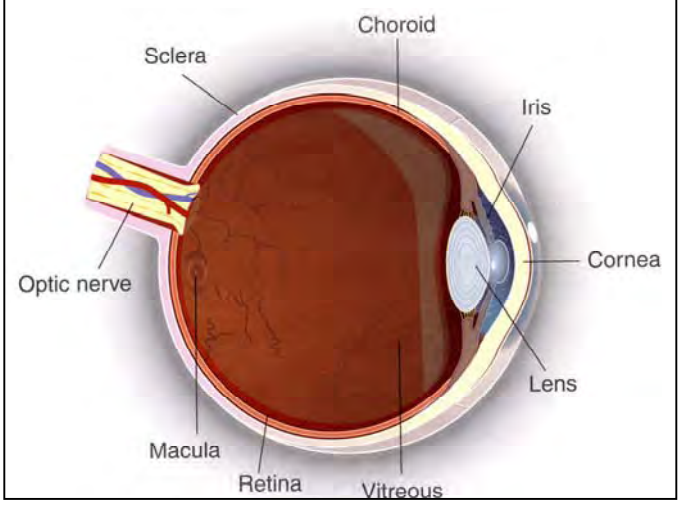
What You Should Know About Optic Neuritis

By David J. Browning, MD, PhD

Optic neuritis is an inflammatory disease of the outer lining of the optic nerve, which connects the retina to the brain. Figure 1 illustrates the relevant anatomy. Light travels through the pupil, the lens, and the clear vitreous gel to reach the retina, the neural lining of the back of the eye. There it is converted into a nerve signal, which travels through the optic nerve to the brain. The optic nerve is composed of over one million nerve fibers, each lined by a white, fatty sheath called myelin that speeds transmission of the nerve signals to the brain. In optic neuritis, the body's immune system attacks the myelin sheath, impairing the conduction of visual information to the brain, and often causing discomfort with movement of the eye. The typical patient is 18 – 45 years old and complains of sudden loss of vision often associated with eye pain made worse with eye motion. Females are more commonly affected than males.

Figure 1. Anatomy of the Human Eye



What is the Relationship of Optic Neuritis to Multiple Sclerosis?

Multiple sclerosis is an immune mediated neurological disease that can affect many functions of the brain. In fact, to reach the diagnosis of multiple sclerosis, multiple neurologic functions must be impaired over time. Optic neuritis can be the first sign of multiple sclerosis, or it can be one of several neurological impairments occurring later in the course of established disease. If optic neuritis develops as a first neurologic impairment, there is a 30% risk of subsequent multiple sclerosis over the next five years. Certain factors present or absent at the time of the optic neuritis help sharpen the prognosis for later multiple sclerosis. Lack of eye pain, having a swollen optic disk on eye examination, and milder visual loss with optic neuritis are signs associated with lower risk of developing multiple sclerosis over 5 years. Having more than 3 lesions on MRI brain scan at the time of optic neuritis is associated with increased risk of developing multiple sclerosis over the next 5 years. Because of the prognostic value of MRI scanning, all patients with optic neuritis undergo MRI brain scans. If more than 3 typical lesions are present, then a neurologist may place the affected patient on weekly injections of interferon beta 1a (Avonex) to reduce the chance of developing multiple sclerosis. Other treatments exist as well, such as interferon beta 1b (Betaseron) or glatiramer (Copaxone). Even patients without MRI lesions can later develop multiple sclerosis, and all patients need regular follow-up. The choice of therapy and follow-up schedule are made by the neurologist based on

the particular details of the patient's situation. The general principle to understand is that ophthalmologists frequently work with neurologists in co-managing patients with optic neuritis.

Laboratory Work-up

Optic neuritis may or may not produce swelling of the optic disk, the junction of the optic nerve and the retina. Figure 2 shows a normal optic nerve. Figure 3 shows a case of optic neuritis with optic disk swelling. If the optic disk is not swollen, and other signs of optic neuritis are typical, laboratory tests may not be needed. This form of optic neuritis is called retrobulbar optic neuritis. If the optic disk is swollen, if there is leakage of fluid and fatty material (lipid) into the retina, and if inflammatory signs elsewhere in the eyes are prominent, then blood tests may be useful to determine if certain infections or other autoimmune diseases are associated with the optic neuritis. Knowledge of these underlying conditions is important because it might affect treatment. For example, antibiotics and steroid usage might be indicated or not depending on the laboratory results. Cat scratch disease, Lyme disease, syphilis, toxoplasmosis, and herpes zoster are but a few of the infections that can lead to optic neuritis, and these and other conditions may be detected with the help of blood tests.

