Uses of Steroids in Vitreoretinal Surgery

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Steroids have anti-inflammatory, antipermeability, and antifibrotic properties, which justify their use in inflammatory and vascular ophthalmic diseases. The surgical use of steroids has been advocated to aid in visualization of transparent tissue in ophthalmic surgery: (1) in anterior segment surgery to help manage vitreous loss during complicated cataract surgery,1 (2) to visualize the posterior cortical vitreous during pars plana vitrectomy (PPV),2,3 (3) in the visualization and peeling of epiretinal membrane (ERM) and internal limiting membrane (ILM),4,5 and (4) in surgical repair of proliferative vitreoretinopathy (PVR).6,7 This article discusses the uses of steroids in vitreoretinal surgery.

TRIAMCINOLONE ACETONIDE

The use of triamcinolone acetonide was first suggested in 2000 by Peyman et al, who noted that when triamcinolone acetonide was injected into the vitreous cavity, the crystals became trapped in the vitreous gel. Further, they observed that the suspension allowed for good contrast between the whitened vitreous and the post-hyaloid space, which harbored a free-floating suspension of triamcinolone acetonide particles. Triamcinolone acetonide adheres to vitreous fibrils but not to the retina and demonstrates the vitreous anatomy and “invisible” residual cortical vitreous. It is useful in surgery of the posterior segment, for example in highlighting adhesions on the optic nerve and the bursa premacularis (Figure 1) and in the peeling of ERMs (Figure 2), and may also be used in the anterior segment to manage vitreous loss in complicated phacoemulsification.

USES IN VITREORETINAL SURGERY

Steroids are useful after vitrectomy for their inhibitory effect on PVR8,9 and as postoperative therapy after membrane peeling to reduce macular edema.10 They can also be used for the treatment of chronic, refractory hypotony associated with uveitis11 as well as for the treatment of macular edema in patients who have undergone vitrectomy.12,13

Figure 1. Steroids may be used to highlight adhesions on the optic nerve and the bursa premacularis.

PVR

In 2008, Ahmadieh et al7 published a study evaluating the effect of adjunctive intraocular triamcinolone acetonide in silicone-filled eyes as an adjunctive treatment for PVR. The investigators found that the outcomes of vitreoretinal surgery for established PVR were not significantly improved by the use of triamcinolone acetonide.

Macular Edema Post-Peeling

Most papers published to date show that systemic and local steroid treatment after successful vitrectomy combined with ERM and ILM peeling does not seem to significantly improve the anatomic and functional outcomes in eyes with ERM. Ahn et al14 found that intravitreal injection of triamcinolone acetonide combined with vitrectomy for ERM did not affect postoperative foveal thickness and functional recovery. Lai et al15 conducted a study to compare the long-term anatomic and visual outcomes of patients with idiopathic ERM removed by vitrectomy and membrane...
peeling with or without the use of intravitreal injection of triamcinolone acetonide. The authors found that the intravitreal triamcinolone acetonide use after ERM removal provided no significant benefits during long-term follow-up, but its use did increase the risk of increased intraocular pressure.

Ritter et al.16 evaluated the functional and morphologic outcomes of postoperative systemic steroid therapy after successful macular surgery in eyes with macular edema due to idiopathic ERMs. The authors found that the early postoperative use of systemic steroid treatment after successful vitrectomy combined with ERM and ILM peeling did not seem to significantly improve the anatomic and functional outcomes in eyes with ERM.

Vitrectomized Eyes

Experience with a number of drugs suggests that some drugs are cleared more rapidly in vitrectomized eyes. Chin et al.17 conducted a study in rabbit eyes to evaluate the difference in clearance of intravitreal triamcinolone acetonide between vitrectomized (n=42) and nonvitrectomized eyes (n=42). After 30 days, triamcinolone acetonide was detected in only 1 eye (0.22 µg/mL) in the vitrectomized group, compared with 4 of 6 eyes (0.92 ± 1.25 µg/mL) in the nonvitrectomized group.

One solution to the faster clearance issue in vitrectomized eyes may be the use of intravitreal implants. The CHAMPLAIN study12 showed that treatment with the dexamethasone intravitreal implant (Ozurdex; Allergan Inc.) led to statistically significant improvements in vision and vascular leakage from diabetic macular edema in difficult-to-treat cases. Steroids are useful in the peeling of ERMs.

Figure 2. Steroids are useful in the peeling of ERMs.

The efficacy of the dexamethasone implant in patients who had undergone vitrectomy was confirmed by Chang-Lin et al.,18 whose study demonstrated similar vitreoretinal pharmacokinetics after administration of the 0.7-mg implant in nonvitrectomized and vitrectomized eyes.

CONCLUSION

Steroids are useful as a surgical tool to better visualize the vitreous, as a non-colorant precipitating staining agent in simple peeling, and as a sustained-release preparation for difficult-to-treat cases. Steroids are not effective, however, for macular edema after peeling procedure and for peeling in more complex cases (eg, myopic eyes).

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