

Branch retinal vein occlusions:

What is a branch retinal vein occlusion?

The retina is a thin tissue in the back of your eye that consists of nerve cells. These nerve cells capture images that you see, much like the film of a camera. These nerve cells transmit the image via the optic nerve to your brain allowing you to see. The center portion of the retina is called the macula and this where our best vision comes from. Our ability to do things like driving and reading comes from the function of the nerve cells in our macula.

The retina is nourished by tiny blood vessels that bring blood flow into the eye (arteries) and out of the eye (veins). The arteries travel very close to the veins and occasionally an artery will compress the underlying vein, making it difficult for blood to exit the eye. This blockage, called a branch retinal vein occlusion (BRVO), causes increased back-pressure in the vein, causing it to expand and leak fluid and blood. The main central vein exiting the eye can also become blocked as it travels through the optic nerve, and this is called central retinal vein occlusion (CRVO). Retinal vein occlusions are eye conditions commonly seen by retina specialists. They are second only to diabetic retinopathy as a cause for vision loss due to retinal blood vessel diseases. While there are similarities in the causes and clinical nature of branch retinal vein occlusions (BRVO) and central retinal vein occlusions (CRVO), there are significant differences in their management and prognosis.

What are the causes of a branch retinal vein occlusion?

Branch retinal vein occlusions are the most common form of retinal blood vessel blockages. Males and females are, in general, affected equally. Most occlusions occur after the age of 50, although younger patients are sometimes seen with this disorder. The highest incidence is in individuals in their 60s and 70s. The major risk factor for a branch retinal vein occlusion is atherosclerosis or hardening of the blood vessels. Specifically, the artery gets hardened and thickened and compresses the underlying vein. Therefore, the risk factors for this disorder are similar to those for other blood vessel blockages elsewhere in the body, such as stroke and coronary artery disease. Specifically, aging, high blood pressure, diabetes, elevated blood lipids, and smoking are all risk factors. Having glaucoma has also been identified as a risk factor in some studies. There are other much less common conditions which may put a patient at risk for developing a vein occlusion, including blood clotting abnormalities such as elevated blood homocystine levels, antiphospholipid antibodies, hyper viscosity of the blood and genetic diseases that make a person at an increased risk for blood clotting. Occasionally, inflammatory and infectious conditions which cause blood vessel inflammation such as sarcoidosis, Lyme disease, lupus, and syphilis are also risk factors for vein occlusion. In general, unless there is a reason to suspect these much less common conditions, (such as a young age, or history of other systemic problems suggestive of clotting disorders, inflammation, or

infection), extensive laboratory testing is usually not necessary. Most patients are asked to see their internist for a medical evaluation.

What are the symptoms of a branch retinal vein occlusion and how is it diagnosed?

The symptoms of a branch retinal vein occlusion depend on which branch of the vein is involved. Most often the affected branch involves the center of the retina (macula), causing a reduction in vision and usually a loss of a portion of the field of vision. Usually, this will affect either the top half or bottom half of the field of vision along with the central vision. Occasionally, a branch retinal vein occlusion will affect a vein draining a portion of the retina away from the center vision and will not cause any symptoms and will only be detected on examination. Sometimes patients may be completely asymptomatic when the other eye sees normally, and not realize that there has been decreased vision in one eye. For this reason, it is always a good idea to periodically close one eye, and then the other, to make sure that the vision in each eye is stable.

A person cannot diagnose a retinal vein occlusion by looking in the mirror because the eye looks and feels normal. A branch retinal vein occlusion will not cause any discomfort in the eye. The diagnosis is made through a retinal examination through a dilated pupil. Additional testing, including a fluorescein angiogram, is often performed to better diagnose and assess the need for treatment. A fluorescein angiogram is a test involving photographs, not x-rays, in which a colored vegetable-based dye is injected into an arm or hand vein. Several photographs are taken as the dye passes through the blood vessels in the back of the eye to evaluate the circulation of the retina.

How is a branch retinal vein occlusion treated?

