

RESEARCH LETTERS

Vascular Remodeling in Central Retinal Vein Occlusion Following Laser-Induced Chorioretinal Anastomosis

A laser-induced, chorioretinal, venous anastomosis can improve the retinal circulation in some patients with central retinal vein occlusion.¹

Report of a Case. A nondiabetic 80-year-old woman had an asymptomatic central retinal vein occlusion in her left eye. It was diagnosed during her scheduled 6-month follow-up visit with her general ophthalmologist. On her initial visit, she was using dorzolamide hydrochloride, 2%, and timolol, 0.5%, combination eyedrops at night in both eyes for her glaucoma. Her visual acuity was 20/20 OU and her intraocular pressure was 14 mm Hg OU. She had retinal hemorrhages in all 4 quadrants with dilated retinal veins. Fluorescein angiography showed a retinal recirculation time of 10 seconds, and the average central foveal thickness with Stratus optical coherence tomography was normal at 218 μm . One month later, her visual acuity decreased to 20/70 OS and she had increased retinal hemorrhage and cystoid macular edema. The retinal veins were dilated, including the tributary connecting the inferotemporal branch retinal vein to the central retinal vein (**Figure 1A**). The average central foveal thickness on Stratus optical coherence tomography had increased to 511 μm . Fluorescein angiography was not repeated.

She was treated with 2 laser spots inferior to the optic nerve at a site where a retinal vein crossed over a choroidal vein.² The first laser spot intentionally ruptured the Bruch membrane and the second laser spot intentionally nicked the retinal vein, causing a localized retinal hemorrhage.



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Results. Following laser therapy, because of poor visual acuity and persistent macular edema, the left eye was treated with intravitreal bevacizumab, 1.25 mg/0.05 mL once every 6 weeks for 3 treatments, and then with intravitreal triamcinolone, 0.2 mg/0.05 mL once 6 months following laser therapy. Despite maximal topical therapy, the patient's intraocular pressure remained in the mid 20 mm Hg for 4 months following the intravitreal triamcinolone injection.

Seven months after laser therapy, her visual acuity had improved to 20/50 OS. The tributary connecting the inferotemporal branch retinal vein to the central retinal vein was narrowed (**Figure 1B**).

Five years after laser therapy, her visual acuity had improved slightly to 20/40 OS. The tributary connecting the inferotemporal branch retinal vein to the central retinal vein was no longer visible in the color fundus photograph (**Figure 2A**). A video of early-phase fluorescein and indocyanine green angiography shows venous drainage through the anastomosis inferior to the optic nerve (video, <http://www.jamaophth.com>). Fluorescein angiography showed a small amount of fluorescein in the narrowed venous tributary (**Figure 2B**). Indocyanine green angiography showed a dilated choroidal vein distal to the chorioretinal anastomosis (**Figure 2C**). Her visual acuity had improved to 20/50 OS. Stratus optical coherence tomography showed retinal atrophy with an average central foveal thickness of 218 μm .

Comment. In response to the central retinal vein occlusion in this patient, 2 venous chorioretinal anastomoses formed: one at the laser site inferior to the optic disc and the other at the superior edge of the optic disc. Conse-

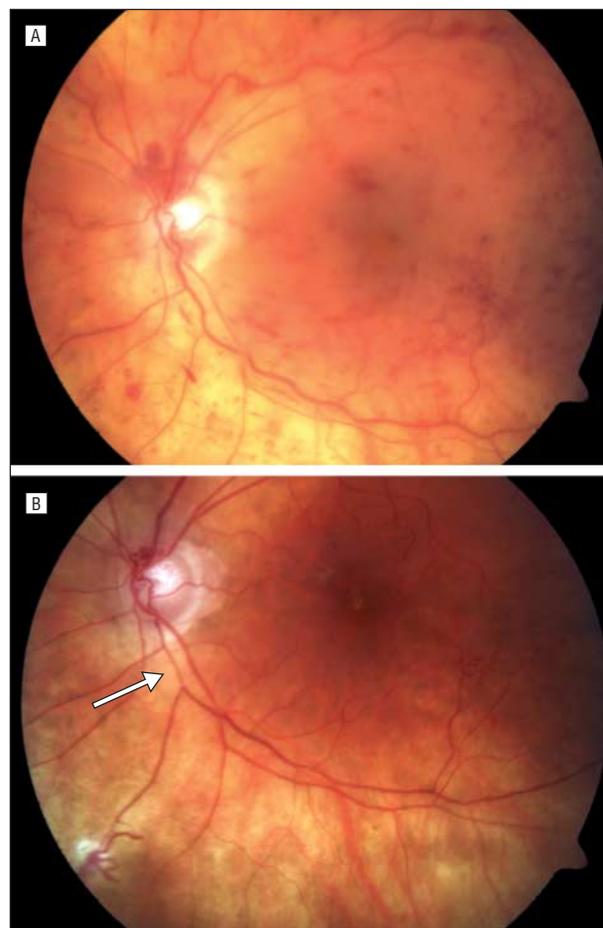


Figure 1. Color fundus photographs of the left eye. A, Color fundus photograph showing an acute central retinal vein occlusion and worsening macular edema. B, Color fundus photograph 7 months after laser therapy. Arrow indicates where the tributary connecting the inferotemporal branch retinal vein to the central retinal vein has narrowed.

