Differentiation of Choroidal Effusion from Melanoma

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Choroidal effusion is a rare condition in which serous transudation accumulates in the suprachoroidal layer within the eye causing engorgement and thickening of the ciliary body and choroid, ultimately leading to peripheral ciliochoroidal detachment and serous detachment of the retina. The transudation is the result of decreased venous/transscleral outflow or increased inflow through incompetent choroidal vascular tissue, especially in a hypotonous eye. The most common setting for the latter is following glaucoma surgery. Other causes of effusion include moderate and severe uveitis in which resultant chronic hypotony and/or choroidal inflammation plays a role. On the other hand, patients with high hyperopia or nanophthalmos demonstrate increased scleral thickening that can cause vortex vein compression and decreased scleral protein permeability, which is thought to lead to choroidal fluid retention. A rare cause of choroidal effusion is a uveal tumor, particularly large or necrotic melanoma or metastasis.

Choroidal effusion has clinical features similar to those of choroidal melanoma, including dome-shaped elevation, brown color, and associated serous retinal detachment. Choroidal effusion is 1 of many pseudomelanomas that can cause diagnostic confusion. In a review of 1739 cases of pseudomelanoma of the eye by Shields et al, uveal effusion syndrome represented 1% of all cases. Findings on clinical examination, ultrasound, magnetic resonance...
imaging, and transillumination can aid in distinguishing these clinically similar conditions.\(^3\)

We present a case of choroidal effusion that was referred to us with a diagnosis of choroidal melanoma.

**CASE REPORT**

A 76-year-old man was referred to the Ocular Oncology Service at Wills Eye Hospital for management of uveal melanoma in the right eye (OD). The patient had an ocular history of open-angle glaucoma. Five months prior to presentation, he underwent implantation of a glaucoma shunt device OD. Systemic findings included type 2 diabetes mellitus and systemic hypertension, both controlled with oral medication.

Ophthalmic examination revealed a visual acuity of light perception OD and 20/60 in the left eye (OS). Intraocular pressure (IOP) was 10 mm Hg in each eye. Each eye was pseudophakic with a well-centered posterior chamber intraocular lens. Evaluation revealed a large, inferotemporal, dome-shaped, pigmented choroidal mass OD measuring 14 x 12 mm in base and 6.6 mm in thickness. There was no subretinal fluid, hemorrhage, or lipid exudation (Figure 1A). B-scan ultrasonography showed a 6.6 mm completely hollow mass with no intrinsic vascular pulsations, consistent with choroidal detachment (Figure 1B). Transillumination disclosed normal transmission of light without shadow, suggestive of a condition other than melanoma. The optic disc was pale, with enlarged cup-to-disc ratio of 0.9 and narrowing of the retinal vessels, consistent with hypertensive changes in each eye.

Fundus autofluorescence and ultra-widefield infrared reflectance imaging showed no evidence of hyperautofluorescence or hyperreflectance, respectively (Figure 1C-D). Fluorescein angiography (FA) of the mass demonstrated normal retinal vasculature with mild hyperfluorescence of the peripheral fundus anterior to the tumor with no sign of intrinsic vascular pulsation within the mass (Figure 1E). OCT confirmed an abrupt elevation of the sensory retina and the RPE, suggestive of effusion rather than melanoma (Figure 1F). Based on these clinical findings in combination with imaging features, a diagnosis of choroidal effusion was rendered. A period of observation was suggested for this relatively ill person with diabetes mellitus, with a plan to use corticosteroids systemically or locally or, if needed, scleral window surgery.

**DISCUSSION**

Choroidal effusion is commonly misdiagnosed as choroidal melanoma.\(^1\) Especially difficult is the differentiation of ring melanomas from circumferential uveal effusion, leading to mistakenly enucleated eyes.\(^1\) In a study of 1739 patients that can be used to differentiate it from choroidal melanoma.

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common pseudomelanomas included choroidal nevus (49%), peripheral exudative hemorrhagic chorioretinopathy (8%), congenital hypertrophy of the RPE (6%), hemorrhagic detachment of the retina or RPE (5%), circumscribed choroidal hemangioma (5%), and age-related macular degeneration (4%).\(^3\) Choroidal effusion represented only 1% of cases.

A choroidal effusion has distinctive features on both ophthalmic examination and imaging studies that can be used to differentiate it from choroidal melanoma.\(^1-3\) On external examination, uveal effusion shows a lack of prominent sentinel vessels that are fairly common with ciliary body melanoma of similar size. On binocular indirect ophthalmoscopy, a choroidal effusion is mostly lightly pigmented and typically has a remarkably smooth surface, often with buckling of the choroid appearing like a sulcus between 2 mounds. Generally, melanoma does not show this feature. Sometimes the elevated effusion is semitranslucent, and one can see partially through the tissue with ophthalmoscopy. On transillumination, choroidal effusion transmits light without blockage, whereas uveal melanoma blocks light and casts a shadow, even if it is nonpigmented.

Transillumination is an important and reliable differentiating feature. On ultrasonography, choroidal effusion appears completely hollow without vascular pulsation, as opposed to a moderately echolucent mass with visible vascular pulsations, as is commonly seen with large melanoma. In our case, B-scan ultrasonography was completely hollow, suggestive of choroidal effusion without hemorrhage.

On FA, choroidal effusion usually is hypofluorescent without vessels, unlike melanoma. FA is not very helpful for tumors of this size. When doubt exists, magnetic resonance imaging can be helpful, and it will typically show choroidal effusion with little to no enhancement and melanoma with prominent enhancement. If a high level of suspicion for melanoma remains, fine needle aspiration biopsy can resolve the issue.

Choroidal effusion can occur secondary to underlying uveal melanoma. Palamar et al described a 78-year-old woman with necrotic choroidal melanoma who presented with painful scleritis and choroidal effusion.\(^4\) The tumor was
identified and treated with iodine-125 plaque radiotherapy, and the scleritis and choroidal effusion completely resolved by 2 months.

Choroidal effusion can regress without treatment, but often medical or surgical intervention is necessary, depending on the pathogenesis of the effusion. Corticosteroid, administered either orally or intravitreally, can be a primary treatment; surgical intervention can frequently be avoided. Surgical drainage of choroidal effusion with sclerectomy and vortex vein decompression can be reserved for eyes with structural deficits such as severe hyperopia or nanophthalmos.  

In summary, we have described a case of choroidal effusion presenting as a pseudomelanoma. Careful clinical examination and ancillary testing provided clues to the true underlying pathology.

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