

# Optic Neuritis

## Treatments and drugs

Optic neuritis usually gets better on its own. In some cases, steroid medications are used to treat optic neuritis, because they help reduce inflammation in the optic nerve. If you receive steroids, your treatment may involve:

- *Intravenous steroids.* You will likely receive steroid therapy by vein (intravenously) for a few days. Intravenous steroid therapy may accelerate vision recovery, but it does not appear to affect the ultimate extent to which you will recover your vision.
- *Oral steroids.* After intravenous steroid therapy, you may take an oral steroid called prednisone for about two weeks. Oral steroids usually follow an intravenous course of steroids, because using oral steroids alone to treat optic neuritis has been associated with an increased risk of recurrence.

In instances in which steroid therapy has failed and severe vision loss persists, a treatment called plasma exchange therapy may help some people recover their vision.

### *Preventing multiple sclerosis*

If you have optic neuritis and you are at high risk of developing multiple sclerosis, you may benefit from drugs that help prevent multiple sclerosis. These drugs include interferon beta-1a (Avonex, Rebif) and interferon beta-1b (Betaseron). These injectable drugs are used to prevent or delay the development of multiple sclerosis in people with optic neuritis who have two or more brain lesions evident on MRI scans.

### *Prognosis*

The prognosis following optic neuritis is generally good. Most people regain close to normal vision within six months after an episode of optic neuritis.

People with multiple sclerosis or neuromyelitis optica may experience recurrent attacks of optic neuritis sometime after they have recovered from the initial episode. Other people without any underlying conditions also may have recurrent optic neuritis. These people have a better prognosis for their vision in the long term than do people with neuromyelitis optica.

### *Tests and diagnosis*

You are likely to see an ophthalmologist for a definitive diagnosis. He will likely check your vision and your perception of different colors. The ophthalmologist may also perform the following eye tests:

- *Ophthalmoscopy.* During this examination, your doctor shines a bright light into your eye and examines the structures at the back of your eye. This eye test evaluates the optic disk, which is the area where the optic nerve enters the retina in your eye. The optic disk becomes swollen in about one-third of people with optic neuritis.
- *Pupillary light reaction test.* Your doctor may swing a flashlight in front of your eyes to see how your pupils respond when they are exposed to bright light. Pupils affected by optic neuritis do not constrict as much as healthy eyes do when stimulated by light.

Other tests to diagnose optic neuritis may include:

- *Visually evoked potentials test.* To perform this test, you sit before a screen on which an alternating checkerboard pattern is displayed. Attached to your head are wires with small patches to record your brain's responses to the visuals. This type of test is able to detect the slowing of electrical conduction resulting from damaged areas on nerves.

- *Magnetic resonance imaging (MRI) scans.* An MRI scan is a test that uses a magnetic field and pulses of radio wave energy to make pictures of your body. During an MRI to check for optic neuritis, you may be injected with a contrast agent to make the optic nerve and other parts of your brain more visible on the pictures. An MRI is also important to determine whether there are areas in your brain where the myelin has been damaged (lesions), which indicate a high risk of developing multiple sclerosis. An MRI also can help rule out tumors or other conditions that can mimic optic neuritis.
- *Blood tests.* A new blood test called an NMO-IgG blood test checks for antibodies for neuromyelitis optica. People with severe optic neuritis may undergo this test to determine whether they are likely to develop neuromyelitis optica. An erythrocyte sedimentation rate (ESR) blood test is used to detect inflammation occurring in your body. This test may help determine whether optic neuritis is caused by inflamed cranial arteries (cranial arteritis).

### *Complications*

Complications arising from optic neuritis may include:

- *Optic nerve damage.* Most people have some permanent optic nerve damage following an episode of optic neuritis, but they may not experience any symptoms.
- *Decreased visual acuity.* Vision loss may persist after optic neuritis has improved. Up to 10 percent of people with a history of optic neuritis have some degree of long-term vision loss.
- *Side effects of treatment.* Steroid medications used to treat optic neuritis subdue your immune system, which causes your body to become more susceptible to infections. Long-term use of steroids may also cause thinning of your bones (osteoporosis).

