

## Newly Recognized Serous Macular Detachment in Retinal Vascular Disease

Serous macular detachment has only recently been recognized to occur in a significant number of eyes with retinal vascular leakage, including diabetic macular edema,<sup>1,2</sup> branch retinal vein occlusion,<sup>3-5</sup> central retinal vein occlusion (CRVO),<sup>6</sup> and hypotony maculopathy.<sup>7</sup> These serous retinal detachments associated with retinal vascular leakage were not suspected clinically or angiographically but were diagnosed with optical coherence tomography beneath the edematous neurosensory retina. In a recent issue of *Retina*, Ozdemir et al<sup>6</sup> found a surprisingly high frequency (82%) of serous retinal detachment in eyes with acute CRVO and macular edema. Serous retinal detachment was not suspected clinically or by angiography but was demonstrated with a remarkably high incidence by optical coherence tomography. The ability of optical coherence tomography to provide cross-sectional, high resolution imaging of the macula has enabled demonstration of previously unrecognized serous detachment beneath the thickened and cystic macula. The presence of serous detachment in retinal vascular disease may have important implications in therapy for macular edema associated with retinal vascular leakage.

Serous retinal detachment associated with macular edema has been demonstrated in 15% to 46% of eyes with diabetic macular edema,<sup>1,2</sup> 37.8% to 71.4% of eyes with branch retinal vein occlusion,<sup>3-5</sup> and 82% of eyes with CRVO.<sup>6</sup> The presence of serous retinal detachment may significantly limit the ability to perform effective macular laser treatment and to achieve the usual light gray treatment spot during macular laser. In macular edema associated branch retinal vein occlusion, the presence of serous retinal detachment is

a negative prognostic factor for resolution of macular edema and for visual acuity after grid macular laser treatment.<sup>3</sup> The high percentage of serous retinal detachment in CRVO reported by Ozdemir et al<sup>6</sup> may have played a previously unrecognized role in the poor response of macular edema associated with CRVO to grid macular laser in the multicenter trial on CRVO by the Central Retinal Vein Occlusion Study Group.<sup>8</sup> The reasons for this high incidence of serous retinal detachment in CRVO are unknown but could be related to the acute blockage of the entire central retinal venous system that results in acute leakage diffusely throughout the retinal capillaries, leading to edema of the retinal tissue and leakage into the subretinal space (which is not able to be absorbed by the retinal pigment epithelium). Serous retinal detachment has also been clinically recognized to be associated with other retinal vascular diseases, such as retinal angiomas, Coats disease, and retinal vasculitis.<sup>9</sup> The mechanism is probably due to excessive fluid flow from the abnormal retinal vessels, which overwhelms the retinal pigment epithelium pump and leads to serous retinal detachment.<sup>9</sup> Potentially, future therapies stimulating the retinal pigment epithelium pump may be important to treat serous retinal detachments, such as acetazolamide<sup>10</sup> or newer investigative retinal pigment epithelium pump stimulators.<sup>11</sup>

Alternative therapies, such as intravitreal steroid injections and intravitreal anti-vascular endothelial growth factor injections, may also allow resolution of edema and serous retinal detachment. The natural history of serous retinal detachment associated with macular edema and the response of serous retinal detachment associated with macular edema to therapeutic interventions, such as macular laser and intravitreal pharmacologic agents, are currently unknown, and further research should be directed at following the course of serous detachment in macular edema.

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Combination therapy, such as intravitreal pharmacologic drugs to initially resolve edema and serous retinal detachment and subsequent macular laser treatment once the serous detachment has resolved, possibly deserve further study.

Previously unrecognized shallow serous detachment of the macula has also been identified by optical coherence tomography postoperatively in eyes after successful retinal detachment repair and may be responsible for delayed vision recovery.<sup>12</sup> Shallow residual foveal detachment has also been identified postoperatively after successful closure of macular holes and may be responsible for delayed or decreased vision recovery and a higher risk of late recurrence of the macular hole.<sup>13</sup>

Unrecognized shallow foveal detachment is being increasingly recognized by optical coherence tomography in clinical situations not identified by biomicroscopic examination, fundus photography, and fluorescein angiography. The identification of shallow foveal detachment may be helpful in better understanding the pathogenesis of these disorders, such as macular edema in retinal vascular diseases or during postoperative recovery after macular hole or retinal detachment surgery.<sup>12,13</sup> In addition, the recognition of serous foveal detachment may also help to better guide and assess the results of therapy in the future.

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## References

1. Otani T, Kishi S, Maruyama Y. Patterns of diabetic macular edema with optical coherence tomography. *Am J Ophthalmol* 1999;27:688–693.
2. Otani T, Kishi S. Tomographic findings of foveal hard exudates in diabetic macular edema. *Am J Ophthalmol* 2001;131:50–54.
3. Ohashi H, Oh H, Nishiwaki H, et al. Delayed absorption of macular edema accompanying serous retinal detachment after grid laser photocoagulation in patients with branch retinal vein occlusion. *Ophthalmology* 2004;111:2050–2056.
4. Spaide RF, Lee JK, Klancnik JM, Gross NE. Optical coherence tomography of branch retinal vein occlusion. *Retina* 2003;23:343–347.
5. Lerche RC, Schaudig U, Scholz F, et al. Structural changes of the retina in retinal vein occlusion. Imaging and quantification with optical coherence tomography. *Ophthalmic Surg Lasers* 2001;32:272–280.
6. Ozdemir H, Karacorlu M, Daracorlu S. Serous macular detachment in central retinal vein occlusion. *Retina* 2005;25:561–563.
7. Kokame GT, de Leon MD, Tanji T. Serous retinal detachment and cystoid macular edema in hypotony maculopathy. *Am J Ophthalmol* 2001;131:384–386.
8. The Central Retinal Vein Occlusion Study Group. Evaluation of grid laser photocoagulation for macular edema in central vein occlusion. *Ophthalmology* 1995;102: 1425–1433.
9. Spaide RF, Goldbaum M, Wong DW, et al. Serous detachment of the retina. *Retina* 2003;23:820–846.
10. Moldow B, Sander B, Larsen M, et al. The effect of acetazolamide on passive and active transport of fluorescein across the blood-retina barrier in retinitis pigmentosa complicated by macular oedema. *Graefes Arch Clin Exp Ophthalmol* 1998;236:881–889.
11. Maminishkis A, Jalickee S, Blaug SA, et al. The P2Y(2) receptor agonist INS37217 stimulates RPE fluid transport in vitro and retinal reattachment in rat. *Invest Ophthalmol Vis Sci* 2002;43:3555–3566.
12. Hagimura N, Iida T, Suto K, Kishi S. Persistent foveal retinal detachment after successful rhegmatogenous retinal detachment surgery. *Am J Ophthalmol* 2002;133:516–520.
13. Kang SW, Ahn K, Ham DL. Types of macular hole closure and their clinical implications. *Br J Ophthalmol* 2003;87:1015–1019.