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## Ocular Tuberculoma in the Absence of Miliary TB

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### Abstract

**Background:** While tuberculosis is a common disease worldwide, the incidence of tuberculomas in the eye is rare in developed nations. Posterior segment tuberculomas typically present with associated uveitis, although, among patients with uveitis, a diagnosis of tuberculosis infection is less than 0.1%. The most commonly affected ocular structure is the choroid, and as such, tuberculomas can share many characteristics with choroidal tumors. Given it's the varied nature of presentation, clinical diagnosis is challenging.

**Methods and findings:** A retrospective case report of a 45-year-old Filipino woman presented with blurred vision in her right eye two years after immigrating to the United States. The right eye demonstrated an amelanotic choroidal lesion in the macula of the right eye, mimicking an amelanotic choroidal melanoma or choroidal metastasis. A positive Tuberculin Skin Test and IGRA allowed for anti-mycobacterial therapy to be initiated. On follow up, the subretinal fluid and visual symptoms resolved.

**Conclusions:** Tubercular eye granulomas require a high degree of suspicion as they can mimic choroidal tumors. This case report demonstrates how careful anti-tubercular therapy can lead to excellent lesion regression once properly identified.

posterior uveitis, and endophthalmitis. When the lungs are involved, ocular involvement tends to primarily manifest as choroiditis [2].

Given it's the varied nature of presentation, clinical diagnosis is challenging. While the most common symptom of ocular tuberculosis is uveitis, focal granulomatous disease is common as well. Posterior segment tuberculomas typically present with associated uveitis, even though tuberculosis is only diagnosed in 0.1% [3] of uveitis patients. Herein, we present the case of a tuberculoma presenting as a potential neoplasm in the absence of vitritis, anterior segment inflammation, or miliary TB.

### Case Summary

A 45-year-old Filipino woman presented with blurred vision in her right eye two years after immigrating to the United States. Her best-corrected visual acuity was 20/50 in the right eye and 20/20 in the left. The patient's medical history was otherwise unremarkable. The left fundus was unexceptional. The right eye demonstrated an amelanotic choroidal mass extending from the disc margin to the temporal aspect of the fovea. Optical Coherence Tomography (OCT) revealed a dome-shaped choroidal mass accompanied by subretinal fluid, with a juxtafoveal adhesion (Figure 1).

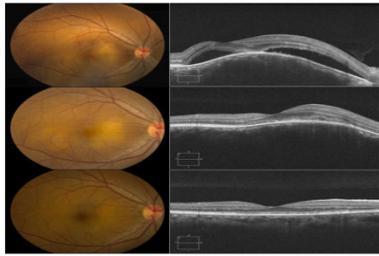
A quantiferon gold test was recommended and was found to be positive, confirming the diagnosis of choroidal tuberculoma.

The patient initiated anti-tubercular therapy with a 2-month induction regimen of isoniazid (INH), rifampin (RIF), pyrazinamide (PZA), and ethambutol (EMB) followed by a 4-month consolidation regimen of isoniazid and rifampin. Pyridoxine, a vitamin B6 supplemented the anti-tubercular therapy. Four months later, BCVA in the right eye had improved to 20/40 with notable reduction in the size of the macular tuberculoma. OCT demonstrated decreased subretinal fluid. At final follow-up, BCVA in the right had improved to 20/20. No evidence of subretinal fluid was found on OCT. The patient completed ATT therapy and followed up as needed.

**Keywords:** Granuloma; Tuberculosis; Lesion

### Introduction

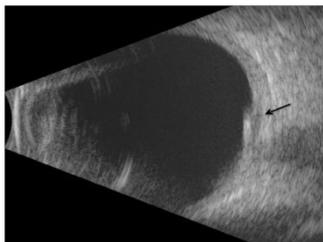
While tuberculosis is a common disease worldwide, the incidence of tuberculomas in the eye is rare in developed nations. In 2015, there were approximately 10,000 cases of tuberculosis (TB) in the United States. Of the global population infected by *Mycobacterium tuberculosis*, 75% of those are latent infections [1]. Tuberculosis primarily affects the lungs although extra-pulmonary TB may affect the liver, bone, meninges, and eye. Although rare, primary TB has been documented in the eye. As such, ocular TB is manifested as panophthalmitis, keratitis,



**Figure 1:** Tuberculoma Resolution with Anti-tubercule Treatment; [A] September. Initial presentation. Irregular contour of the retina with apparent juxtafoveal “contact point”; [B] October. Resolving subretinal fluid and retinal contour; [C] July Post ATT treatment. Subretinal fluid absent, flat contour.

