Review Article

When the Choroid Speaks First: Choroidal Metastasis

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Abstract

Choroid is the most common intraocular metastatic site, presenting typically as yellow subretinal/choroidal lesions with rapid symptom onset and associated subretinal fluid. Breast and Lung primaries dominate etiologies, and ocular disease may occur even when systemic disease is under treatment. Multimodal imaging (fundus examination, ultrasonography, OCT ± angiography) guides diagnosis and response assessment. Management is individualized: systemic therapy is preferred when the disease is chemosensitive or treatment is being escalated; local therapies (external beam radiotherapy, plaque radiotherapy, photodynamic therapy, transpupillary thermotherapy, and intravitreal anti-VEGF) are considered for vision-threatening lesions, poor systemic control, or inadequate ocular response. In chemotherapy-treated cancers, a unilateral choroidal metastasis should prompt coordinated ocular-oncology care aimed at preserving vision while respecting systemic prognosis and treatment timelines. Early imaging-based diagnosis and timely local therapy can provide meaningful visual benefit.

Keywords: Choroid, Chemotherapy, Lung carcinoma, Breast carcinoma, Metastasis.

Introduction

Choroidal metastasis (CM) is the most frequent form of intraocular metastasis because the choroid offers rich vascularity and a favourable microenvironment for hematogenous spread.[1,2] While many patients have known systemic malignancy, ocular symptoms can be the first clue—or may appear during ongoing systemic therapy, including chemotherapy.[3,4] For an ophthalmologist, the key challenge is to recognize the lesion quickly, confirm it with appropriate imaging, and coordinate management in a way that protects vision without disrupting oncology care.[4,5]

Clinical Vignette

A patient with known lung carcinoma on chemotherapy presents with recent, unilateral blurring of vision and metamorphopsia. Dilated fundus exam shows a solitary, yellow choroidal lesion in the posterior pole with subretinal fluid (Figure 1), which strongly suggests unilateral CM, requiring systemic correlation and a shared ocular-oncology plan.[3,5]

Epidemiology and Primary Tumour Profile

Historical clinicopathologic work has established that ocular metastasis is not rare in advanced systemic cancer, and that the eye/orbit may be involved even when systemic disease is not widespread.[1,2] In large clinical series of uveal metastases, choroid remains the predominant uveal site, and many eyes have a single lesion, though multifocal disease also occurs.[3] Across studies and reviews, the most common primary tumours reported are breast and lung cancers (Table 1).[2,4,5]

Pathobiology (Why The Choroid?)

As proposed by Paget's "Seed and Soil" theory, the tumour cells ("Seed") can grow only in a suitable microenvironment ("Soil"). Metastasis to the choroid is largely hematogenous; the posterior ciliary circulation and the highly dedicated choroidal blood flow facilitate tumour embolization, making it a fertile "Seed-bed".[5] The resulting lesion typically grows and secondarily affects the RPE and neurosensory retina, producing subretinal fluid, photoreceptor dysfunction, and

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Figure 1: Fundus photograph showing unilateral choroidal metastasis in a patient of lung carcinoma on chemotherapy

rapid visual symptoms—often out of proportion to the apparent lesion size.[4,5]

Clinical Presentation

Common symptoms include painless decreased vision, metamorphopsia, photopsia, and scotoma.[4] On examination, classic features include:

Table 1: Suspected primary tumour loci for choroidal metastasis, in decreasing order of frequency

S. No.	*Primary tumour site*	*Occurrence (%)*
1.	Breast	40–53
2.	Lung	20–29
3.	GI Tract	4
4.	Prostate	2
5.	Kidney	2
6.	Cutaneous	2
7.	Rare (Salivary Glands, Thyroid, Testes, Female Genito-Urinary Tract, Neuro-Endocrine Tumours, Sarcomas)	~8

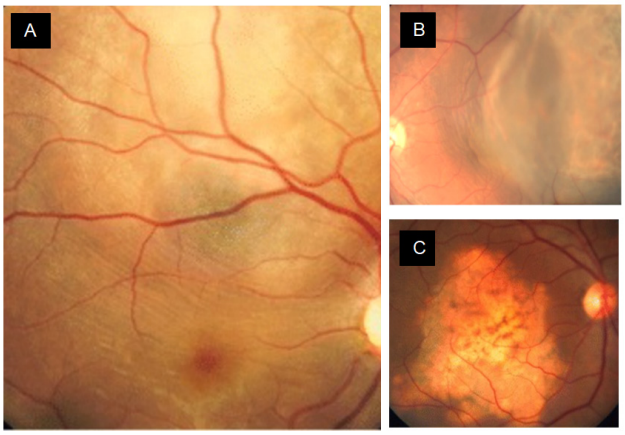

Figure 2: (A) Choroidal metastasis superotemporal to the disc, with serous detachment involving the macula (B) Choroidal metastasis involving the macula, extending beyond the equator with associated serous retinal detachment (C) Large choroidal mass with leopard skin pigmentation in the periphery

- Creamy-yellow, amelanotic choroidal mass (flat, plateau, or slightly dome-shaped)
- Subretinal fluid/serous retinal detachment (Figure 2A, B).