Figure 2. Normal Retina

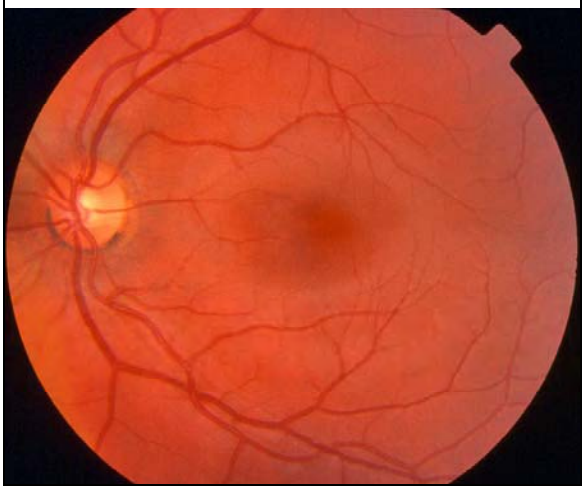
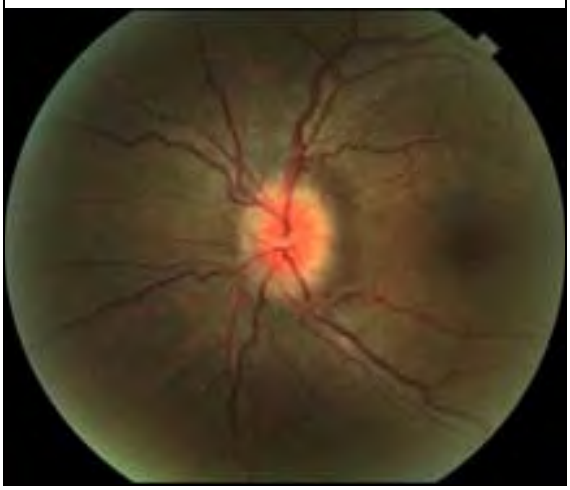


Figure 3. Optic Disk Swelling



Treatment

Therapy of optic neuritis depends on the underlying diagnosis. In typical retrobulbar optic neuritis, if MRI lesions are present, the use of intravenous followed by oral steroids for 2 weeks reduces the rate of development of multiple sclerosis in the first 2 years, speeds recovery of visual loss, but does not change the ultimate amount of recovered visual acuity and visual field. Taking oral steroids alone may be harmful, as it has been associated with more frequent recurrences of optic neuritis. Because steroid therapy causes certain side effects, the decision to use steroids is made based on the specific characteristics of each case. For optic neuritis associated with other

diseases, the treatment is directed at the underlying cause and may involve antibiotics or more prolonged use of steroids.

Optic Neuritis in Children

Childhood optic neuritis has different characteristics from disease in adults. Optic disk swelling is more common in children, and return of vision is more complete on average. The rate of progression to multiple sclerosis is lower. If an infection precedes an episode of optic neuritis, the rate of progression to multiple sclerosis is further reduced. If both eyes develop optic neuritis simultaneously, the rate of progression to multiple sclerosis increases.

Final Comments

Since optic neuritis begins as an eye disease, but can progress to a systemic condition, it needs to be managed by more than the ophthalmologist. MRI scans involve radiologists, and if MRI lesions are present, neurologists are needed for expert care. All patients with optic neuritis need regular follow-up, since recurrences are possible. Variations in course are common depending on particularities of each case. Many cases, but not all, have favorable visual outcomes.

After you read this brochure, we encourage you to browse our website. If you have a focused question for which you cannot find an answer, we welcome you to ask Dr. Browning at: contact@retinareference.com. Also, an excellent resource for medical literature is Pubmed, on the National Library of Medicine website, accessible via a link on our website, or directly at www.pubmed.com.