

Anterior Ischemic Optic Neuropathy (AION)

This is the most common cause of sudden decreased vision in patients older than 50 years.

Anatomy:

Eyes just plays important part in transmitting the visual signals to brain and we cant see the world with eyes only. We see with part of our brain that is capable of interpreting visual signals sent back from the eyes. This is located at the back of our head (the occipital lobes).

Information is transmitted from the eyes to the brain via the optic nerves. These nerves are composed of the long tube extensions (axons) of cells (ganglion cells) located within the inner lining of the eye (the retina) that exit the back of the eye at the optic disc. Each of the optic nerves receives blood supply from branches of the ophthalmic artery within each eye socket. The optic disc has a unique blood supply (the posterior ciliary arteries).

Physiology:

Loss of blood supply within the posterior ciliary arteries deprives the optic nerve tissue of oxygen and results in damage to part or all of the optic nerve. This is a small “stroke” in the optic nerve but unlike other strokes is unassociated with weakness, numbness, or loss of speech, nor is there an increased risk of a classic stroke later. It is also not associated with pain. Patients may become aware of decreased vision or difficulty seeing above or below the center of gaze. Loss of the blood supply results in swelling of the optic disc, often associated with hemorrhages. The hemorrhages and swelling will go away leading to the development of a pale disc (optic atrophy). As the swelling resolves, some of the axons will be permanently lost. We don't completely understand the cause of the loss of blood supply to the optic nerve. We do know that this happens more often in patients who are born with small optic discs. These episodes may occur when there is a sudden drop in blood pressure (following an operation or associated with blood loss after an accident). Patients who smoke, or who have diabetes or high blood pressure, may be at higher risk for AION.

A small group of patients with AION may have inflammation involving the arteries. This is most common in very elderly patients who may also have symptoms of pain when chewing or scalp tenderness. These patients often have a prior history of episodes of visual loss and recovery, as well as weight loss, fever and pain in their shoulders and hips. In young patients a history of migraine might play a role.

Symptoms:

Most patients with AION notice a sudden disturbance in their vision. This may be recognized when the patient covers their opposite eye and becomes aware that the vision is blurred, dim, or dark; often above or below where they are looking. Uncommonly central vision remains normal. There should not be discomfort, redness, tearing, discharge or other change in the appearance of the eye. Patients with tenderness in their temples or pain when chewing may have a different cause of decreased vision and must bring these symptoms to the doctor's attention.

Signs:

Patients with AION have outwardly normal appearing eyes. Because of the decreased optic nerve function, however, the pupils may not react as well when light is directed into the affected eye.

Diagnosis:

Often the optic disc of the other eye may appear small. This seems to be a risk factor that has been present from birth. In the case of typical AION no additional diagnostic imaging studies (CT or MRI scan) may be necessary. Blood pressure should be checked and if there are any unusual features other blood studies may be done. In elderly patients a blood test (sedimentation rate or c-reactive protein) can help assess the risk of giant cell arteritis.

Prognosis:

Most patients with ischemic optic neuropathy will have relatively stable vision. A recent study suggests that 40% of patients may expect to have some improvement in central vision.

Unfortunately, much of the visual field defect (difficulty seeing above or below) will not improve. It may, however, become less noticeable with time, especially if the other eye is normal. A very small number of patients can have worsening of vision. This may be caused by sudden drop in blood pressure and anything that decreases oxygen carrying capacity (such as smoking).

In patients who have had AION there is a possibility of this happening in the other eye.

Fortunately, this is not common (approximately 20% chance). Probably the best news is that it is very rare for a second episode of ischemic optic neuropathy to occur in the same eye.

Treatment:

Unfortunately, at this time there is no proven treatment for patients with AION. It has been suggested that aspirin (regular size or baby aspirin once a day) may decrease the chance of an episode in the opposite eye. It is important that the blood pressure be followed by your doctor (elevated pressure increases risk). On the other hand it is important that there be no sudden drop in blood pressure (overly aggressive treatment). This could cause worsening of vision or even involvement of the other eye. Smoking should be stopped.