

MODULE 9.9

Vitrectomy

Vitrectomy is the surgical removal of all or parts of the vitreous from an intraocular lens or other structure.¹ In the early 1990s, Lewis et al.² evaluated the effects of vitrectomy in diabetic patients to address what they termed “thickened taut glistening posterior hyaloid.” Nine of the 10 patients they treated experienced improvements in vision after vitrectomy. The later development of optical coherence tomography showed that the pathological correlate of the posterior hyaloid is a partial posterior vitreous detachment with focal attachment at the fovea.³ Natural history and observational studies have suggested an improvement in diabetic macular edema (DME) with the separation of the vitreous from the retina.

The precise mechanisms for which vitrectomy acts to ameliorate DME remain unclear,⁴ although several possibilities have been proposed, including:

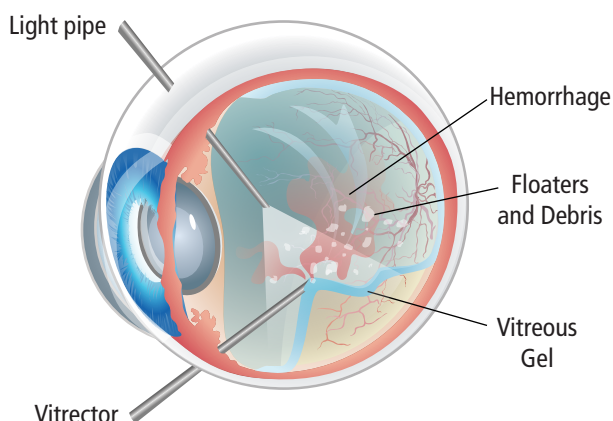
- Reduction in tangential and anterior-posterior traction at the macula²
- Increased oxygenation of the vitreous cavity⁴
- Enhanced diffusion of certain vasogenic growth factors⁴

The role of vitrectomy in the management of refractory DME is less clear than that for other treatment strategies. Several randomized clinical trials have reported conflicting results on pars plana vitrectomy (vitrectomy procedure in which instruments are introduced into the eye through the pars plana),⁵ with and without the removal of the internal limiting membrane in patients with DME unresponsive to standard laser treatment. A large study by the Diabetic Retinopathy Clinical Research Network evaluated vitrectomy in eyes with DME and at least moderate vision loss and vitreomacular traction (a disorder characterized by a partial vitreous detachment and an abnormally strong adherence of the hyaloid face to the macula).^{6, 7} Visual acuity improved by ≥ 10 letters in 38% and deteriorated by ≥ 10 letters in 22% of eyes at 6 months. Postoperative complications through 6 months included vitreous hemorrhage, elevated intraocular pressure requiring treatment, retinal detachment, and endophthalmitis. Another study involving DME and DR patients with posterior hyaloid adherence (strong adherence of the hyaloid to the

Vitrectomy outcomes at 6 months in eyes with diabetic macular edema and vitreomacular traction.

Vitrectomy Surgery for DME

Vitrectomy is a procedure in which the vitreous is replaced with a salt solution, improving the visual acuity and maintaining the anatomy of the eye. Vitrectomy has been very successful with restoring sight by removing blood, but it is not as effective for re-attaching the retina. After vitrectomy performed for DME and vitreomacular traction, retinal thickening is reduced in most eyes.



Vitrectomy outcomes in eyes with diabetic macular edema and vitreomacular traction.



Diabetic Retinopathy Clinical Research Network Writing Committee, Haller JA, Qin H, Apte RS, Beck RR, Bressler NM, Browning DJ, Danis RP, Glassman AR, Googe JM, Kollman C, Lauer AK, Peters MA, Stockman ME. Ophthalmology. 2010 Jun;117(6):1087-1093.e3. Epub 2010 Mar 17

macula) reported improvements in best-corrected visual acuity in 89% of patients and central macular thickness in 100% of the patients.^{7, 8}

A recent systemic review and meta-analysis of 11 randomized clinical trials suggested a structural, and potentially functional, superiority of vitrectomy over observation at 6 months.⁹ Vitrectomy was superior to laser in terms of structural outcomes at 6 months, but this advantage over laser was lost at 12 months. Overall, there was little evidence to support the use of vitrectomy in DME in the absence of epiretinal membrane (a proliferative

fibrocellular tissue found on the inner surface of the retina)¹⁰ or vitreomacular traction.⁹ The analysis suggested there was “no evidence to suggest a superiority of vitrectomy over laser in terms of functional outcomes.”⁹

Randomized clinical trials for combining vitrectomy with intravitreal corticosteroids, intravitreal anti-vascular endothelial growth factor agents, and/or laser photocoagulation to treat refractory DME are lacking. Studies with long-term follow-up are needed to establish a role for this combination treatment approach in DME.

References

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