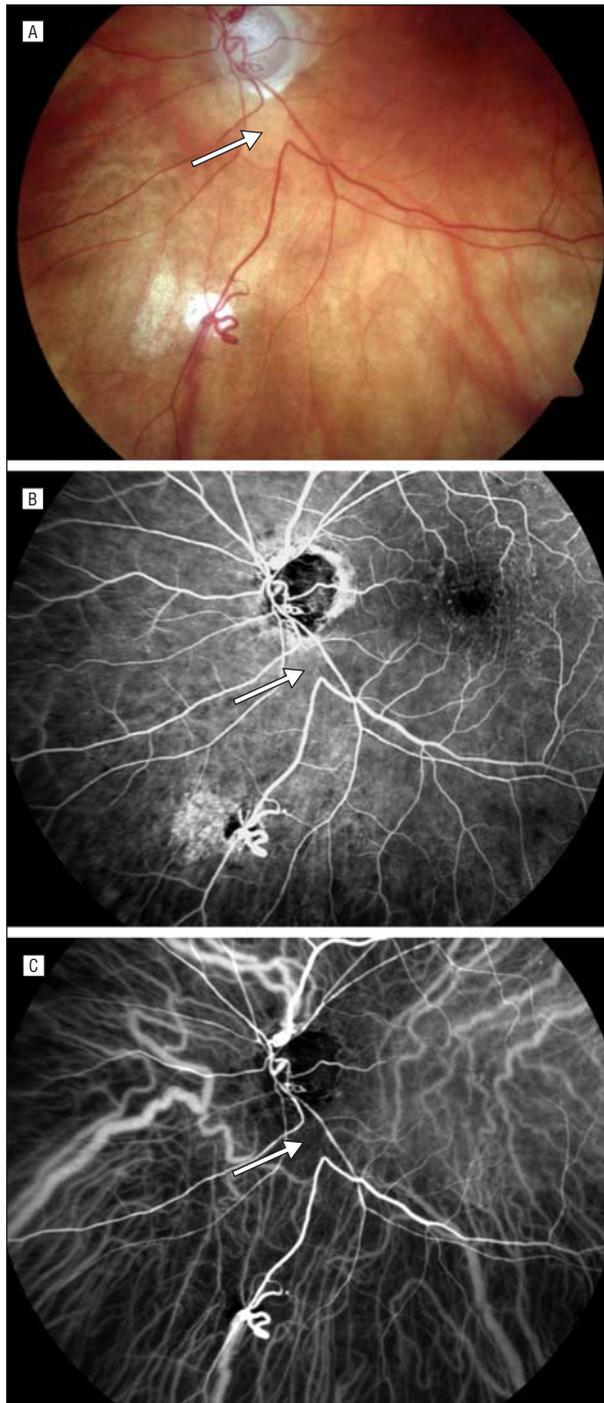


Figure 2. Color fundus photograph, fluorescein angiogram, and indocyanine green angiogram of the left eye. A, Color fundus photograph 5 years after laser therapy. Arrow indicates where the tributary connecting the inferotemporal branch retinal vein to the central retinal vein is no longer visible. There is also advanced glaucomatous optic atrophy. B, Fluorescein angiogram 5 years after laser therapy. Arrow indicates some filling of the tributary connecting the inferotemporal branch retinal vein to the central retinal vein. C, Indocyanine green angiogram 5 years following laser therapy. The dilated choroidal vein distal to the laser-induced chorioretinal anastomosis is visible at the bottom of the image.

quently, the retinal circulation segmented into 2 distinct zones, each with different venous drainage. Between these 2 zones, a watershed developed. After the 2 chorioretinal anastomoses matured, blood flow through

the venous tributary that bridged the watershed zone—the tributary connecting the inferotemporal branch retinal vein to the central retinal vein—was very slow (Figure 2B). The slow blood flow made that blood vessel susceptible to venous stasis-induced thrombosis, narrowing, and subsequent partial occlusion.

This case illustrates retinal venous remodeling over time in response to modification of the retinal circulation.

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Conflict of Interest Disclosures: None reported.

Online-Only Material: The video is available at <http://www.jamaophth.com>.

1. McAllister IL, Constable IJ. Laser-induced chorioretinal venous anastomosis for treatment of nonischemic central retinal vein occlusion. *Arch Ophthalmol*. 1995;113(4):456-462.
2. Cohen SM. Indocyanine green angiography of a laser-induced retinal-choroidal venous anastomosis. *Ophthalmic Surg Lasers*. 1997;28(1):65-66.

Inferior Oblique Myokymia: A Unique Ocular Motility Disorder

Superior oblique myokymia is a well-described disorder in which patients have monocular, high-frequency, low-amplitude contractions of the superior oblique muscle producing torsional or vertical oscillopsia. These episodes often last seconds to hours and can occur several times a day. These movements can sometimes be induced by infraduction but otherwise occur spontaneously. The etiology of this disorder is unknown, although it is almost always benign. In recent years, some have suggested that superior oblique myokymia is due to vascular or nonvascular mechanical compression of the trochlear nerve at the root exit zone or is a primary brainstem disorder.¹⁻⁵ However, in the vast majority of cases, no underlying cause is ever found. The clinical course is



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highly variable, ranging from spontaneous recovery to chronic oscillopsia and diplopia.⁶ Several therapies have been tried with varied success, including topical β -blockers, carbamazepine, phenytoin, baclofen, gabapentin, and, in severe cases, incisional surgery.¹ We describe a unique form of myokymia involving monocular, high-frequency, low-amplitude contractions causing excyclotorsion, not incyclotorsion, induced by supraduction, suggesting an inferior oblique myokymia. Based on a PubMed search, this has not been described in the literature to date.

Report of a Case. A 59-year-old man initially presented to our neuro-ophthalmology unit in 2003 with a 2-month