

## “Dye front reciprocation” in combined central retinal vein occlusion with cilioretinal artery infarction

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**Key words:** Central retinal vein occlusion, cilioretinal artery infarction, dye front reciprocation, fluorescein angiography

A 26-year-old otherwise healthy female with no known systemic illness presented with sudden painless dimness of vision in the left eye for 1 day. Systemic examination was within normal limits with blood pressure of 126/72 mmHg. Her best-corrected visual acuity was 20/20 in the right eye and 20/200 in the left eye. Anterior segments were normal. Left eye fundus revealed a white patch along the territory of cilioretinal arteries along with disc edema, dilated tortuous vessels, and intraretinal hemorrhages [Fig. 1a]. Swept source optical coherence tomography showed hyperreflective inner retinal layers along the distribution of cilioretinal artery. There were no cystoid changes or foveal thickening/edema [Fig. 1b]. A diagnosis of central retinal vein occlusion (CRVO) with cilioretinal artery infarction (CRI) was made. Arm to retina time was normal on fluorescein angiography. However, the filling of cilioretinal arteries (two in number) was delayed as it was seen along with the arterial phase. The arteriovenous transit time was prolonged with delayed filling of dilated tortuous retinal veins. Fundus fluorescein angiography demonstrated systolic advancement of the dye front within the cilioretinal arteries [Fig. 2a, c, d and f at 13 s, 16 s, 18 s, and 20 s, respectively] with its diastolic retraction from the arteries [Fig. 2b and e at 15 s and 19 s, respectively].<sup>[1,2]</sup> This phenomenon is known as “Dye front reciprocation”.

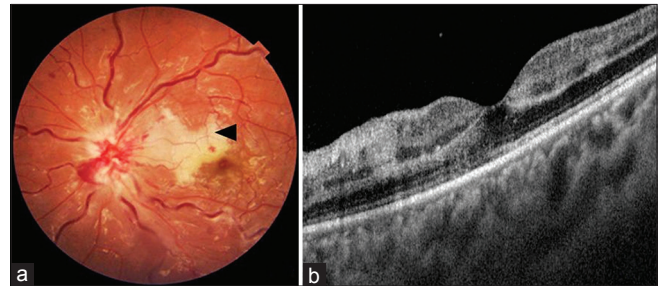
### Discussion

CRI has been commonly reported in patients with CRVO.<sup>[3]</sup> The presence of dye front reciprocation may suggest a distal branch point of the cilioretinal artery from the posterior ciliary artery (PCA). The intermittent flow along with reversal is suggestive of a physiological block due to pressure gradients

and not an anatomical block. Hypotheses for concurrence of CRVO with CRI may include “branch flow exclusion” and “choroidal arterial steal.”<sup>[4]</sup> These hypotheses imply that following CRVO, the blood flow from cilioretinal branch of PCA initially decreases and then completely stops due to lack of an arteriovenous perfusion gradient across the cilioretinal artery (branch flow exclusion) and the flow may be diverted to a system with lesser resistance (choroidal arterial steal).<sup>[4]</sup> Hayreh however proposes a different mechanism emphasizing hemodynamic stasis due to the absence of autoregulation and the presence of low perfusion pressure in choroidal vascular bed along with the absence of vortex venous obstruction as the mechanism for CRI in CRVO.<sup>[5]</sup> Dye front reciprocation has been photodocumented earlier by very few authors.<sup>[4]</sup>

### Conclusion

The demonstration of dye front reciprocation in combined CRVO and CRI may suggest a distal branch point of the



**Figure 1:** (a) Fundus photograph showing translucent white patch (black arrowhead) along the territory of the cilioretinal artery with dilated, tortuous veins, disc edema, and hemorrhage suggestive of central retinal vein occlusion with cilioretinal infarction. (b) Swept source optical coherence tomography image demonstrates inner retinal hyperreflectivity in the region of the cilioretinal artery. Lack of cystoid changes at the fovea or significant macular edema/thickening is also evident

