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CASE REPORT **OPEN ACCESS**

MONOCULAR QUADRANTANOPIA CAUSED BY INTRAOCULAR METASTASIS MIMICKING OCULAR TUBERCULOSIS: A NEURO-OPHTHALMOLOGIC DIAGNOSTIC PITFALL

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ABSTRACT

Background: Monocular quadrantanopia is an uncommon visual field defect that is typically associated with prechiasmal lesions. In tuberculosis-endemic regions, intraocular lesions are frequently attributed to ocular tuberculosis. However, intraocular metastases may present with similar clinical and radiological characteristics, creating significant diagnostic challenges and potentially delaying appropriate management.
Case: A 34-year-old man presented with headache and visual field loss in the superior temporal quadrant of the right eye. Neurological examination revealed monocular superior temporal quadrantanopia without additional deficits, while funduscopy showed a superior intraocular lesion. Orbital MRI demonstrated a solid posterior choroidal lesion with mild contrast enhancement, and brain MRI revealed multiple intraaxial supratentorial and infratentorial lesions. Although ocular tuberculosis was initially diagnosed based on epidemiological context and imaging, subsequent investigations excluded tuberculosis. Further systemic evaluation identified a primary lung malignancy, confirming that the intraocular and intracranial lesions represented metastatic disease.
Discussion: Quadrantanopia usually results from retrochiasmal lesions, but focal intraocular pathology can mimic neurogenic visual field defects. Distinguishing ocular tuberculosis from intraocular metastasis is difficult because of overlapping clinical and imaging findings. Minimal perilesional edema, absent diffusion restriction, and poor response to antituberculosis therapy should raise suspicion for metastatic disease, underscoring key neuro-ophthalmologic diagnostic pitfalls in infection-endemic settings worldwide regions.
Conclusion: Intraocular metastasis should be considered in patients presenting with atypical monocular visual field defects, even when tuberculosis is strongly suspected. Awareness of this diagnostic pitfall is essential to avoid misdiagnosis and delays in appropriate treatment.

Keywords: diagnostic pitfall, intraocular metastasis, monocular quadrantanopia, neuro-ophthalmology, ocular tuberculosis

Introduction

Visual field defects are important clinical indicators that help localize lesions along the visual pathway, ranging from retinal pathology to post-chiasmal cerebral lesions. Precise interpretation of visual field patterns plays a crucial role in differentiating neuro-ophthalmologic disorders from primary ocular diseases.[1] Although quadrantanopic visual field defects are typically associated with retrochiasmal lesions involving the temporal or parietal lobes, certain retinal abnormalities may occasionally produce sectoral visual field defects that mimic neurologic patterns, potentially leading to diagnostic challenges.[2]

In regions where tuberculosis remains endemic, ocular tuberculosis represents an important cause of intraocular inflammation and uveitis.[3,19] Ocular tuberculosis can present with a wide spectrum of clinical manifestations, including choroidal granulomas, multifocal choroiditis, retinal vasculitis, and subretinal lesions.[3-6,22] Because direct microbiological confirmation is often difficult, the diagnosis of ocular tuberculosis is frequently presumptive and based on clinical findings combined with supportive systemic investigations.[4,20,21,25] This diagnostic uncertainty may increase the risk of misclassification when other ocular conditions present with similar inflammatory features.

Intraocular metastasis is the most common form of intraocular malignancy in adults and most frequently originates from breast and lung carcinomas.[10,11,16] Although choroidal metastasis is the most commonly reported presentation, metastatic lesions may also involve the retina or other intraocular structures.[8,9,12] The clinical appearance of intraocular metastasis may vary considerably and can resemble inflammatory or infectious ocular diseases, making early diagnosis challenging, particularly in patients without a previously known history of systemic malignancy.[8,11,15] This overlap in clinical presentation may create significant diagnostic dilemmas, especially in tuberculosis-endemic settings where inflammatory etiologies are often considered first.[17,19] Misinterpretation of retinal lesions as ocular tuberculosis may delay the identification of underlying malignancy and appropriate systemic evaluation.[12,13,15]

A rare case of monocular quadrantanopia caused by intraocular metastasis that initially mimicked ocular tuberculosis is presented. This case highlights the diagnostic challenges in differentiating inflammatory ocular diseases from metastatic lesions and emphasizes the importance of comprehensive ocular and systemic evaluation in patients presenting with atypical retinal findings.

Case Report

A 34-year-old male presented to the hospital with a primary complaint of visual field disturbance in the right eye. The patient reported partial visual obscuration in the right eye, described as a “curtain-like” defect in the superotemporal quadrant, present for approximately one month prior to admission. Symptom onset was gradual and progressive, with persistent visual impairment despite topical ocular treatment. Visual disturbance was monocular, affecting only the right eye, without diplopia, while the left eye remained normal, confirming the monocular nature of the defect.

