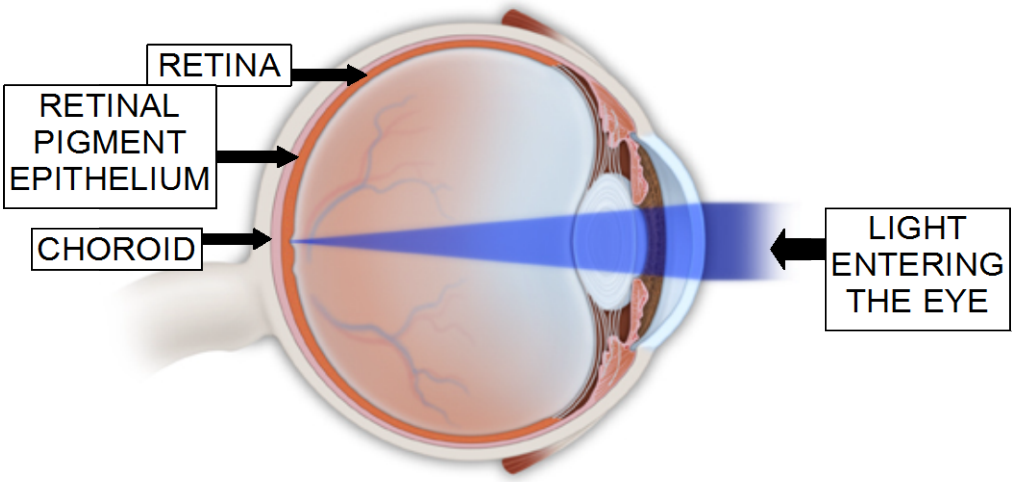
What You Should Know About Idiopathic Choroidal Neovascularization

By David J. Browning, MD, PhD

The light entering the human eye through the pupil is focused on the back lining of the eye, a layer of nerve tissue called the retina. There, photoreceptor cells turn the incident light into nerve signals, a process called phototransduction. The nerve signals travel to the brain via the optic nerve. Beneath the retina is a layer of cells called the retinal pigment epithelium, which is necessary for recycling a form of vitamin A, which is crucial to the chemistry of phototransduction. Beneath the retinal pigment epithelium is a layer of red blood vessels called the choroid, which provides oxygen and nutrients to the retinal pigment epithelium and the photoreceptors. Figure 1 shows these layers and structures of the eye for your orientation and clearer understanding.

Figure 1. Anatomy of the Eye



Normally, these layers of the eye are distinct. However, sometimes the boundaries break down for unknown reasons, and sprouts of blood vessels from the choroid break through the retinal pigment epithelium and grow beneath the photoreceptors. These fragile blood vessel sprouts can leak fluid and bleed, causing loss of vision. This constellation of findings is called an Idiopathic Choroidal Neovascular Membrane. Idiopathic simply means that the cause is unknown.

Similar blood vessel growths can occur in conditions better understood, such as after scarring from trauma, from previous infections,

and from extreme nearsightedness. By definition, all these causes are excluded when one refers to Idiopathic Choroidal Neovascularization.

Who Is Affected By Choroidal Neovascularization?

Patients with idiopathic choroidal neovascularization can range in age from 10-55 years. The average age is approximately 40. Patients may develop idiopathic choroidal neovascularization after age 55, but follow-up frequently reveals signs of development of age-related macular degeneration, a common cause of choroidal neovascularization in the older population. For this reason, by convention, the term idiopathic choroidal neovascularization is usually applied to people younger than 55 years. Females outnumber males approximately 2:1. In Japan, the disease is a more common cause of choroidal neovascularization than in the United States, which may point to an ethnic or to a geographical, environmental influence.

What Are The Signs And Symptoms?

Affected patients have blurred and distorted vision. Straight lines, such as doorjambs, may look crooked. Blur spots on a printed page may swallow up letters in a word or words in a sentence. When the ophthalmologist examines the eye, fluid, fatty yellow deposits in the retina, or flecks of blood may be seen. Figures 2 and 3 show a normal retina and a retina with idiopathic choroidal neovascularization, respectively.

