Scholars Journal of Medical Case Reports
Abbreviated Key Title: Sch J Med Case Rep
ISSN 2347-9507 (Print) | ISSN 2347-6559 (Online)
Journal homepage: https://saspublishers.com

OPEN ACCESS

Radiology

Case Report: Atypical Choroidal Melanoma in A Young Adult with Retrobulbar Extension and Palpebral Infiltration

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DOI: https://doi.org/10.36347/sjmcr.2026.v14i11.076 | **Received:** 23.09.2026 | **Accepted:** 11.11.2026 | **Published:** 20.11.2026

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Abstract | **Case Report**

Primary choroidal melanoma is the most common primary intraocular malignancy in adults; however, its manifestation in a 20-year-old patient is extremely rare. We present the case of a 20-year-old male presenting with acute visual acuity loss. Orbital MRI demonstrated an intraocular tissue mass within the left eye exhibiting spontaneous T1 hyperintensity and T2 hypointensity characteristic of the melanic effect, accompanied by marked diffusion restriction. The singularity of this case lies in its early locoregional aggressiveness, involving infiltration of the optic nerve, intraconal fat, lateral rectus muscle, and inferior eyelid.

Keywords: Choroidal melanoma, Young adult, Melanic effect, ADC restriction, Orbital infiltration, Case Report.

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1. INTRODUCTION & DIAGNOSTIC RARITY

Choroidal melanoma accounts for approximately 85% of ocular melanomas. Its peak incidence occurs in the 6th decade of life. Presentation in individuals under 30 years old represents less than 2% of all cases. Diagnosis is primarily based on funduscopic examination and B-scan ultrasonography; however, cross-sectional magnetic resonance imaging (MRI) is mandatory whenever extra-scleral extension, retrobulbar involvement, or atypical features are encountered.

2. CLINICAL CASE PRESENTATION (OBSERVATION)

A 20-year-old male presented to the emergency ophthalmology unit with a rapid decline in left ocular vision, describing blurred vision and a central scotoma. There was no history of ocular trauma or excessive ultraviolet exposure.

- **Ophthalmological Examination:** Fundus examination revealed a pigmented, elevated choroidal mass associated with localized exudative retinal detachment. Visual acuity was reduced to counting fingers. Examination of the right eye was completely normal.
- **Physical Examination:** Grade I left proptosis was present. Dermatological survey revealed no suspicious cutaneous melanocytic lesions.

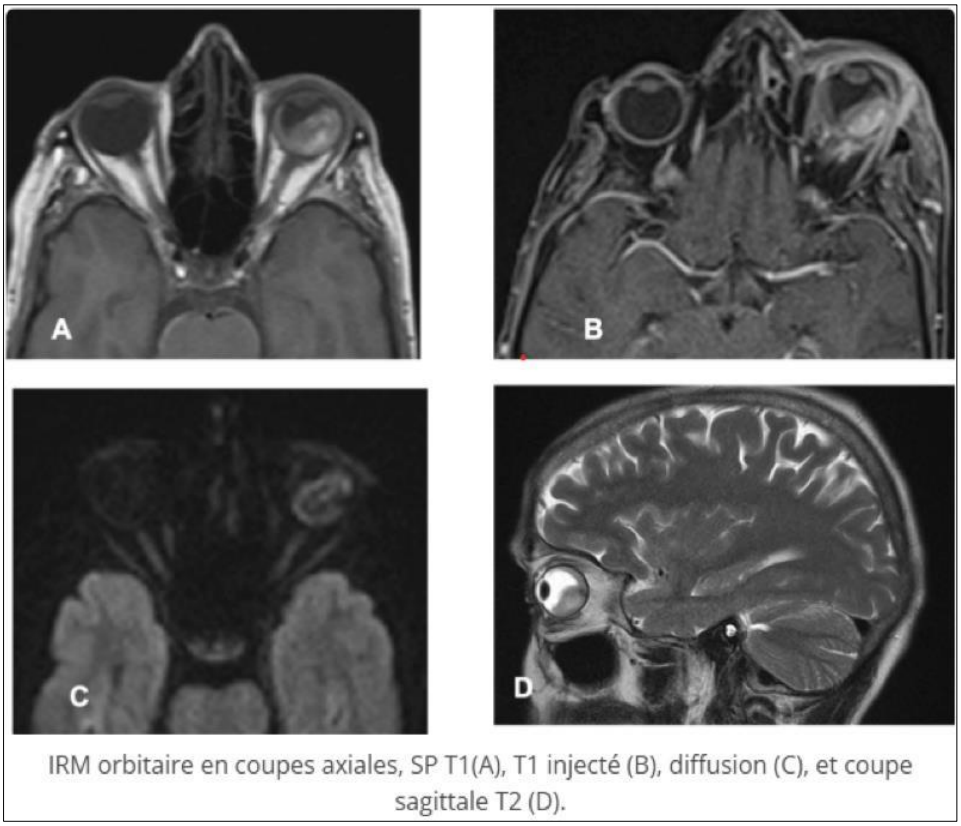
3. Detailed Semiological Characterization on 3T MRI

High-resolution orbital MRI demonstrated:

- **Intraocular Tumor Morphology:** Heterogeneous intraocular soft-tissue mass originating from the posterior segment of the left choroid.
- **Specific Melanic Signal Intensity:** Spontaneous hyperintensity on T1-weighted sequences (attributable to stable free radicals in melanin shortening T1 relaxation time) and distinct hypointensity on T2-weighted sequences.
- **Diffusion-Weighted Imaging Characteristics:** Marked hyperintensity on high b-value diffusion sequences (b=1000) with a corresponding drop on ADC mapping, confirming high tumor cellular density.
- **Contrast Enhancement:** Early and heterogeneous enhancement following intravenous gadolinium injection.
- **Extra-Scleral & Locoregional Extension:** Posterior scleral breach with extension into intraconal fat, direct infiltration of the left optic nerve sheath, involvement of the lateral rectus muscle belly, and anterior extension to the soft tissues of the inferior eyelid.

4. Differential Diagnosis

- **Choroidal Hemangioma:** Benign, hypervascular lesion typically demonstrating T2 hyperintensity and intense early arterial enhancement without diffusion restriction.
- **Choroidal Metastasis:** Commonly multiple or bilateral in patients with known primary malignancies (breast, lung), typically showing T1 iso/hypointensity and T2 hyperintensity.
- **Subretinal Hematoma / Hemorrhagic Choroidal Detachment:** Signal evolution varies with hemoglobin degradation stage, lacking a solid mass restricting diffusion.



IRM orbitaire en coupes axiales, SP T1(A), T1 injecté (B), diffusion (C), et coupe sagittale T2 (D).

5. DISCUSSION & ONCOLOGICAL MANAGEMENT

This observation highlights the potential occurrence of choroidal melanoma in young adults and underscores the role of high-resolution MRI. Given the extensive extraocular extension (optic nerve, eyelid, intraconal space), conservative modalities (brachytherapy or proton beam therapy) were unviable. Management required radical surgical resection (enucleation/exenteration) alongside systemic staging (chest-abdomen-pelvis CT and PET-CT) focused on hepatic and pulmonary metastasis surveillance.

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