Unfortunately, there is no cure for a branch retinal vein occlusion. Identifying and treating risk factors for the blockage is the first step in the management of a BRVO. Initially, when a branch retinal vein occlusion occurs, there is often a significant amount of blood within the retina that obscures visualization of the retina. This makes it difficult to predict the clinical course, prognosis and visual outcome. The blood will often gradually absorb, but this usually, at a minimum, takes three to six months. Sometimes it can take much longer as well. In addition to the blood, there are three common complications of branch retinal vein occlusion which threaten vision that your physician will be watching for: Macular edema (swelling from leaking blood vessels), macular ischemia (loss of blood flow) and neovascularization (growth of new abnormal blood vessels in response to poor blood flow). The more complete the blockage, the more intense the hemorrhages, edema and ischemia. If the blockage is very severe, the involved capillaries stop functioning and close off. This is called ischemia. This is identified on the fluorescein angiogram, and if it affects the center of the macula, it usually carries a poor prognosis because we have no current way of restoring blood vessels once they are lost. Sometimes the blood vessels become leaky and cause swelling in the macula. If there is significant swelling in

the central macula causing vision loss from leaking blood vessels, laser treatment is often employed. A national study, The Branch Vein Occlusion Study, found that laser improved the visual prognosis at the three year follow-up visit. This study found that treated eyes were more likely to gain at least two lines of vision compared to untreated eyes. A major goal of the treatment is also to try to decrease the risk of further vision loss. Macular edema does damage the retinal architecture. Additional treatments are considered at approximately four-month intervals if the macular edema persists. Despite laser treatments, swelling and other changes from a branch retinal vein occlusion can lead to scarring within the retina that can permanently limit vision. Sometimes scar tissue on the surface of the retina (macular epiretinal membrane or macular pucker) develops after a BRVO and surgical removal of this tissue helps. It is important to realize that the hemorrhage needs to clear enough to allow the physician to view the macula before macular laser treatment can be performed. Therefore, an initial period of observation is usually necessary.

For those patients with macular edema who do not respond to laser treatment or for those with edema that the physician feels cannot be treated with laser, the physician may consider injection of an anti-inflammatory steroid medicine (Kenalog) into or around the eye. This is sometimes used in conjunction with laser treatment. This is an in office procedure done under anesthesia. It does appear to improve both the macular edema and vision loss, but long-term data is still forthcoming. The injections can be repeated. Some patients can develop a painless increase in their intraocular pressure as a result of steroids and need to be monitored for this. Patients with known glaucoma are at increased risk of steroid-related intraocular pressure elevation.

Another serious potential problem in branch retinal vein occlusions is that of retinal neovascularization. In advanced cases, where there is significant closure of the retinal capillaries, abnormal blood vessels may grow from the retina into the gel of the eye known as the vitreous humor. These vessels are very fragile and are pulled by the currents in the vitreous humor and can result in bleeding into the eye called a vitreous hemorrhage. This will often cause an immediate, painless drop in vision and can cause large floaters. The blood will usually not cause damage to the eye, but can significantly reduce the vision. This retinal neovascularization generally develops in the first six to 12 months after the occlusion. Laser photocoagulation treatment to the peripheral retina (panretinal photocoagulation) is very helpful in this situation. This is a different form of laser and is used for the macular edema and it is a heavier treatment. Laser treatment usually results in stabilization or even regression of the blood vessel growth. This treatment, while important in stopping new blood vessels from growing, is usually not associated with an improvement in vision. The bleeding will sometimes clear on its own, but if it does not, then an operation to remove the blood and the vitreous gel called a vitrectomy is sometimes performed. At that time, abnormal blood vessels are often removed with the vitreous gel and laser treatment is applied further. In severe cases of blood vessel growth, a retinal

detachment known as a tractional retinal detachment can occur if the vitreous gel pulls these vessels and subsequently pulls on the retina. If this occurs to any significant degree, a vitrectomy operation is usually performed to relieve this traction.

In severe or progressive cases of otherwise untreatable branch retinal vein occlusions, or in occlusions felt by the physician to have an otherwise poor prognosis, a newer surgical procedure has been proposed. This is called an arteriovenous sheathotomy. With modern vitreoretinal surgical techniques, it is possible to use a very fine blade to sever the connection (sheath) between the artery and the underlying vein that it compresses. A vitrectomy is performed first and then the above procedure is performed. Some limited reports have shown improvement in circulation and vision after this intervention. Any visual improvement is still slow and gradual and may take months. Not all patients will benefit from this procedure, likely because some the vessels and retinas are already too damaged. There is no data available yet from a full-scale randomized clinical trial, so this procedure is usually reserved for patients who the physician feels have an otherwise poor prognosis or are not good candidates for some of the other treatments.

There is no known medical treatment for branch retinal vein occlusion. Controlling blood pressure, cholesterol, diabetes and other systemic vascular risk factors are emphasized. Anti-coagulants (medications that make the blood vessels less likely to clot) have not been proven of value in preventing a BRVO or managing his complications. Aspirin can help prevent the blood platelets from sticking together and is often considered to try to decrease the risk of clotting within already narrowed blood vessels from existing atherosclerosis. There are other medications similar to aspirin for those who cannot take aspirin. Because anti-coagulants can be associated with systemic complications, they should be prescribed in conjunction with your internist, who will need to monitor you while on such medications.