Possible RPE mottling, "leopard spotting," or overlying changes in chronic lesions (Figure 2C).[4,5]

Although not a rule, the colour appearance may give a clue towards the possible primary site of metastasis, as listed in Table 2.[5]

Multimodal imaging approach

Ultrasonography (B-scan/A-scan)

USG (A scans+ B Scans) constitute an important diagnostic tool for CM, which often show moderate-to-high internal reflectivity on A-scan and a plateau/lobulated configuration on B-scan (as opposed to the classically low-to-medium reflectivity of many melanomas).[3,5]

OCT (Essential for Diagnosis and Follow-up)

OCT is an essential investigation in our armamentarium for documentation at the time of presentation as well as during follow-up. It typically demonstrates subretinal fluid, RPE undulations, "lumpy-bumpy" contour, and outer retinal disruption.[5] It is extremely useful for monitoring response after systemic therapy or radiotherapy, because visual symptoms often correlate with fluid dynamics better than the bulk of the tumour.[5]

Angiography (FFA/ICGA) and OCTA

Angiographic patterns can support diagnosis and help rule out mimics; however, in many clinical settings, Fundus + Ultrasound + OCT is sufficient to justify a systemic correlation and treatment planning.[4,5]

Differential Diagnosis

- Amelanotic choroidal melanoma
- Choroidal haemangioma
- Posterior scleritis
- Choroidal granuloma (TB/sarcoid)
- AMD-related lesions (PED, fibrovascular complex)
- Lymphoma and other infiltrative disorders[4,5]

A short timeline, systemic cancer history, creamy-yellow lesion, and significant subretinal fluid favour metastasis.[4,5]

Table 2: The likely colour changes seen in Choroidal Metastasis from various primary tumour loci are listed in Table 1

S. No.	*Primary*	*Clinical feature*
1.	Breast	Creamy-white
2.	Lung	Pale yellow
3.	Carcinoid (including GI Tract)	Orange
4.	Prostate	Amelanotic
5.	Kidney	Orange
6.	Melanoma (including Cutaneous, Mucosal, or Uveal)	Dark brown
7.	Thyroid	Orange

Systemic Evaluation and Coordination with Oncology

Once CM is suspected, the ophthalmologist's role is to:

- Document ocular baseline (VA, Fundus photos, OCT, Ultrasound).[4,5]
- Communicate promptly with the oncologist ocular disease can reflect systemic progression, treatment resistance, or a need for regimen change.[4,6]
- Consider whether tissue confirmation is needed. In a patient with known lung carcinoma and classic ocular features, biopsy is often unnecessary; however, atypical lesions or unknown primary may require further work-up.[4,5]

Management Options

Treatment is multidisciplinary and is individualized based on visual threat, systemic status, expected survival, number/location of lesions, and response to systemic therapy.[4,7]

Systemic therapy

If the patient is already receiving chemotherapy (or targeted therapy/immunotherapy), ocular lesions may regress with systemic control.[5,7] Contemporary cancer cohorts highlight that CM may accompany advanced disease, yet ocular symptom-driven diagnosis is common, reinforcing the need for ophthalmology-oncology linkage.[6]

External beam radio therapy (EBRT)

EBRT remains a standard local option for vision-threatening lesions or inadequate response to systemic therapy, often achieving tumour regression and fluid resolution.[7,8] It is particularly useful for posterior pole lesions where rapid functional improvement is desired.

Plaque brachytherapy/focal radiotherapy

When a focal approach is preferred (single lesion, limited field), plaque therapy can be considered based on institutional experience and logistics.[7]

Intravitreal anti-VEGF (Adjunct)

Anti-VEGF can reduce exudation and sometimes tumour thickness in selected cases, especially when subretinal fluid is a major driver of visual loss.[9,11] It is commonly used as an adjunct to radiotherapy or when systemic therapy is ongoing, but ocular response is slow.[8,11]

PDT/TTT (Selected, Small, Accessible lesions)

Transpupillary thermotherapy (TTT) and photodynamic therapy (PDT) have been described in select cases and small series, generally as focal options for smaller lesions or when other modalities are not feasible.[12] The choice depends on lesion size, location, and available expertise.

Prognosis

Visual prognosis depends on macular involvement, the amount/duration of subretinal fluid, and response to therapy.[4,5] Systemic prognosis is primarily driven by the underlying malignancy stage and treatment responsiveness; CM generally indicates advanced disease, although modern systemic therapies can meaningfully extend survival in selected subsets.[6,7]

Conclusion

CM in a patient with carcinoma even while on chemotherapy should be treated as a time-sensitive, vision-threatening event. A pragmatic approach uses Fundus examination, OCT, and Ultrasonography to support diagnosis, rapidly informs oncology colleagues, and selects between systemic therapy optimization and local control (often EBRT ± intravitreal anti-VEGF) based on ocular urgency and systemic realities.[3,8] With coordinated care, many patients gain stabilisation of vision and symptomatic relief, aligning eye care with overall cancer management goals.[4,7]

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