### *Risk factors*

Risk factors for optic neuritis arising from autoimmune disorders include:

- *Age.* Optic neuritis most often affects young adults aged 20 to 45 years. The average age of onset is about 30 years. Older people or children also can develop optic neuritis, but it occurs less frequently in these groups.
- *Sex.* Women are twice as likely to develop optic neuritis.
- *Race.* Optic neuritis occurs more in whites.
- *Genetic mutations.* Certain genetic mutations may increase your risk of developing optic neuritis or multiple sclerosis.

### *Causes*

The complex process of sight begins when light reflecting off an object enters the clear outer portion of your eyeball (cornea) and passes through the lens, which brings the light into focus on the nerve cell layer of your eye (retina). When light hits the retina, electrical impulses are generated and carried along the optic nerve to your brain, where the impulses are converted into visual information.

The optic nerve is a bundle of nerve fibers covered by a fatty insulated material called myelin, which helps electrical impulses travel quickly along the nerve. Optic neuritis in young adults is believed to most commonly develop when the immune system attacks myelin covering the optic nerve, resulting in inflammation and damage. It is not certain what causes your immune system to attack its own tissue. The following two autoimmune conditions are often associated with optic neuritis:

- *Multiple sclerosis.* Multiple sclerosis is a disease in which your autoimmune system attacks the myelin sheath covering nerve fibers in your brain and spinal cord. In one long-term study of people with optic neuritis, the risk of developing multiple sclerosis following one episode of optic neuritis was 50 percent after 15 years. The evidence of brain lesions on MRI images increased the risk. People with optic neuritis and abnormal MRI

scans were three times more likely to develop multiple sclerosis compared with those who had normal MRI scans.

- *Neuromyelitis optica.* Another autoimmune condition that may cause optic neuritis is neuromyelitis optica. In this condition, inflammation occurs in the optic nerve and spinal cord. Neuromyelitis optica is not the same as multiple sclerosis, because neuromyelitis optica does not cause damage to the nerves in the brain as often as multiple sclerosis does. Optic neuritis arising from neuromyelitis optica tends to be more severe than optic neuritis associated with multiple sclerosis.

Other causes of optic neuritis include:

- *Infections.* Bacterial infections, including Lyme disease, cat scratch fever and syphilis, or viruses such as HIV, hepatitis B and herpes can cause optic neuritis. In addition, some infections may lead to a type of optic neuritis, called neuroretinitis, which is not believed to be associated with the risk of developing multiple sclerosis.
- *Cranial arteritis.* This is an inflammation of the lining of the arteries in your head. Inflamed cranial arteries can block blood flow to your eyes and brain, which may cause permanent vision loss or a stroke. Cranial arteritis is most likely to occur in adults ages 70 to 80.
- *Diabetes.* Diabetes is a condition in which your body cannot make or properly use insulin, a hormone that regulates the amount of sugar in your blood. People with diabetes are at an increased risk of developing disorders of the optic nerve.
- *Drugs.* Some drugs have been associated with the development of optic neuritis. One of these drugs is ethambutol (Myambutol), which is used to treat tuberculosis.

Radiation therapy to your head is an uncommon cause of optic neuritis. In addition, any process resulting in inflammation or compression of the optic nerve, including tumors, nutritional deficiencies or toxins, can interfere with the nerve's ability to conduct

electrical impulses. This may cause vision loss and other symptoms that may mimic optic neuritis.

