after 6 months of treatment. She also had poor control of diabetes mellitus. Her ATT was extended for 3 months and referral for control of blood sugar was done.

4. Discussion

Ocular TB can present clinically in a myriad of ways both extra-ocularly and intra-ocularly. Studies indicate posterior uveitis was the most common anatomic location for ocular TB, followed by pan uveitis, intermediate uveitis, and anterior uveitis.[7] Choroiditis followed by retinal vasculitis are the most common phenotype of ocular TB.[7] However we found retinal vasculitis to be the most common clinical manifestation of ocular TB in our case series followed by choroiditis and panuvueitis.Our findings may be different because of our small sample size due to the retrospective nature of our study.

Being an extrapulmonary form of the disease, OTB commonly occurs without any evidence of pulmonary involvement. Although most patients have no clinical signs of active pulmonary disease, radiology can be useful, providing evidence of old healed TB. Results from Collaborative ocular tuberculosis study-1(COTS-1) showed that among 702 patients affected by OTB with documented radiological results, 26.9% had radiologic

Table 1: Demographic profile and clinical manifestations of cases

S.No	Age/Sex	Previous history	Presenting complaint	Clinical Features
1.	9y/M	Contact with TB patient	Blurry vision BE	Vitritis, Disc edema, Vasculitis BE
2.	28/F	TB in Husband	Black spot in RE	RE disc edema, hemorrhage around disc, perivascular cuffing
3	35/F	Not significant	Blurring of vision BE	B/L vasculitis, Vitreous hemorrhage
4	30/F	Not significant	Loss of vision RE	Rt eye panuvieits, LE healed Choroiditis
5	35/F	Uncontrolled diabetes	Blurring of vision BE	Optic nerve head granuloma LE, multifocal choroiditis RE
6	65/F	COPD	Blurring of vision BE	B/l panuveitis
7	35/F	Not significant	Pain in RE	Unilateral nodular scleritis
8	35/F	Not significant	Pain in LE	Unilateral nodular scleritis
9	37/F	Contact with TB patient	Blurring of vision BE	RE anterior uvieitis and LE choroiditis
10	27/F	Not significant	Blurring of vision BE	BE disc edema, hemorrhage around disc
11	43/F	Contact with TB patient	Blurring of vision BE	RE posterior synechae with complicated cataract, post synechae with pseudophakia (LE). B-scan (BE) shows viterous heamorrhage
12	35/F	Not significant	Blurring of vision BE	BE multifocal choroiditis

