

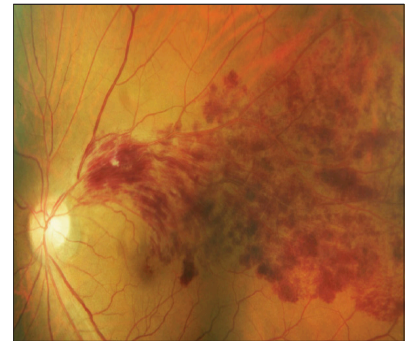


## Branch Retinal Vein Occlusion

*A Branch Retinal Vein Occlusion (BRVO) is a blockage of the blood flow in one section of the retina. BRVO occurs in about 1 out of every 250 individuals. The blockage is usually temporary, but the resulting damage and complications can be ongoing. The most common complication is cystoid macular edema, or swelling in the center of the retina which directly blurs the vision. The second most common complication is retinal neovascularization, or growth of abnormal blood vessels which can lead to bleeding (vitreous hemorrhage) or detachment of the retina.*

### HOW DOES BRVO OCCUR?

The retina is fed by a system of blood vessels like a tree, with the trunk in the optic nerve and branches extending to the farthest edges of the retina. A branch retinal vein occlusion is a vein blockage along a branch of the tree, usually at a point where an artery crosses over a vein and compresses it. This results in poor blood flow to a section of the retina. While blood flow usually returns to the affected part of the retina, the blood vessels in that region may be permanently damaged.



### WHY DOES BRVO OCCUR?

The main causes for BRVO include age, high blood pressure, high cholesterol, and high eye pressure or glaucoma. In rare cases, BRVO may be due to an underlying blood clotting disorder.

### WHAT IS BRVO WITH MACULAR EDEMA?

In some cases, the damaged blood vessels leak fluid (like a hose with holes in it) and the fluid accumulates in the center of the retina, blurring the vision. This is called cystoid macular edema (CME) and treatment of BRVO with CME is discussed later in this handout.

### WHAT IS BRVO WITH MACULAR ISCHEMIA?

In other cases, the damaged blood vessels shut down, like a tree that had its branched pruned. The pruned areas lose their blood flow. If this happens in the center of the retina (macular ischemia), the vision can be permanently reduced. Treatment of macular ischemia is limited.

## WHAT IS BRVO WITH SECONDARY NEOVASCULARIZATION?

In some cases, the pruning of the tree results in sick parts of the retina releasing help signals. Those help signals cause the eye to grow new blood vessels, but those blood vessels grow in the wrong places. The abnormal blood vessels may bleed into the middle of the eye (the vitreous) causing decreased vision. Treatment (most often laser, sometimes injections or surgery) is discussed later in this handout. In severe cases, the abnormal blood vessels may turn into scar tissue that physically pulls the retina away from the wall of the eye, sometimes requiring complex surgical repair.

## TREATMENT OF BRVO AND ITS COMPLICATIONS

### Anti-VEGF injections

The mainstay of treatment for BRVO with CME is the injection of anti-VEGF injections into the eye (see separate handout on injections). Anti-VEGF medications are non-steroid medications that suppress leakage or proliferation by damaged blood vessels. Anti-VEGF injections usually have to be repeated regularly in order to control the edema. Your BARA physician will talk to you about frequency of treatment and choice of medication in your particular case. There are several anti-VEGF medications currently used to treat BRVO with CME:

- Bevacizumab (Avastin) has been used off-label in the eye for more than 15 years
- Ranibizumab (Lucentis) is FDA-approved and is very similar to bevacizumab
- Byooviz and Cimerli are FDA approved biosimilar medications, considered equivalent to Lucentis
- Aflibercept (Eylea) is FDA-approved and works slightly differently than bevacizumab and ranibizumab

All of these medications are injected at intervals of one month or longer depending on the specific case. All of these medications are considered safe and effective.

### Steroid injections

Steroid injections last longer than anti-VEGF injections in general. They carry a risk of cataract progression or elevated eye pressure. There are three steroid medications and delivery methods currently used to treat BRVO with CME:

- Subtenon **triamcinolone** is an injection around the side of the eye, under the stretchy clear tissue on the outside of the eye
- Intravitreal triamcinolone (**Triesence**) is an injection of steroid particles into the eye
- Intravitreal dexamethasone (**Ozurdex**) is an injection of a tiny solid slow-release implant into the eye

### Laser photocoagulation

Laser can be used to treat neovascularization in the front or back of the eye in the setting of BRVO. Panretinal photocoagulation (PRP) is a laser treatment that ablates peripheral regions of retina that have lost their blood supply; this is a permanent treatment usually meant to treat neovascularization and prevent further growth of the abnormal blood vessels and prevent further bleeding.



*Bay Area Retina Associates*  
Diseases and Surgery of the Retina and Vitreous

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