### *Symptoms*

Optic neuritis usually affects one eye, although it may occur in both eyes simultaneously. Optic neuritis symptoms may include:

- *Pain.* Most people who develop optic neuritis experience eye pain that is worsened by eye movement. Pain associated with optic neuritis usually peaks within one week and then goes away within several days.
- *Visual loss.* The extent of visual loss associated with optic neuritis varies. Some people experience severe difficulty seeing, while others might not notice any changes in their vision. Vision loss, should it occur, usually develops over the course of a day to two weeks and may be worsened by heat or exercise. Vision loss is usually temporary, but it may be permanent in some cases.
- *Loss of color vision.* Optic neuritis often affects the perception of colors. You may notice that the colors of objects, particularly red ones, temporarily appear ‘washed out’ or less vivid than normal.

The signs and symptoms of optic neuritis may be indications of an autoimmune disorder called multiple sclerosis. In 15 to 20 percent of people who eventually develop multiple sclerosis, optic neuritis is their first symptom.

Eye conditions can be serious, because some problems can cause you to lose your vision. Contact your doctor under the following conditions:

- *New symptoms.* Anytime you have eye pain or notice a change in your vision, make an appointment to see your doctor.

- *Worsening symptoms.* If you have optic neuritis and experience new eye pain, worsening vision or symptoms that do not improve with treatment, see your doctor.
- *Unusual symptoms.* If you have unusual symptoms, including numbness or weakness in one or more limbs, which may be an indication of a neurological disorder, see your doctor.

### *Definition*

Optic neuritis is an inflammation of the optic nerve, the bundle of nerve fibers in your eye that transmits visual information to your brain. Pain and temporary vision loss are common symptoms of optic neuritis.

Optic neuritis usually develops due to an autoimmune disorder that may be triggered by a viral infection. In some people, signs and symptoms of optic neuritis may be an indication of multiple sclerosis, a condition resulting in inflammation and damage to nerves in your brain and spinal cord.

Most people who experience a single episode of optic neuritis eventually recover their vision. Treatment with steroid medications may speed up vision recovery.

### *Definition of Optic Neuritis*

Optic neuritis and pupillitis are broad terms denoting inflammation, degeneration, or demyelination of the optic nerve due to a wide variety of diseases.

### *Description of Optic Neuritis*

The optic nerve may be affected by inflammation in any part of its course. The clinical term optic neuritis implies involvement of any part of the optic nerve by an inflammatory disease process.

Pupilledema is the most common differential diagnostic problem. In Pupilledema, there is often greater elevation of the optic nerve head,

nearly normal visual acuity, normal pupillary response to light, associated intracranial pressure, and an intact visual field defect except for an enlarged blind spot.

### *Causes and Risk Factors of Optic Neuritis*

The most frequent cause of retrobulbar neuritis is multiple sclerosis. When the disk is affected, the term pupillitis is used.

The ophthalmoscopic appearance of the disk in pupillitis and Pupilledema may be similar, but pupillitis often causes significant vision loss, and usually a faint vitreous haze caused by cellular and fluid exudation from the inflamed area, with some opacification of the inner surface of the disk.

### *Symptoms of Optic Neuritis*

Typically, nerve conductivity is impaired, with loss of visual acuity and visual field changes. When the retrobulbar portion of the nerve is affected, ophthalmoscopic examination initially reveals no significant alteration, and the disease is called retrobulbar neuritis.

### *Diagnosis of Optic Neuritis*

This problem is best diagnosed by means of an eye exam performed by an ophthalmologist.

### *Treatment of Optic Neuritis*

Ideally, treatment is directed toward the underlying cause. Systemic corticosteroids are helpful in retrobulbar neuritis by shortening the course of the disease. Their value in influencing the final outcome is under investigation.

In pupillitis with minimal evidence of collagen vascular disease or other signs of multiple sclerosis, pulsed intravenous methylprednisone therapy continued over days to weeks may be indicated as the visual loss is often more extensive.

Optic neuritis in demyelinating disease has a favorable prognosis without treatment for an individual attack, but over a period of years



significant visual loss is the rule since permanent damage results from recurrent attacks.