In addition to visual complaints, the patient experienced headaches for approximately three months. The pain was described as pulsatile, diffuse with predominance in the right retro-orbital region, occurring almost daily, and unresponsive to oral analgesics. There were no associated projectile vomiting, seizures, altered consciousness, or other focal neurological deficits. The patient also reported a history of chronic cough beginning four months prior, initially with hemoptysis, as well as weight loss of about 8 kg. He had been diagnosed with pulmonary tuberculosis and started on antituberculosis therapy (ATT) since April 2025, although treatment was temporarily interrupted due to diagnostic uncertainty before being resumed. No history of hypertension, diabetes mellitus, cardiovascular disease, stroke, head trauma, or previous malignancy was reported.

On physical examination, the patient was alert and oriented with vital signs within normal limits. Neurological examination revealed intact higher cortical functions, motor and sensory systems, reflexes, and coordination, with no meningeal signs. Cranial nerve assessment revealed a right optic nerve deficit characterized by a superotemporal quadrant visual field defect in the right eye, with initial visual acuity in both eyes >3/60. The left eye visual field was normal. All other cranial nerves were unremarkable.

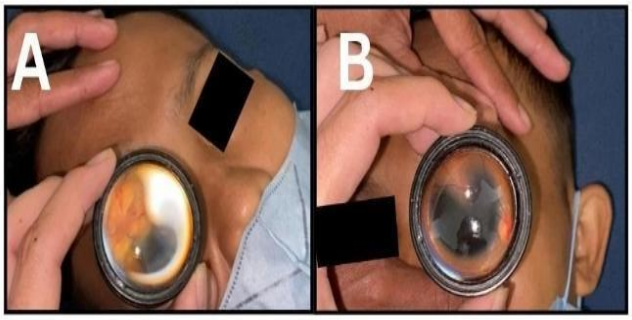

Figure 1. Funduscopic findings of the patient’s right eye (A) and left eye (B)

Funduscopic examination of the right eye (Figure 1A) revealed that the arteriovenous ratio and the optic disc (cranial nerve II) were difficult to evaluate, with a yellowish-brown lesion observed in the superior aspect. The overall impression of the right eye fundus was an intraocular lesion in the superior region. The location of this superior retinal lesion correlated with the patient’s complaint of a superior temporal quadrantic visual field defect. Funduscopic examination of the left eye (Figure 1B) was within normal limits.

Laboratory investigations revealed mild normocytic normochromic anemia (Hb 10.4 g/dL), while other hematological and biochemical parameters were normal. GeneXpert testing for

Mycobacterium tuberculosis on sputum and CSF was negative. CSF analysis was unremarkable.

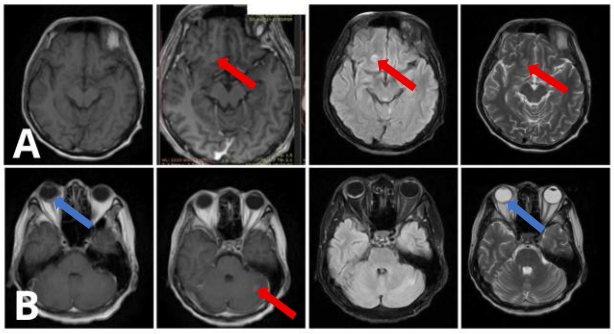

Figure 2. Contrast-enhanced brain MRI (A) and orbital MRI (B) images. Axial MRI demonstrating multiple metastatic lesions. Red arrows indicate intra-axial brain metastases, while the blue arrow points to a solid intraocular lesion in the posterior right retina consistent with retinal/choroidal metastasis. Minimal perilesional edema is noted

Axial MRI scans obtained in July demonstrated multiple intracranial and intraocular lesions in a patient presenting with monocular quadrantanopia. Orbital MRI with contrast (Figure 2B) revealed an irregularly bordered solid intraocular lesion in the posterior right globe, likely originating from the retina, demonstrating T1 hyperintensity, T2 hypointensity, no diffusion restriction, and mild post-contrast enhancement (blue arrows), without thickening of the optic nerve sheath or signs of elevated intracranial pressure. Brain MRI (Figure 2A) during the same period showed multiple intra-axial lesions in the right frontal lobe and left cerebellar hemisphere (red arrows), appearing iso- to hypointense on T1 post-contrast, hyperintense on T2/FLAIR, without diffusion restriction, and with mild post-contrast enhancement; there was minimal perilesional edema and no midline shift. These findings correlate with the patient's visual field defect.

