Guest editorial

The macular edema

Malla OK
Professor and Head
Department of Ophthalmology
Kathmandu Medical College, Sinamangal, Kathmandu, Nepal

Retinal vascular diseases, mainly diabetic retinopathy (DR) and retinal venous occlusions (RVO), account for the majority of blinding retinal conditions seen at retina clinics today. The implications of the rising numbers of patients who are being diagnosed with diabetes are significant to our profession, as many of these people will experience resultant visual loss. Treating our patients with diabetes is also complicated by medical issues such as hypertension, both of which are coming up in an epidemic form in this part of the world.

Macular edema (ME) is the single most important cause of profound visual loss in these retinal vascular diseases (The Branch Vein Occlusion Study Group 1984; Central Vein Occlusion Study Group 1993, 1995, 1997). The results of the Diabetic Retinopathy Clinical Research Network (DRCR.net) study comparing focal/grid laser photocoagulation treatment with intravitreal triamcinolone therapy in 2008 supported grid laser photocoagulation as the gold standard in therapy for diabetic retinopathy (DR). Research, however, continues to be geared to finding effective pharmacologic and surgical treatments.

ME in DR and RVO affects mainly the neuro-retina and the photo-receptors are involved only in the later stages of the disease process, unlike in Age Related Macular Degeneration (AMD) where the retinal pigment epithelial cells and photoreceptors are damaged first. Thus, in DR and RVO, early intervention is more likely to restore vision.

Vascular Endothelial Growth factor (VEGF) antagonists have gained attention in recent years as VEGF has been shown to play a crucial role in the pathogenesis of Diabetic Macular Edema (DME). Ranibizumab (Lucentis), a humanized, monoclonal antibody fragment and an anti-VEGF, is being investigated in several trials to assess its efficacy in the treatment of DME. To date, ranibizumab appears to be effective in reducing optical coherence tomography (OCT) central retinal thickness (CRT) and improving vision early (Geeta 2009). Dr Richard Rosen shares his experience using the IQ 577 yellow laser at a less power and shorter pulse duration for improving vision after one treatment in a 58-year-old man with DME. Pars Plana Vitrectomy (PPV) and removal of the posterior hyaloid may be promising for selected cases of DME, mainly in conditions associated with Vitreo-Macular Traction (VMT) (Hikichi et al 1997, Kaiser et al 2001, Lewis et al 1992, Harbour et al 1996).There is no shortage of exciting news from researchers searching for an effective pharmaceutical treatment for DME. Promising new anti-angiogenic and anti-inflammatory therapies may soon offer hope to diabetic patients.

The ME, though traditionally managed with laser photocoagulation, results in little or no improvement in visual acuity in patients with Central Retinal Vein Occlusion (CRVO) and modest improvement relative to observation in Branch Vein Occlusion (The Branch Vein Occlusion Study Group 1984; The Central Vein Occlusion Study Group 1995). VEGF has been implicated in the patho-physiology of RVO. Anti-VEGF has been shown to be effective in reducing ME. A prospective open-label study of intra-vitreal ranibizumab

in patients with significant ME associated with perfused CRVO showed a mean decrease in CRT on OCT with improvement in visual acuity (Pieramici et al 2008). In a study of Bevacizumab for management of RVO, many patients responded with initial vision improvement, 71 % for Branch Retinal Vein Occlusion (BRVO) and 56 % for CRVO, with most of the improvement occurring after the first injection. There was regression in vision in all patients, but more regression occurred for patients with CRVO than with BRVO. However, even with the regression, patients were still significantly improved from the baseline (Dev and Bhatia, 2009).

RVO requires a varied approach depending upon the case. Anti-VEGF agents can be used with success as the first line therapy for CRVO and BRVO and in combination with laser. Two approved intra-vitreal agents available till date are bevacizumab and ranibizumab. The difference in the efficacy of ranibizumab and bevacizumab still remains to be seen but most extensive data are available regarding the uses of ranibizumab from BRVO and CRUISE trials. The US Food and Drug Administration (FDA) has approved ranibizumab for the treatment of ME following RVO. Both the 0.3 mg and 0.5 mg doses of ranibizumab clinically and statistically improved vision in BRVO and CRVO according to the results of the BRVO and CRUISE trials (The Central Vein Occlusion Study Group, 1995). In a study done in Nepal, thirty four eyes with ME due to RVO treated with intra-vitreal bevacizumab (1.25mg) at 6 weeks interval and followed-up for 7.5 ± 4.8 months, showed a significant improvement both in visual acuity and ME (Thapa and Poudyal, 2010).

Although we have many more treatment options available to us in 2010 for RVO, they only suppress the macular edema, thereby buying time so that the body can re-canalize the vessel that is occluded. The treatment with an injection of anti-VEGF prior to laser application is important as it decreases the area requiring treatment. Similarly, because it decreases the thickness of macula, the precision of laser burn placement is more accurate using less power (Pieramici 2010). Hypoxia-regulated genes play an important role in ocular neo-vascularization and macular edema.
The role of VEGF in the pathogenesis of macular edema is particularly important, and most efforts thus far have been directed at suppressing it (Peter 2010).

References

Dev S, Bhatia H (2009). Benacizumab for the management of retinal vein occlusion. Retina Today; 4(2): 56-57.

Harbour J W, Smiddy WE, Flynn HWJr, Rubsamen PE (1996). Vitrectomy for diabetic macular edema associated with athickened and taut posterior hyaloids membrane. Am j Ophthalmol; 121(4):405-413.

Hikichi, Fujio N, Akiba J et al (1997). Association between the short term natural history of diabetic macular oedema and the vitreomacular relationship in type II diabetes mellitus. Ophthalmology; 104(3):473-478.

Kaiser PK, Riemann CD, Sears JE, Lewis H (2001). Macular traction detachment and diabetic macular edema associated with posterior hyloidal traction. Am J Ophthalmol; 131(1):44-49.

Lalwani G A (2009). Anti-VEGF therapy in diabetic macular edema. Retina Today; 4(6):45-47.

Lewis H, Abrams GW, Blumenkranz MS, Campo RV (1992). Vitrectomy for diabetic macular traction and edema associated with posterior hyaloids traction. Ophthalmology; 99(5): 753-759.

Peter A (2010). Molecular targets for retinal diseases. Retina Today; 5:4-7

Pieramici D (2010). Anti VEGF for recurring macular edema. Retina Today; 5:72-76.

Pieramici DJ, Grey SM, Rubio R (2008). Intravitreal Ranibizumab(lucentis) in macular edema secondary to retinal vein occlusion: the design of the BRVO and CRUISE trials. Paper presented at:American Society of Retina Specialists meeting; Maui, Hawaii.

Pieramici DJ, Rabena M, Castellarin AA et al (2008). Ranibizumab for the treatment of macular oedema associated with perfused central retinal vein occlusions. Ophthalmology; 115(10): 47-54.

Thapa R, Poudyal G (2010). Intravitreal bevacizumab for treatment of macular oedema secondary to retinal vein occlusion. The 25th APAO Congress, poster SL 1-282, panel 282.

The Branch Vein Occlusion Study Group (1984). Argon laser photocoagulation for macular oedema report. Am J Ophthalmol; 98:271-282.

The Central Vein Occlusion Study Group (1995). Evaluation of grid pattern photocoagulation for macular oedema in central vein occlusion. The Central Vein Occlusion Study Group M Report. Ophthalmology; 102(10):1425-1433.

Source of support: nil. Conflict of interest: none