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Choroidal Nevus

A choroidal nevus (plural: *nevi)* is typically a darkly pigmented lesion found in the back of the eye. It is similar to a freckle or mole found on the skin and arises from the pigment-containing cells in the *choroid,* the layer of the eye just under the white outer wall *(sclera).* (Figures 1 and 2).

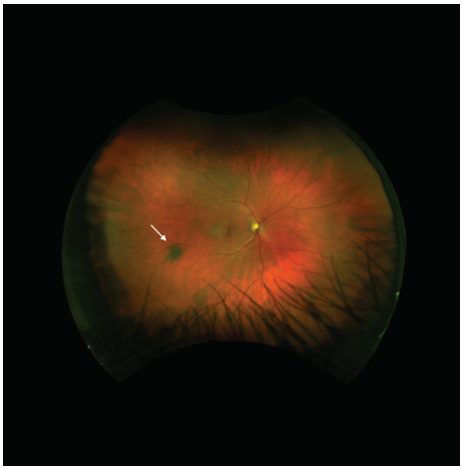

Figure 1
A small flat choroidal nevus (arrow).

Figure 2
Another small benign-appearing choroidal nevus (arrow).

Some nevi can have areas that appear nonpigmented or *amelanotic,* and others are mostly amelanotic and appear yellowish rather than brown (Figure 3). Nevi can also develop overlying deposits known as *drusen*, as well as degenerative changes of the overlying **retinal pigment epithelium (RPE)** seen as mottled pigmentation or fibrosis (Figure 4).

The estimated prevalence of choroidal nevi in the United States has been reported to be 5% with significant variation by race: 5.6% in White individuals, 2.7% in Hispanic populations, 0.6% in Black individuals. The estimated prevalence of choroidal nevi in Asian populations has been reported at 1.8% to 2.9%.

Figure 3
An "amelanotic" choroidal nevus (arrow).

Figure 4
A slightly raised choroidal nevus with drusen (yellow dots) on surface.

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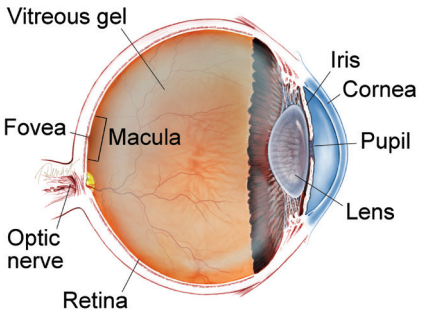
SYMPTOMS

Most commonly, a choroidal nevus does not cause any symptoms and is found on routine eye exam. However, sometimes nevi under the center of the retina (the *macula*) can cause blurred vision. When a nevus causes degeneration or dysfunction of the overlying RPE, fluid may accumulate under the retina or abnormal blood vessels *(choroidal* **neovascularization***)* may develop and bleed or leak fluid.

WHAT IS THE RETINA?



THE RETINA is a thin layer of light-sensitive nerve tissue that lines the back of the eye (or vitreous) cavity. When light enters the eye, it passes through the iris to the retina where images are focused and converted to electrical impulses that are carried by the optic nerve to the brain resulting in sight.

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Diagnostic Testing: Many nevi can be identified by their appearance alone on examination of the retina. This includes a brown to slate gray coloration with distinct but mildly blurred margins where the color of the nevus blends into the normal retina.

Most nevi are flat or have minimal elevation of 2 millimeters or less. Some eyes have more than one nevus, and nevi may also be found in the fellow eye. Retinal photographs of the nevus are typically performed to allow them to be monitored for any signs of growth on subsequent office visits.

Additional diagnostic testing of larger or suspicious nevi includes **optical coherence tomography (OCT)**, ultrasound to measure the size and thickness of elevated nevi, and **fluorescein angiography**. Less frequently, imaging techniques including indocyanine green angiography, **optical coherence tomography angiography,** and **fundus autofluorescence photography** are utilized to assist in diagnosis.

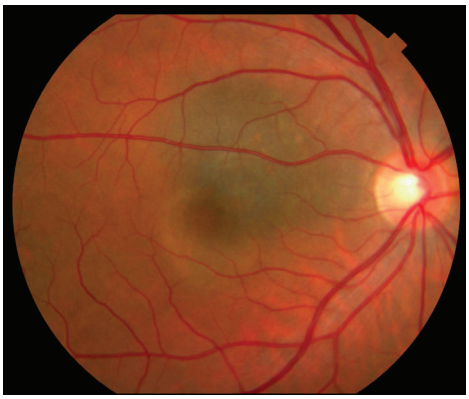

Figure 5
A choroidal nevus associated with a small blister of subretinal fluid. Although presence of subretinal fluid is a risk factor for growth, this nevus has remained stable without transforming into melanoma.

Treatment and prognosis: Most choroidal nevi remain *benign* (non-cancerous) and have no symptoms. However, occasionally, a nevus can transform into uveal melanoma. The rate of choroidal nevi transforming into melanoma is estimated at approximately 1 in 9000 per year. When a nevus shows significant growth over a relatively short period of time (such as 1 year), it is presumed to have become *malignant* (cancerous).

