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Deep sclerectomy in patients with corneal grafts: our experience

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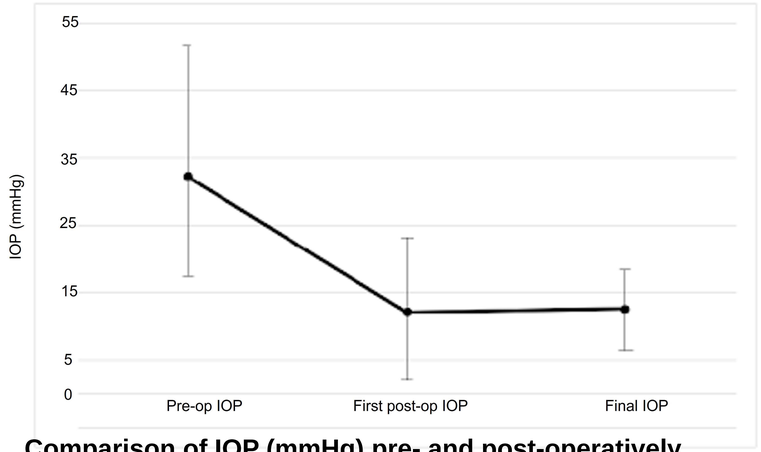
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Introduction

Deep sclerectomy is a non-penetrating glaucoma surgery in which a scleral lake is formed by de-roofing Schlemm's canal; lowering intraocular pressure without entering the anterior chamber and maintaining a physiological barrier between anterior chamber and the sub-scleral space.

Raised IOP can occur in patients with corneal grafts for a number of reasons, and can be difficult to manage, with great care being needed to reduce the risk of graft failure.

We present 10 patients with corneal grafts who underwent DS to treat concurrent glaucoma.



Comparison of IOP (mmHg) pre- and post-operatively
Error bars denote range

Methods

Retrospective review of all patients with corneal grafts who underwent DS from May 2007 to September 2021.

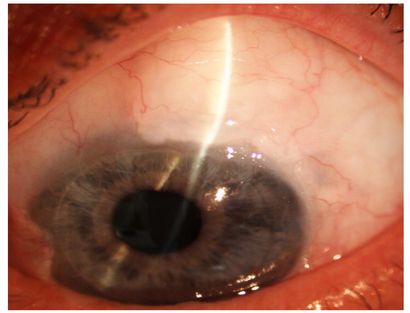
Results

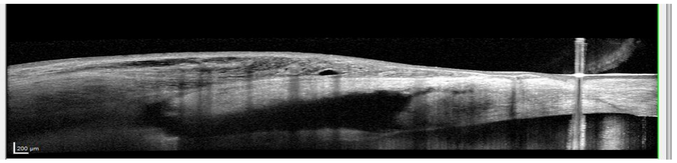
10 eyes of 10 patients underwent DS on a background of corneal graft; 7 penetrating keratoplasties, and 3 endothelial keratoplasties. Mean age was 54.6 years with a mean follow-up period of 60.2 months.

Mean pre-operative IOP was 32.2 mmHg (range 17-52 SD 12.7). First post-operative IOP was mean 12.1 mmHg (range 2-24, SD 6.6), with mean final IOP 12.6 mmHg (range 6-18, SD 4.0). Mean change in IOP was -19.6 mmHg, with a mean reduction of 2.2 glaucoma medications.

One eye had perforation of the trabeculo-Descemet's membrane (TDM) peri-operatively, and one had corneal perforation. Post-operatively, 3 eyes developed numerical hypotony (IOP ≤5 mmHg), without sequelae. One eye (who had intra-operative TDM perforation) developed hypotony with choroidal effusion, which resolved without surgical intervention. 4 patients developed IOP ≥21 mmHg over the course of follow-up, though all eyes had a final IOP of <18 mmHg.

1 eye underwent bleb needling and antimetabolite injection. 3 underwent YAG goniopuncture to open the TDM. 1 patient with recurrent microbial keratitis required 2 bleb revisions and 4 repeat PKPs; he suffered expulsive haemorrhage during the last PKP and later underwent evisceration.





Colour photo of DS with OCT of bleb, demonstrating the subscleral lake

Discussion and conclusions

We have found DS to be an effective treatment to lower IOP in patients with corneal grafts, with all patients having final IOP of 6-18 mmHg and all but one experiencing a reduction in their glaucoma medications. This compares well with the literature, which suggests higher success rates than trabeculectomy in patients with corneal grafts in the 1st year (76% vs 44%), which equalises at 5 years (44% vs 49%).[1]

Transient hypotony was common post-operatively, though only one patient suffered visual sequelae as a result. Published rates of chronic hypotony are around 13.5%, with 5.6% suffering visual sequelae – though this includes all patients with DS, not just those with corneal grafts.[2]

Further procedures to control raised IOP were also common, with 30% needing YAG goniopuncture and 10% undergoing bleb needling; these procedures successfully lowered IOP.

We feel DS is a promising surgical option for glaucoma specialists to manage some of these difficult eyes with concurrent corneal grafts.

1. Loriaut P et al. DS vs. trabeculectomy in eyes with PKP. *Cornea* 2015;34(4):375-80

2. Rabiolo et al. Hypotony-associated complications after DS: incidence, risk factors and long-term outcomes. *J Glaucoma* 2021;30(7):e314-26