Based on the history of tuberculosis and initial clinical and radiological findings, the patient was initially diagnosed with ocular tuberculosis with intracranial tuberculoma and treated with first-line ATT, along with supportive therapy including analgesics, systemic corticosteroids, and topical ocular therapy.

During the disease course, headache improved however, right eye visual impairment progressed, with visual acuity declining to no light perception (NLP). There was no significant improvement after antituberculosis therapy. Further evaluation did not support active tuberculosis. Subsequent systemic examination identified adenocarcinoma of the right lung. A repeat review of the MRI obtained in September 2025 demonstrated brain metastases characterized by multiple intra-axial lesions involving both the supratentorial and infratentorial compartments, specifically within the right frontal lobe, left cerebellar hemisphere, and left cerebellar vermis. In addition, also retinal metastasis was identified as a solid intraocular lesion located in the posterior aspect of the right retina.

Based on overall clinical findings and ancillary investigations, the patient was diagnosed with right-sided monocular blindness due to intraocular (retinal) metastasis with multiple intracranial metastases involving both the supratentorial and infratentorial compartments, specifically within the right frontal lobe, left cerebellar hemisphere, and left cerebellar vermis. Oncologic management was planned according to the patient's condition.

Discussion

Monocular visual field defects can arise from abnormalities at multiple levels of the visual pathway, including the retina, optic nerve, optic tract, or visual cortex. However, visual field defects that resemble quadrantanopia are commonly associated with retrochiasmal lesions such as temporal or parietal lobe pathology.[1] In rare circumstances, retinal lesions may produce localized field defects that mimic neurologic visual field patterns, potentially leading to diagnostic confusion.[2,17] In regions where tuberculosis remains endemic, ocular tuberculosis is frequently considered in patients presenting with posterior segment inflammation or granulomatous lesions.[3,19] Ocular tuberculosis represents a significant cause of infectious uveitis and may manifest with various clinical presentations including choroidal granulomas, multifocal choroiditis, retinal vasculitis, and subretinal lesions.[4-6,22] These overlapping manifestations often make the diagnosis challenging, as ocular tuberculosis is frequently presumptive and based on clinical suspicion combined with supportive systemic findings rather than direct microbiologic confirmation.[20,21,25]

The initial clinical presentation suggested ocular tuberculosis because of the inflammatory appearance of the retinal lesion and the epidemiological context of tuberculosis endemicity. However, further evaluation revealed that the underlying pathology was intraocular metastasis. Intraocular metastases are the most common intraocular malignancies in adults, most frequently originating from breast and lung carcinomas.[10,11,16] Although choroidal metastasis is the most commonly reported form, retinal metastasis and other atypical intraocular metastatic patterns have also been described.[8,9,12-15]

The clinical appearance of intraocular metastasis can vary widely and may mimic inflammatory, infectious, or vascular retinal disorders.[8,12,17] This variability contributes to frequent misdiagnosis during the early stages of disease, particularly in patients without a known history of systemic malignancy.[11-15] Multimodal imaging, including optical coherence tomography and fundus imaging, plays an important role in differentiating

inflammatory lesions from metastatic tumors.[1-8,11,12] In addition to the retinal lesion, the patient demonstrated a monocular quadrantanopia on visual field testing. While quadrantanopic defects are typically associated with post-chiasmal lesions, retinal abnormalities can occasionally produce sectoral visual field defects that resemble neurologic patterns.[2,17] Therefore, careful correlation between visual field testing and retinal imaging findings is essential to accurately localize the lesion.

This case highlights the importance of maintaining a broad differential diagnosis when evaluating ocular lesions that resemble infectious or inflammatory conditions. In tuberculosis-endemic settings, clinicians may be more inclined to diagnose ocular tuberculosis, which may contribute to diagnostic anchoring bias.[3,19-21] However, intraocular metastasis should remain an important differential diagnosis, especially in cases with atypical clinical features or inadequate response to initial therapy.[12,23] Early recognition of intraocular metastasis is clinically important because it may represent the first manifestation of an underlying systemic malignancy and has significant implications for patient management and prognosis.[10,11,16] A multidisciplinary approach involving ophthalmologists, neurologists, and oncologists is often required to ensure timely diagnosis and appropriate treatment.[17,18,24]

Conclusion

Retinal metastatic lesions may mimic both neuro-ophthalmologic visual field defects and inflammatory ocular diseases, including ocular tuberculosis. In tuberculosis-endemic settings, this overlap may lead to diagnostic anchoring bias and delay the recognition of underlying malignancy. Comprehensive ocular examination combined with multimodal imaging and systemic evaluation is therefore essential when visual field defects are accompanied by atypical retinal findings. Early identification of intraocular metastasis is critical because it may represent the first manifestation of systemic cancer and significantly influences patient prognosis and management.

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