Clinical features of a nevus associated with growth include thickness greater than 2 mm, subretinal fluid, symptoms (such as decreased vision, flashes of light, or floaters), orange pigment, and location close to the optic disc (Figure 5).

Nevi without any clinical risk features may be examined annually. However, those with one or more risk factors should be examined approximately every 4 to 6 months. Evaluation of these lesions would include a dilated retinal examination and possibly ultrasonography, fundus photography, and OCT.

Most nevi do not require any specific treatment. However, choroidal neovascularization associated with nevi can be treated with **intravitreal injection** of **anti-VEGF agents** (Figure 6). A nevus that has demonstrated growth or has suspicious features should be evaluated by an *ocular oncologist* (an ophthalmologist specializing in treating eye tumors), and if determined to be a melanoma, would most commonly be treated with radiation (see Intraocular Melanoma Fact Sheet) (Figure 7).

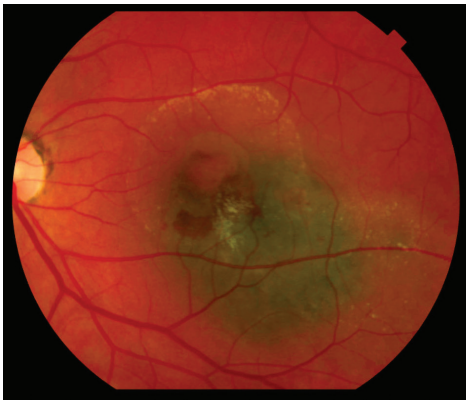

Figure 6
A choroidal nevus with associated fluid and blood due to the development of abnormal vessels under the retina (choroidal neovascularization). This complication can cause vision loss but is not a sign of transformation into melanoma.

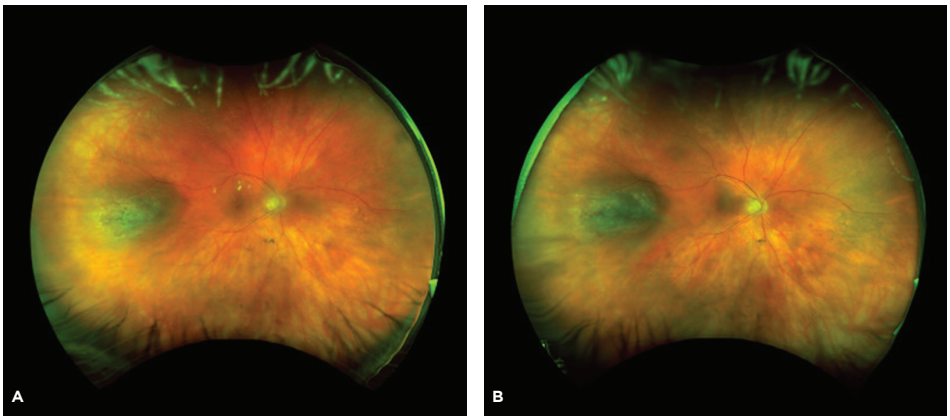

Figure 7
(A) A choroidal nevus with mild elevation. (B) The same lesion showed increase in thickness 2 years later and was diagnosed as a melanoma.

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Clinical Terms *(appearing green within fact sheet text)*

Anti-VEGF medications: Elevated vascular endothelial growth factor (VEGF), a soluble factor that can be produced in eyes with poor circulation can lead to swelling and the growth of abnormal new blood vessels in the eye. Leaky blood vessels cause swelling such as macular edema and are prone to bleeding, both of which cause decreased vision. Anti-VEGF drugs which inactivate VEGF have revolutionized treatment allowing retina specialists to reduce new blood vessel growth and swelling with periodic injections of anti-VEGF drugs including bevacizumab (Avastin®), ranibizumab (Lucentis®), and aflibercept (Eylea®).

Fluorescein angiography (FA): An imaging technique where a yellow dye called *sodium fluorescein* is injected into a vein in the arm, allowing a special camera to record circulation in the retina and *choroid* in the back of the eye. This test can be very useful in diagnosing a number of retinal disorders.

Fundus photography: Involves the use of specialized cameras equipped with lenses that capture images of the back of the eye where the retina, macula, vitreous, choroid and optic nerve are located.

Indocyanine green angiography (ICGA): A diagnostic procedure that uses a green dye to illuminate blood flow in the choroid, which is a layer of blood vessels located between the white of the eye (sclera) and the retina that supplies nutrients to the inner eye.

Intravitreal injections: Treatment where a medication is injected into the vitreous cavity in the middle of the eye.

Neovascularization: Excessive growth of new blood vessels on abnormal tissue as a result of oxygen deprivation that can cause vision loss.

Optical coherence tomography (OCT): A non-invasive imaging technique that uses light to create a 3-dimensional image of your eye for physician evaluation.

Optical coherence tomography angiography (OCTA): A noninvasive imaging technique that uses light to image the blood vessels in different layers of the retina and choroid.

Retinal pigment epithelium (RPE): A pigmented layer of the retina lying just outside the retinal photoreceptors that transmit light to the brain.

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