Retinal Vein/Artery Occlusion
Retinal Vein/Artery Occlusion

• **Retinal vein occlusion** is a blockage of the small veins that carry blood away from the retina.

• **Retinal Artery occlusion** is a blockage in one of the small arteries that carry blood to the retina (usually embolic, unattached mass that travels through the bloodstream), but can be thrombotic (blood clot), inflammatory or traumatic)
Veins/Arteries

- **Veins** and **Arteries** - There are two types of blood vessels in the circulatory system of the body: **arteries** that carry oxygenated blood from the heart to various parts of the body and **veins** that carry deoxygenated blood towards the heart for purification.
Veins/Arteries
CRVO/BRVO

- **Branch retinal vein occlusion** (BRVO) is a blockage of the small veins in the retina. BRVO often occurs when retinal arteries that have been thickened by Atherosclerosis (hardening of the arteries) cross over and place pressure on a retinal vein. When the vein is blocked, nerve cells within the eye may die.

- **Central retinal vein occlusion** (CRVO) is a blockage of the main vein that causes blood leakage and excess fluid into the retina. This fluid often collects in the area of the retina responsible for central vision called the macula. When the macula is affected, central vision may become blurry.

- **Non-ischemic CRVO**—a milder type characterized by leaky retinal vessels with macular edema

- **Ischemic CRVO**—a more severe type with closed-off small retinal blood vessels
After diabetic retinopathy, CRVO/BRVO is the second most common retinal vascular disorder. CRVO/BRVO usually occurs in people who are age 50 and older. In most cases, it is not known what causes the condition however it is more common in patients with high blood pressure, arteriosclerosis, diabetes, and glaucoma than it is in other people. The second eye will develop vein occlusion in 6-17% of cases.

Patients with ischemic CRVO have worse vision with less chance for improvement. They have a tendency for the eye to cause new blood vessels to grow—and in the front of the eye, these new vessels can clog the outflow of normal eye fluids. The eye pressure goes up and glaucoma develops. In the back of the eye, new blood vessels may cause bleeding.
Symptoms

- CRVO/BRVO have symptoms such as blurred or distorted vision due to swelling of the center part of the retina. If the affected area is not in the center of the eye, BRVO can go unnoticed without symptoms.
- In rare cases of an undetected vein occlusion, visual floaters from a vitreous hemorrhage (blood vessels leaking into the vitreous gel of the eye) can be the main symptom; this is caused by development of abnormal new blood vessels (neovascularization) in the retina.
• Most BRVOs occur at an arteriovenous crossing—an intersection between a retinal artery and vein. These vessels share a common sheath (connective tissue), so when the artery loses flexibility, as with atherosclerosis (hardening of the arteries), the vein is compressed.
Risk Factors

The common risk factors for CRVO/BRVO are:

• Uncontrolled high blood pressure
• Being overweight or obese (increased body mass index)
• Cardiovascular (heart) disease
• Glaucoma
• In younger patients who suffer BRVO, an abnormal tendency to develop blood clotting is also possible
FA

FA provides images of fluid leaking from damaged or abnormal retinal vessels, demonstrating:
Venous stasis (congestion and slowing of circulation)
Edema (swelling with fluid)
Ischemia (inadequate blood supply) or Retinal neovascularization (abnormal growth of new blood vessels in the retina)
Treatment

Treatment begins with identifying underlying risk factors and treating them. Risk factors are assessed using several methods:

• Blood pressure monitoring
• Determining if blood cholesterol or lipid levels are elevated
• Blood tests, if appropriate, to determine if there is an abnormal tendency to form blood clots
Treatment