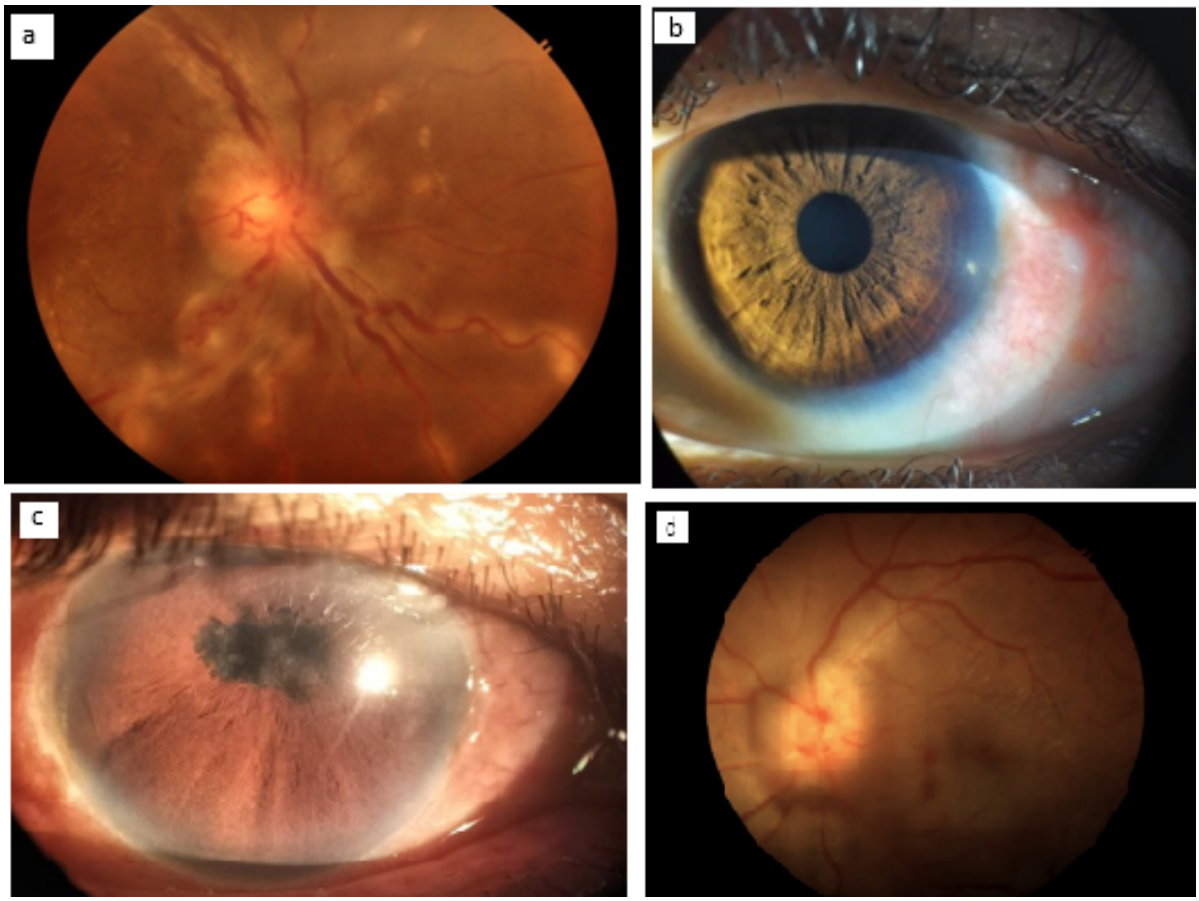

Figure 1: Showing various clinical phenotypes of OTB; **a:** Tuberculous retinal vasculitis in 9yr male (case 1); **b:** Nodular episcleritis (case 7); **c:** Panuveitis with iris bombe in 65 yr female (case 5); **e:** Optic nerve head tuberculoma in 35 year female (case 6)

features suggestive of inactive TB on chest X-ray, and 68.6% had positive findings on chest computed tomography (CT).[10] CT appears to be a more sensitive technique, that can be a valuable diagnostic tool in patients with ocular findings suggestive of OTB and history of exposure with no signs of active infection.[10] We were not able to perform CECT chest on our patients because of economical constraints. Only one patient had evidence of pulmonary TB on Chest Xray, while one patient had suspicion of abdominal Tb on Ultrasound.

Immunological Tests are relevant for diagnosing OTB as intraocular fluid or tissues are rarely sampled because they require major surgical intervention. The Mantoux test being the most common immunological test, especially in endemic countries. This test was reported to have a positive result in 87% of suspected ocular TB patients. COTS-1 study highlighted that over 90% of patients diagnosed with OTB do not present with any systemic evidence of TB, indicating ocular TB is an extrapulmonary form of the disease that occurs in isolation.[10,11]

The Mantoux test has been traditionally thought to have a low positive predictive value and a high false-negative rate in the absence of systemic disease, whereas interferon-gamma release assays (IGRAs), although more specific, have a high false-positive rate. Approximately 90% of positive IGRAs can be false positives, and the possibility of latent TB in a patient with ocular inflammation not related to TB must be considered, especially in the TB-endemic regions.[12–14] Thus, in a patient with a clinical phenotype of OTB, most aptly the standards published by the Department of Health Research, Ministry of Health and Family Welfare, Government of India, and the ICMR consider tests as Essential: CXR for healed/active pulmonary TB, Desirable: Mantoux test (standardized TU units): 10 mm induration considered positive, and Optional: CT Chest (if available) for healed/active pulmonary TB, with other investigations to rule out the other causes of clinical presentation, need to be applied in general practice, as in our study. In our study, it is worth reemphasizing that all patients had strongly positive Mantoux test(>15mm) with 4 patients having injection site ulceration. Only 2 patients had evidence of TB elsewhere while 2 patients had positive contact history. However, all of our patients showed a positive response to treatment to ATT. As almost all reactions with induration of 15 mm or more in size may be attributable to infection with tubercle bacilli, irrespective of BCG vaccination ATT was initiated in these patients.[14] Like us Morekar et al[15] also treated 5 patients purely on basis of clinical signs of OTB with positive Mantoux test and found good response to treatment. Further all our patients except one improved solely on ATT without requirement of any systemic steroids

Our study is limited by small sample size. Further, while we have a 5-month follow-up of our patients at the time of sending this manuscript for publication, in diseases like uveitis, it is known that phenotypes of diseases may evolve over the years.