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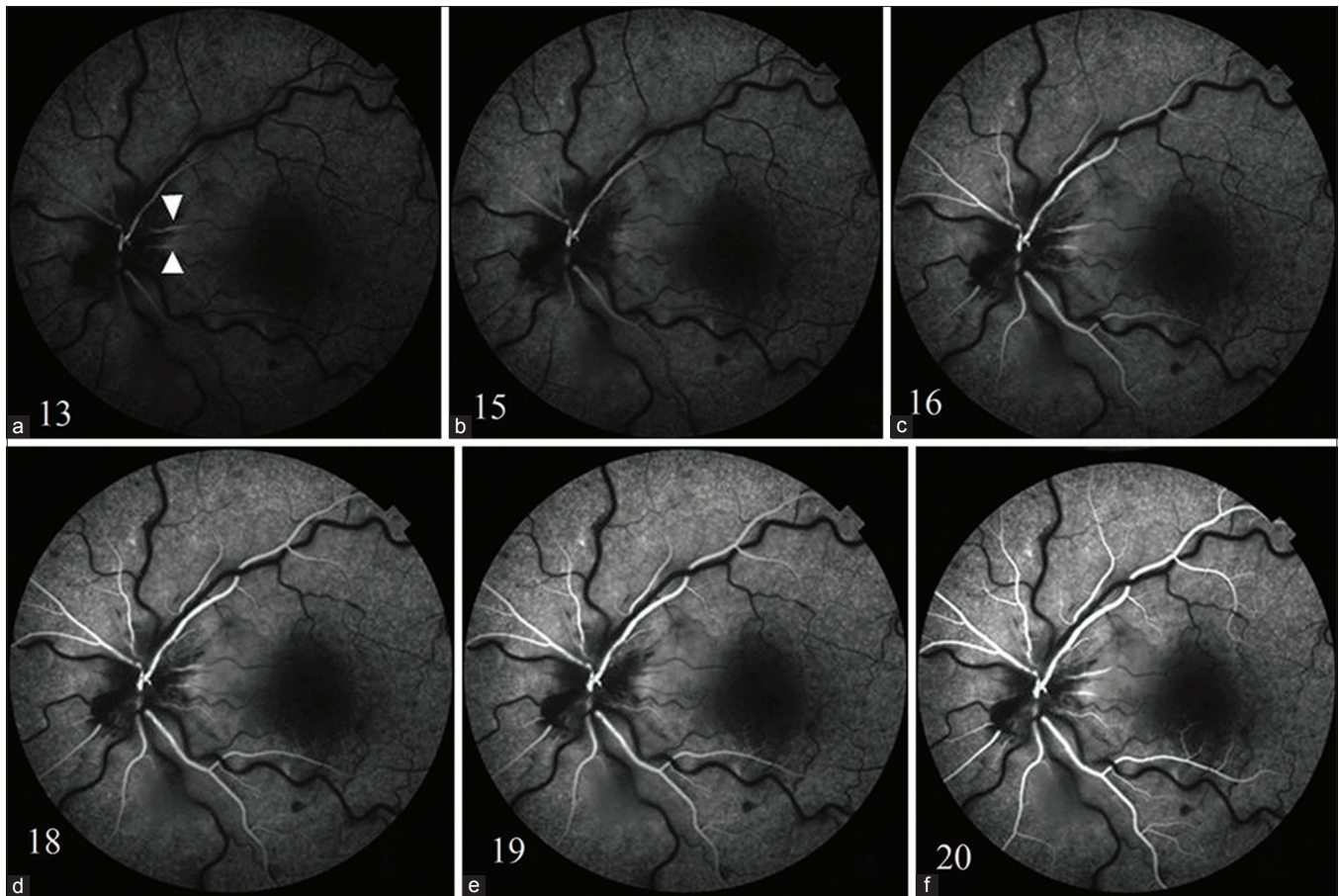
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**Figure 2:** Fundus fluorescein angiography of the patient in various phases showing “Dye Front Reciprocation” (a, c, d and f). Systolic advancement of the dye front within the cilioretinal arteries (white arrowheads) with its reciprocation seen in b and e. Numerical at lower left corner of each angiographic image denotes the angiographic time in seconds of the respective image

cilioretinal artery from the PCI. Intermittent flow along with reversal may support the hypothesis of a physiological block for CRI with CRVO.

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#### Conflicts of interest

There are no conflicts of interest.

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