- In patients with CRVO/BRVO, vascular endothelial growth factor (VEGF) is elevated; this leads to swelling as well as new vessels that are prone to bleeding. The most common treatment, based on results from clinical trials, involves periodic injections into the eye of an anti-VEGF drug to reduce the new blood vessel growth and swelling. Anti-VEGF drugs include bevacizumab (Avastin®), ranibizumab (Lucentis®), and aflibercept (Eylea®).
- It’s important to note that early detection of macular edema or abnormal blood vessels is important; most patients can avoid severe vision loss if treatment is begun before substantial damage develops in the eye.
Treatment

• Retinal neovascularization is a potentially serious complication of CRVO/BRVO in which an inadequate blood supply (ischemia) causes abnormal new blood vessels to grow on the surface of the retina. This growth can further decrease vision by causing vitreous hemorrhage that can causes floaters and loss of vision, retinal detachment, and glaucoma.

• When neovascularization develops, *scattered laser photocoagulation therapy* is used to create burns in the area of the vein occlusion (blockage). The aim is to try to lower the oxygen demand of the retina and thus stop the abnormal blood vessels from growing.
Central retinal artery occlusion-occurs when the central retinal artery becomes blocked, usually due to an embolus. Retinal artery occlusion may be due to embolism or thrombosis.

Emboli may come from any of the following:

- Atherosclerotic plaques- hardening of the arteries
- Endocarditis-inflammation of your heart’s inner lining,
- Fat
- Atrial myxoma-noncancerous tumor in the upper left or right side of the heart
CRAO/BRAO

• Occlusion can affect a branch of the retinal artery as well as the central retinal artery.
• Typically, the arteries are attenuated and may even appear bloodless. If a major branch is occluded rather than the entire artery, fundus abnormalities and vision loss are limited to that sector of the retina.
• Neovascularization (abnormal new vessel formation) of the retina or iris (rubeosis iridis) with secondary (Neovascular) glaucoma occurs in about 20% of patients within weeks to months after occlusion. Vitreous hemorrhage may result from retinal neovascularization.
Symptoms

- Retinal artery occlusion causes sudden, painless, severe vision loss or visual field defect, usually unilaterally.
- The pupil may respond poorly to direct light but constricts briskly when the other eye is illuminated (relative afferent pupillary defect).
Branch retinal artery occlusion

- Sudden profound altitudinal or sectoral VF loss
- VA – variable
- Fundus – narrowing of arteries and veins with sludging and segmentation of the blood column / cattle trucking, box carrying/
- One or more emboli may be seen
- Cloudy white retina that corresponds to the area of ischaemia.
- Sign may sometimes be subtle.
BRAO

Calcific Plaque
Central Retinal Artery Occlusion

Ocular emergency

Sudden painless unilateral vision loss

Emboli, thrombotic plaque, vasculitis

Cherry red spot (perifoveal atrophy), box cars (arteriolar narrowing)

Tx: emergency ophtho referral, poor prognosis, atherosclerotic wkup
CRAO
Treatment

- Sometimes reduction of intraocular pressure
- Immediate treatment is indicated if occlusion occurred within 24 hours of presentation. Reduction of intraocular pressure with ocular hypotensive drugs (eg, topical timolol 0.5%, acetazolamide 500 mg IV or po), intermittent digital massage over the closed eyelid, or anterior chamber paracentesis may dislodge an embolus and allow it to enter a smaller branch of the artery, thus reducing the area of retinal ischemia. Some centers have tried infusing thrombolytics, Tissue plasminogen activator (abbreviated TPA or PLAT) is a protein involved in the breakdown of blood clots into the carotid artery to dissolve the obstructing clot. Nonetheless, treatments for retinal artery occlusions rarely improve visual acuity. Surgical or laser-mediated embolectomy is available but not commonly done
BRAO/CRAO Work-up

• Once the diagnosis is made, carotid Doppler ultrasonography and echocardiography should be done to identify an embolic source so that further embolization can be prevented.

• If giant cell arteritis is suspected, ESR, C-reactive protein, and platelet count should be done immediately. These tests may not be necessary if an embolic plaque is visible in the central retinal artery.
Questions are guaranteed in life; Answers aren't.