5. Conclusion

Retinal vasculitis followed by choroiditis and panuveitis were the most common manifestation of OTB in our case series. We safely reaffirm the role of the Mantoux test in diagnosing OTB, with the understanding that its results need to be interpreted, considering the clinical picture of the ocular inflammation, backed with appropriate radiology findings. Oral anti tuberculous drugs with or without topical steroids are sufficient to treat such cases.

6. Source of Funding

None.

7. Conflict of Interest

None.

References

1. Global tuberculosis report 2022. Geneva: World Health Organization; 2022.
2. Testi I, Agrawal R, Mehta S, Basu S, Nguyen Q, Pavesio C, et al. Ocular tuberculosis: Where are we today? *Indian J Ophthalmol*. 2020;68(9):1808–17.
3. Basu S, Monira S, Modi RR, Choudhury N, Mohan N, Padhi TR, et al. Degree, duration, and causes of visual impairment in eyes affected with ocular tuberculosis. *J Ophthalmic Inflamm Infect*. 2014;4(1):3. doi:10.1186/1869-5760-4-3.
4. Agrawal R, Gunasekeran DV, Grant R, Agarwal A, Kon OM, Nguyen QD, et al. Collaborative Ocular Tuberculosis Study (COTS)-1 Study Group. Clinical Features and Outcomes of Patients With Tubercular Uveitis Treated With Antitubercular Therapy in the Collaborative Ocular Tuberculosis Study (COTS)-1. JAMA Ophthalmol. *JAMA Ophthalmol*. 2017;135(12):1318–27.
5. Gan WL, Jones NP. Serpiginous-like choroiditis as a marker for tuberculosis in a non-endemic area. *Br J Ophthalmol*. 2013;97(5):644–7.
6. Basu S. Ocular tuberculosis. Cham: Posterior Uveitis. Springer; 2019. p. 115–24.
7. Helm CJ, Holland GN. Ocular tuberculosis. *Surv Ophthalmol*. 1993;38(3):229–56.
8. Gupta V, Gupta A, Rao NA. Intraocular tuberculosis–an update. *Surv Ophthalmol*. 2007;52(6):561–87.
9. Maurya RP. Tuberculosis of Retina: A Review. *Ind J Clin Exp Ophthalmol* . 2021;7(1):1–2.
10. Testi I, Agrawal R, Mahajan S, Agarwal A, Gunasekeran D, Raje D, et al. Intraocular tuberculosis–an update. *Ocul Immunol Inflamm*. 2019;28(1):1–11. doi:10.1080/09273948.2019.1646774.
11. Lee JE, Kim HJ, Lee SW. The Clinical Utility of Tuberculin Skin Test and Interferon-γ Release Assay in the Diagnosis of Active Tuberculosis among Young Adults: A Prospective Observational Study. *BMC Infect Dis*. 2011;11(1):96. doi:10.1186/1471-2334-11-96.
12. Bianchi L, Galli L, Moriondo M, Veneruso G, Becciolini L, Azzari C, et al. Interferon-gamma release assay improves the diagnosis of tuberculosis in children. *Pediatr Infect Dis J*. 2009;28(6):510–4.
13. Baba K, Sornes S, Hoosen AA, Lekabe JM, Mpe MJ, Langeland N, et al. Evaluation of immune responses in HIV infected patients with pleural tuberculosis by the QuantiFERON TB-Gold interferon-gamma assay. *BMC Infect Dis*. 2008;8:35. doi:10.1186/1471-2334-8-35.
14. Chadha VK. Tuberculin test. *Indian J Pediatr*. 2001;68(1):53–8.

15. Moreker MR, Avya B, Sunila J, Sonali S, Asmita S, Moreker S, et al. Demystifying the role of the Mantoux test in ocular tuberculosis. *J Clin Ophthalmol Res*. 2023;11(3):194–8.

Author biography

Praveen Singh, Junior Resident

Neha Singh, Associate Professor

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