Abstract:
Because choroidal melanoma may arise from and closely resemble a choroidal nevus, it is important for optometrists to be knowledgeable regarding the characteristics of each. This case report outlines the characteristics that define each entity.

I. Case History
Patient demographics: 27 year old white female
Chief Complaint: evaluation of a choroidal nevus in the left eye after being referred by an optometrist three months earlier, no additional ocular complaints or concerns
Ocular history: choroidal nevus diagnosed four years prior without subsequent follow up
Medical history and medications: polycystic ovarian syndrome being treated with spironolactone, cabergoline, and oral birth control containing ethinyl estradiol and levonorgestrel

II. Pertinent Findings
Best corrected acuities were 20/20 in the right eye and 20/25 in the left with a moderate myopic prescription. The extraocular motilities, pupillary reactions and confrontation fields were normal. Intraocular pressures were 20 mmHg and 19 mmHg in the right and left eyes respectively, as measured by NCT.

Biomicroscopy revealed a normal ocular adnexa and anterior chamber in each eye. An engorged blood vessel was noted on the inferior bulbar conjunctiva of the left eye. Dilated ophthalmoscopy revealed a healthy optic nerve with a cup-to-disc ratio of 0.1 round and a healthy macula with even pigmentation and a foveal reflex in each eye. The retinal vasculature appeared normal in both eyes. The peripheral retina in the right eye was intact with even pigmentation, while examination of the left eye revealed flat, well-defined pigmented lesions near the posterior pole. Inferiorly, an elevated, darkly pigmented mass associated with lipofuscin was noted, though the inferior view was obscured by overlying subretinal fluid and an exudative retinal detachment.

A B-scan clearly demonstrated the overlying retinal detachment and measured the height of the mass to be 6.31 millimeters and the diameter to be 12.10 millimeters. The anterior borders of the mass were more highly reflective than the internal tissue. No signs of extrascleral extension were noted. A fluorescein angiogram showed that the flat lesions blocked the view of the choroidal vasculature and demonstrated no hyperfluorescence during the course of the angiogram. The elevated lesion showed areas of diffuse hyperfluorescence during early and late stages of the angiography, though image clarity was decreased by the retinal detachment.

III. Differential Diagnoses
1. Choroidal Melanoma
2. Choroidal Nevus

IV. Diagnosis and discussion
The patient was diagnosed with a medium-sized choroidal melanoma with a sentinel vessel, subretinal fluid and overlying retinal detachment in the left eye.

Choroidal melanoma (CM) is a malignant tumor of the melanocytic cells of the choroid. It shows no predilection for gender and is most often seen in patients between 50 and 60 years old. Choroidal melanoma is most commonly found in light skinned individuals of European descent and...
rarely occurs in races with darker pigmentation. Approximately six in one million Caucasians develop choroidal melanoma. The development of melanoma can be associated with certain predisposing factors, including family history of uveal melanoma, an existing choroidal nevus, congenital ocular melanocytosis, dysplastic nevus syndrome or xeroderma pigmentosum. Choroidal melanoma typically arises from a precursory lesion such as a nevus, but rarely may arise de novo.

A typical CM appears as an elevated, dome-shaped, darkly pigmented lesion. The tumor can take on a mushroom shape if it breaks through Bruch's membrane and invades the retina; this occurs in approximately 20% of cases. The tumor may exhibit areas of orange lipofuscin, which may be confused with drusen. Choroidal melanoma may be associated with subretinal fluid and a non-regenerative retinal detachment. Additionally, sentinel vessels may be found on the nearby conjunctiva. A B-scan ultrasound can be used to evaluate the thickness of the tumor and check for signs of scleral invasion or transscleral extension. Furthermore, B-scan of a melanoma demonstrates a characteristic appearance called ultrasonographic hollowness; a lesion that is acoustically dark with B-scan is likely CM. A B-scan can also be used to measure the maximum linear dimension of the tumor, but digital photography has recently been shown to be more accurate. Fluorescein angiography (FA) usually reveals a hypofluorescent lesion in the early stages. During later stages of the FA, interlesional blood vessels may briefly be visible before ultimately being obscured by hyperfluorescence.

Because CM may arise from and closely resemble a choroidal nevus, it is important to note the defining characteristics of each. Like choroidal melanoma, a choroidal nevus (CN) is a lesion of the melanocytic cells of the choroid and may be associated with subretinal fluid or lipofuscin. Unlike melanoma, however, a nevus is benign. A typical nevus presents as a flat, evenly pigmented gray to brown lesion with clearly defined margins at the level of the choroid. The average CN is five millimeters or less in diameter and one millimeter or less in thickness. While the size should remain relatively stable, a nevus can benignly grow to sizes that are commonly considered diagnostic of choroidal melanoma. To be considered benign, growth should not exceed half a millimeter over the course of many years. Normal changes in the appearance of a nevus over time may include a loss of homogeneity as it develops retinal pigment epithelium clumping or drusen. A halo, or depigmentation surrounding the lesion, may also form and is suggestive of stability and chronicity. With FA, the typical choroidal nevus will appear hypofluorescent except in areas of RPE clumping or drusen.

A study in 2000 established lesion characteristics predictive of nevus growth, including thickness greater than 2 millimeters, a margin within 3 millimeters of the optic disc, a symptomatic patient and presence of subretinal fluid or lipofuscin. Later studies found that ultrasonographic hollowness by B-scan, lack of a surrounding halo or no overlying drusen increased the risk for lesion growth. A study in 2009 amended an old mnemonic to include the newly confirmed risk factors: “To Find Small Ocular Melanoma Using Helpful Hints Daily”. Using this mnemonic, T stands for thickness greater than 2 millimeters, F for subretinal fluid, S for visual symptoms, O for orange pigment (lipofuscin), M for margins near the optic disc, UH for ultrasonographic hollowness, H for lack of a surrounding halo and D for lack of associated drusen. Choroidal nevi without any of these characteristics have a three percent chance of growth to CM at five years, while lesions with one factor have a 38 percent risk of growth. Those with two or more factors show growth greater than 50 percent of the time. It is imperative that optometrists be prepared to evaluate patients for these factors and manage them accordingly.

V. Management and Treatment

The classical treatment of choroidal melanoma is enucleation of the affected eye, but a globe-sparing form of radiation called brachytherapy is becoming more common. Brachytherapy can still lead to vision loss secondary to radiation retinopathy, which occurs bilaterally and currently has no successful long-term treatments. Additional complications of brachytherapy, including neovascular glaucoma or tumor recurrence, may nonetheless eventually require enucleation. In fact, 34 percent of
radiation-treated eyes undergo enucleation within ten years. Overall, these two treatments have shown to be equally effective and demonstrate no significant difference in mortality rates. After discussing treatment options with her oncologist, this patient chose enucleation over brachytherapy.

VI. Conclusion
Differential diagnosis between a choroidal nevus and melanoma may be difficult, but must be accomplished promptly and accurately. Failure to do so increases the patient's risk of metastasis and mortality. Optometrists must be familiar with and able to identify the lesion characteristics that indicate a high probability of melanoma and they must know when a referral for further evaluation is appropriate. Furthermore, optometrists must be able to provide the patient with basic education regarding choroidal melanoma and the importance of proper follow up. In cases of definite diagnosis, the optometrist should discuss any basic questions the patient may have, including available treatment options and prognosis. Lastly, an optometrist facing a suspicious lesion must take the time to make sure the patient understands the serious nature of this potentially fatal cancer, as a lack of understanding could cost the patient his or her life.

References: