A 77-Year-Old Male with BRVO and No Macular Edema

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Introduction:

A 77-year-old male referred for evaluation of sclerotic vessels in the left eye. PMH of HTN and HLD, and POHx of OU HTN retinopathy and cataracts.

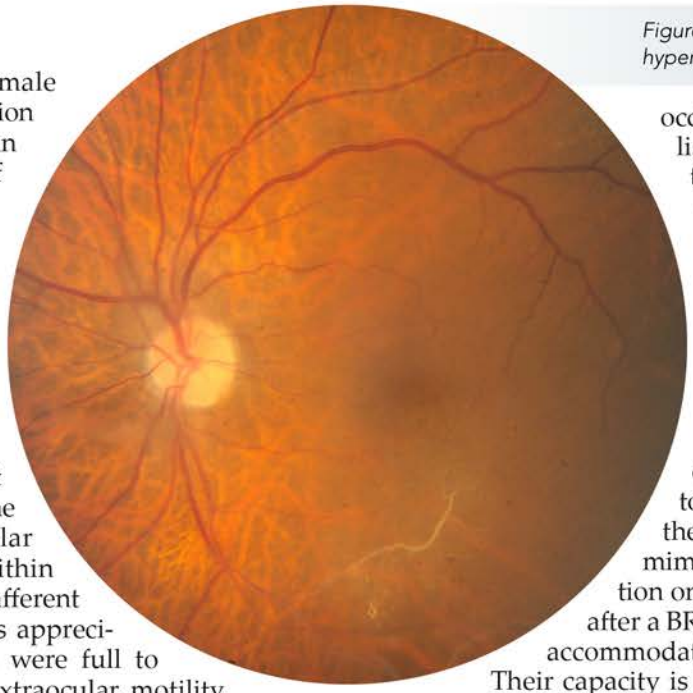


Figure 1: Fundus photo of the left eye shows the hypertensive changes along with sclerotic vessels.

Exam:

Best corrected visual acuity was 20/50-2 in the right eye and 20/100 in the left eye. Intraocular pressures were within normal limits. No afferent pupillary defect was appreciated. Visual fields were full to confrontation and extraocular motility was full in both eyes. Anterior segment exam was notable for a cataract in both eyes.

Dilated fundus examination revealed normal optic nerve with a 0.1 cup-to-disc ratio in both eyes. Examination of the macula revealed normal anatomy. Peripheral retinal exam revealed a cotton-wool spot in the right eye. Examination of the vasculature revealed hypertensive changes bilaterally along with sclerotic vessels inferiorly in the left eye (Figure 1). OCT imaging revealed foveal exudates and irregular inner contour (Figure 2). Fluorescein angiography revealed the presence of an old inferior BRVO with collateral vessel flow (Figure 3).

Discussion:

Biomicroscopic evaluation of the patient's left eye revealed sclerotic vessels, and along with the absence of macular edema mimicked findings seen with a branch retinal artery occlusion. Although the patient's referral listed a BRAO in the left eye, additional testing was able to reveal that the changes seen were secondary to a BRVO with extensive collateral flow. This collateral flow theoretically allowed enough shunting of venous blood from the affected area to prevent the development of chronic retinal edema.

Thought to arise from pre-existing capillaries, these collaterals are vein-to-vein channels that develop to bypass the blocked retinal segment, and can mimic the appearance of neovascularization on slit lamp examination.[1] Immediately after a BRVO, pre-existing capillaries attempt to accommodate the additional flow in the area. Their capacity is limited and this extra flow can strain the endothelium to the point that leakage and subsequent retinal edema occurs. Over time, collaterals develop and mature, and exhibit minimal leakage.[2] IVFA can be useful to determine whether the abnormal vasculature is secondary to neovascularization, immature collaterals, or mature collaterals.[3] A retrospective study performed by Im et al revealed that collateral vessels formed in 60% of patients over a mean period of 6 months with maturation over 24 months.[3]

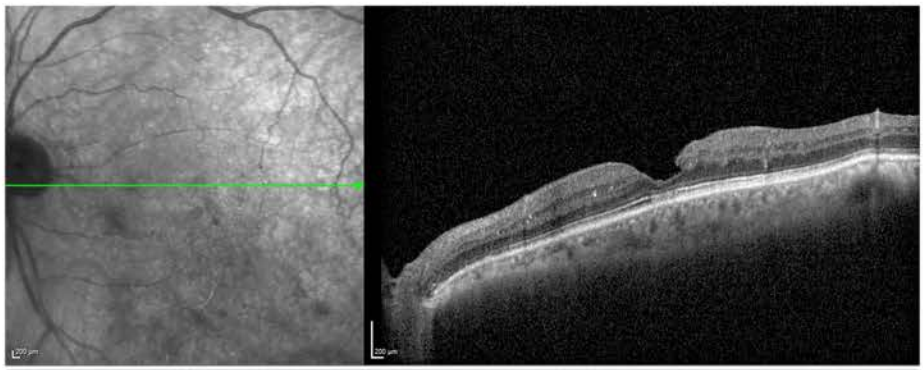


Figure 2: Foveal exudates and irregular inner contour are shown on the OCT.

These collaterals were most commonly found in the temporal macula and crossing the horizontal raphe. Patients with collaterals experienced a visual acuity around three lines better than those who did not, and the favorable effects of the presence of collaterals was statistically significant. Focal laser to areas of active neovascularization resulted in the prevention of new collateral formation. Additionally, one case received focal laser resulting in photocoagulation of the collateral vessels. Retinal edema and leakage on IVFA increased significantly afterwards.[3]

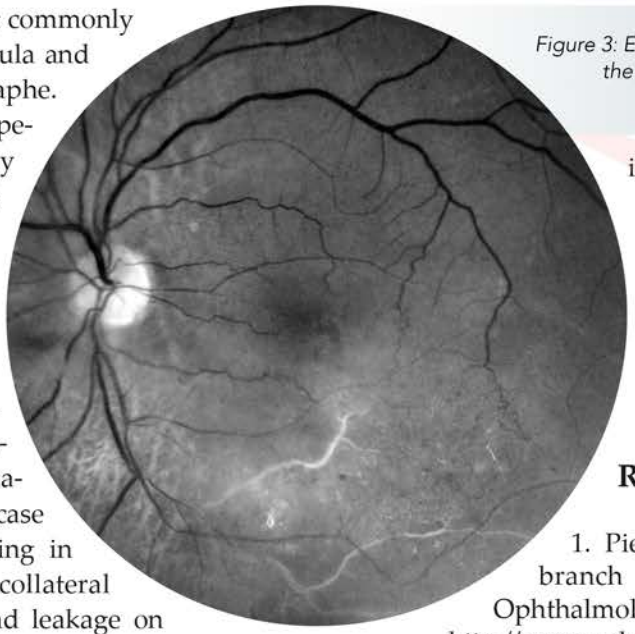
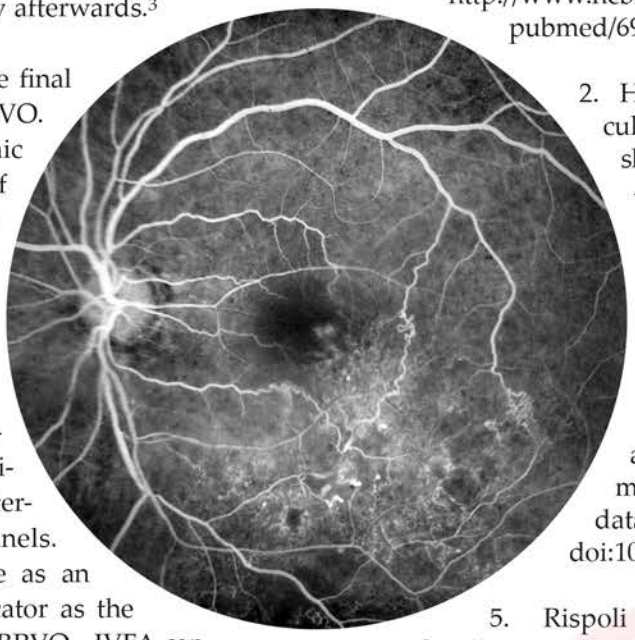


Figure 3: Early phase (top) and late frame (bottom) of the FA show an old inferior branch retinal vein occlusion with collateral vessel flow.

Many factors determine the final visual outcome after a BRVO. Patient risk factors, systemic vascular status, areas of ischemia, and ocular health all can influence the risk of macular edema, neovascularization, and final visual acuity.[4] Although these can still occur in the presence of collaterals, the risk is significantly reduced by these alternative vascular channels. Therefore, they may serve as an important prognostic indicator as the patient's eye adapts to the BRVO. IVFA can serve as an essential diagnostic tool to follow their maturation and prevent accidental closure should focal laser be applied. If available, OCTA can add additional information concerning the vascular change and evolution of the affected tissue. OCTA can observe venous collaterals in higher detail than IVFA and can be used to further define the maturation of vascular changes within the deeper retinal layers.[5]



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