'Flying Eagle' Incision for Combined Manual Small Incision Cataract Surgery-Trabeculectomy

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Abstract

Combined trabeculectomy with cataract extraction is a frequently performed procedure. Manual small incision cataract surgery (MSICS) is preferred over phacoemulsification in combination with trabeculectomy in situations like lens induced glaucoma, hard cataract, non-dilating pupil with shallow chamber, corneal opacities or non-availability of phacomachine. We describe a simple technique of MSICS-trabeculectomy with lens implantation using anterior chamber maintainer that results in satisfactory control of intraocular pressure with minimal induction of astigmatism.

Keywords: combined surgery; MSICS; trabeculectomy; intraocular pressure

Introduction

Development of cataract in glaucomatous eyes impedes the examination of fundus, visual acuity and visual field scores. A combined trabeculectomy with cataract extraction with posterior chamber lens (PCIOL) implantation is the surgical procedure of choice for visually significant cataract interfering with the daily functions of life and failure to achieve target pressures by medications and/or trabeculoplasty, borderline controlled intraocular pressure (IOP), disease progression on near maximal medical therapy, or advanced glaucomatous damage on at least two or three medications. Phacoemulsification with trabeculectomy has the advantage of lesser conjunctival dissection, leaving intact conjunctiva for future interventions. However, lens induced glaucoma, hard cataract, non-dilating pupil with shallow chamber and corneal opacities are some situations where manual small incision cataract surgery (MSICS) is preferred. We describe a technique of MSICS-trabeculectomy with PCIOL implantation that results in reproducible lowering of intraocular pressure (IOP) with minimal surgically induced astigmatism (SIA).

Principle

A superior sclero-corneal tunnel is dissected with frown shaped external incision and a rectangular partial thickness scleral flap at the centre. After the nucleus delivery and IOL implantation, 2X2mm fistula is created using an MVR knife and Vanna’s scissors. Iridectomy is performed and two sutures are applied at the posterior free vertices of the rectangle to secure the fistula and prevent against the wound (ATW) astigmatism followed by bleb forming sutures to ensure an adequate bleb formation.

Procedure

A peribulbar anaesthesia (without adrenaline especially in patients with advanced cupping) is used. Superior rectus suture is applied; the conjunctiva is dissected far posteriorly using a fornix based flap and a gentle cauterization is performed saving the perforators. A frown shaped external incision is fashioned (summit should be 1.5 mm from the limbus) with an additional creation of a central rectangular scleral flap 1.5X3mm (Vertical X Horizontal). The MSICS with PCIOL implantation is performed using anterior chamber maintainer (ACM). Figure 1,2 & 3 The pupil is constricted with 0.5% intracameral pilocarpine and the anterior chamber is formed with 2% hydroxymethylcellulose.

Figure 1: A frown shaped external incision is fashioned with an additional creation of a rectangular shaped scleral flap at its center.

Figure 2: The nucleus is delivered using ACM.
The rectangular scleral flap is lifted, the anterior and posterior sides of the 2x2 mm square shaped fistula are created using MVR knife at the blue-white junction of limbus, joined laterally using Vannas scissors and a block of deep limbal tissue is excised. (Figure 4-6) A peripheral iridectomy is performed while keeping the blades of Vannas horizontal. (Figure 7) Two sutures are placed at the two free vertices of the scleral flap using 10-0 nylon. (Figure 8) Viscoelastic is removed from the anterior chamber and replaced with mixture of Basic salt solution and air. The conjunctival
edges are sutured using 8-0 vicryl wing sutures. One or two bleb forming sutures are passed with 10-0 nylon. The first bite is taken from internal surface of conjunctival free edge towards its external surface; the needle is moved towards the right and brought out again towards the internal surface; a horizontal bite is taken through partial thickness of corneal stroma towards the left and tied to the free end of suture. The knot gets buried under the conjunctiva. (Figure 9-11) This prevents the occurrence of leakage at the limbus in the early postoperative period and guards against hypotony and choroidal detachment. The side ports are hydrated. In high risk cases, 0.2mg/ml for 2 minutes Mitomycin C is applied on the sclera prior to intraocular entry.

**Postoperative treatment**

Systemic antibiotics and anti-inflammatory for 5 days; topical antibiotic-steroid drops in tapering doses for 6 weeks and cycloplegic are prescribed for a week.

**Results**

In our series of 30 eyes, at one year of follow up, IOP remained between 10-15 mm of Hg in 23 eyes (76%) and 15-20 mm of Hg in 7 eyes (23%). The mean IOP reduction was 17±2.59 mm of Hg. There were no intraoperative or postoperative complications. SIA was less than 0.5D in all the eyes.

**Discussion**

Single site combined MSICS-trabeculectomy is described using sutureless frown incision and suured ‘W shaped ’ incision. The mean IOP reduction in sutureless group was reported to be 12.52 ± 3.59 and, in sutured ‘W’ incision was 16.47 ±3.79 mm Hg (p<0.01) at 6 weeks of follow up. Our series had a comparable reduction to the latter at one year of follow up. Iris prolapse, corneal edema, uveitis and shallow anterior chamber reported in the sutureless group 2 was not seen in our series and could be explained due to better wound stability.

We used ACM for nucleus delivery. Fluctuation of IOP during cataract surgery, which may be detrimental to an already compromised optic disc has been shown to be reduced with ACM. Also, in eyes with shallow anterior chamber, 12 o’clock cortical aspiration becomes much safer through the side port with a stable chamber through ACM infusion.

Two-site approach is reported to cause less chance of collateral damage to the filtering incision, compared with a single superior scleral tunnel incision. Lesser tissue manipulation may lead to less inflammation and scarring, optimizing filtration. On the other hand, there have been claims that one site combined procedure performed with a high dose of mitomycin –C results in optimal glaucoma control.

In a properly constructed tunnel and ACM infusion, the intraoperative handling is lesser in comparison to other techniques of MSICS. Excision of the block by our technique causes minimal trauma to tissues. An unsutured wound longer than 4.0 mm may create
significant postsurgical ATW changes. Valvular incisions, which finally enter the anterior chamber around 2-3mm ahead of Schwalbe’s line, through a beveled wound, create a corneal lip which rises up to close the wound as soon as the pressure in the chamber builds up. While creating the sclerostomy, the valvular mechanism gets compromised. Leaving a bridge of intact corneal lip anteriorly and placing the scleral sutures, prevents the ATW shift. This, along with meticulous closure of conjunctiva, also prevents occurrence of postoperative hypotony.

The surgery can be performed through a temporal incision, but the bleb is no longer conferred the protection of the upper lid.

Thus our technique of combined surgery results in satisfactory control of IOP with minimal SIA. Lifelong follow up is however required as no treatment guarantees a permanent 100% cure.

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