B-scan ultrasonography demonstrated an acoustically hollow mass measuring  $5.8 \times 4.4 \times 1.4$  mm (Figure 2). Fundus autofluorescence (FAF) found no abnormalities. Multifocal pinpoint leakages with prominent late pooling were seen on fluorescein angiography.

The patient was referred for a chest computerized tomography (CT) scan, mammogram, and evaluations due to concern for a choroidal metastasis. In September, a comprehensive uveitic evaluation was repeated and supplemented by infectious disease panels. Burgdorferi IgG and IgM, HIV antibodies type I and II, treponemal antibodies, and a syphilis screening profile were all negative. One month later, mammography demonstrated unilateral subtle focal microcalcifications, but no dominates mass. A chest, abdominal and pelvic CT with contrast revealed no evidence of acute abnormality, and there did not appear to be definitive signs of tuberculosis. At this point, the patient had a +20 mm PPD test.



**Figure 2:** Ultrasound Study of Ocular Tuberculoma September, Initial presentation, Right eye (OD) demonstrating an acoustically hollow mass measuring  $5.8 \times 4.4 \times 1.4$ .

## Discussion

Active Tuberculosis is an uncommon disease in the United States, with an incidence of 3.0 per 100,000 persons in 2014 according to the CDC [4]. Rarely is ocular tuberculosis the presenting sign of a systemic tuberculosis infection isolated to the eye, and the lack of anterior segment inflammation or vitritis is still more rare.

Tuberculosis most commonly affects the choroid [5], presenting with uveitis or multi-focal choroiditis. Melanoma, metastatic disease, lymphoma and osteomas, need to be considered when tuberculomas are observed, especially in the absence of inflammation. This patient’s lesion had characteristics of both a metastasis and melanoma. Many of the granuloma characteristics matched that of an amelanotic melanoma: there was accompanying subretinal fluid (Figure 1), the lesion margin was adjacent to the optic nerve, the patient had symptoms of vision loss and the ultrasound was acoustically hollow (Figure 2). In contrast, choroidal metastases are typically yellow- or cream-colored, are acoustically solid and larger than 2.0 mm [6], and are often accompanied by subretinal fluid or intraretinal cysts. OCT patterns in ocular metastases show an irregular retinal pigment epithelium, with retinal thickening and gross undulation [7] while melanomas are accompanied by more shallow subretinal fluid and demonstrate a smooth curvature with shaggy photoreceptors [8].

While the cream-colored granuloma reported here was accompanied by fluid suggesting a metastasis, it had a smooth curvature on OCT and was acoustically hollow, which is more consistent with an amelanotic melanoma. Salman, et al. observed that many choroidal tuberculomas demonstrated a characteristic “contact point” on OCT, an adhesion between the retinal layers and retinal pigment epithelium, which may be attributable to the inflammatory adhesions overlying the neurosensory retina [9]. As other case reports [10], including the present one, have demonstrated, this observation by Salman, et al. may aid the clinician in the diagnosis of choroidal tuberculomas, and reflect the inflammatory process even among localized tuberculomas. Given that this patient’s lesion was subfoveal extending below the papillomacular bundle, a fine needle biopsy was felt to be unsafe. A negative chest x-ray and CT scan ruled out any systemic or primary infectious site, confirming the presence of TB isolated only within the eye.

WHO guidelines for tuberculosis infection were followed using INH, PZA, EMB, and RIF for 8 weeks, followed by INH and RIF for the following 18 weeks. Of note, ethambutol is well documented to produce dose-dependent optic neuritis, scotomas and edema, none of which were documented here. While our patient was prescribed EMB, some clinicians have chosen to replace EMB with a fluoroquinilone regimen to eliminate the risks accompanied by standard treatment. Pyridoxine, a vitamin B6 supplement, was prescribed as prophylaxis against peripheral neuropathy in using isoniazid. As seen on the OCT progression, the response was demonstrable in reducing the anatomical changes due to the tuberculoma.

## Conclusion

Tubercular eye granulomas require a high degree of suspicion as they can mimic choroidal tumors. This case report demonstrates how careful anti-tubercular therapy can lead to excellent lesion regression once properly identified.

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