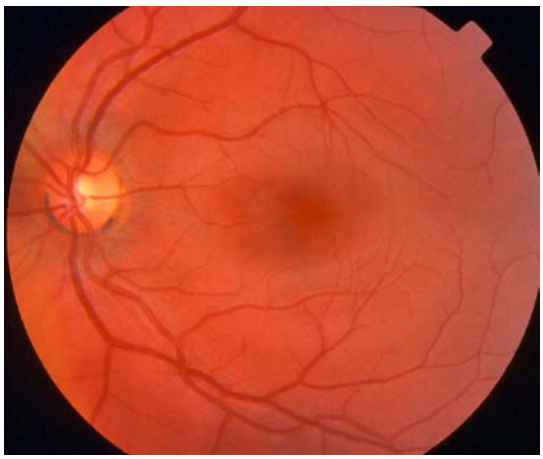


Figure 2. Normal Retina

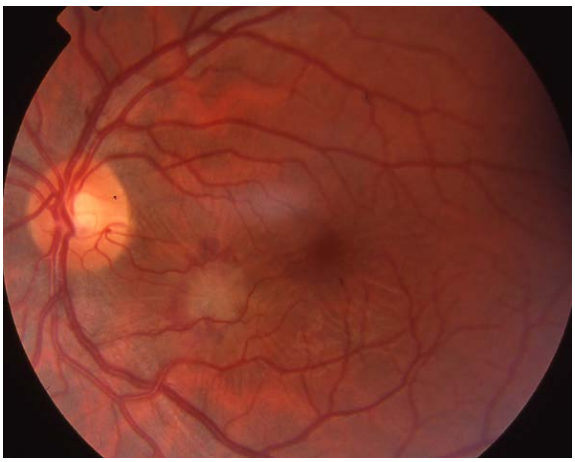


Figure 3. Idiopathic Choroidal Neovascularization

Diagnostic Work-Up

It is routine for patients with suspected idiopathic choroidal neovascularization to have a study performed called a fluorescein angiography, in which approximately 2 tablespoons of food coloring are injected into a vein of the arm and followed by sequential photographs of the retina. The sequential images capture the passage of the dye through the normal and abnormal vessels, aiding the ophthalmologist in detecting a possible cause for the blood vessels and in choosing between the recommendation of laser treatment or observation. Figure 4 shows a frame from a fluorescein angiogram highlighting the abnormal membrane.

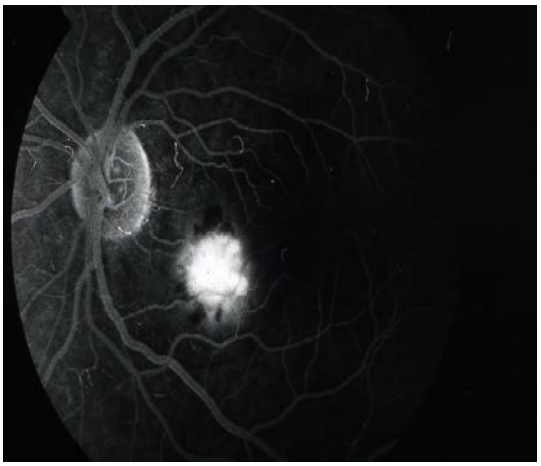


Figure 4. Fluorescein Angiogram of Idiopathic Choroidal Neovascular Membrane

Treatment

If the patient has progressively declining vision, and the blood vessel is not growing directly under the center of the macula, thermal laser treatment may be offered to stop the course. The blood vessel is cauterized by this procedure. A blind spot corresponding to the site of laser is a side effect of this form of treatment. If the blood vessel is growing under the center, or close to the center, then an injection of a drug called bevacizumab (brand name Avastin) may be given into the vitreous.(1;2) The eye is anesthetized with drops followed by Q-tips soaked in zylocaine. A tiny needle is injected through the wall of the eye close to the junction of the cornea and the sclera. This must often be repeated at intervals of one to three months until the abnormal blood vessel becomes dormant. This type of treatment does not leave a blind spot like thermal laser, but the vision rarely returns to normal either. There is usually some residual distortion. Rarely a type of “cold laser” treatment is used. In such cases, a

drug called Visudyne is injected by vein and then activated by a laser to form a clot within the abnormal blood vessel. No cauterization occurs. Surgery to remove the membranes is possible, however it is much more invasive and rarely used. If the patient does not have progressively declining vision, the best option may be to do nothing and to simply check the patient over time. Many such cases of idiopathic choroidal neovascular membranes regress spontaneously.

Once you have read this brochure, if you would like to find more in-depth information about ocular histoplasmosis, an excellent resource is the National Library of Medicine website section called PubMed. It can be accessed via any search engine, or directly at this link, http://www.ncbi.nlm.nih.gov/entrez/query.fcgi. It includes an extensive database of reliable articles published in peer-reviewed medical journals from all over the world.

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Reference List

(1) Toju R, Iida T, Sekiryu T, et al. Near infrared autofluorescence in patients with idiopathic submacular choroidal neovascularization. Am J Ophthalmol 2012; 153:314-319.

(2) Zhang H, Liu ZL, Sun P, Gu F. Intravitreal bevacizumab for treatment of subfoveal idiopathic choroidal neovascularization: results of a 1-year prospective trial. Am J Ophthalmol 2012; 153:300-306.