Outcomes Of Combined Phaco -Trabectome Surgery in Patients with Cataract and Primary Open-angle Glaucoma

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Abstract: Purpose: To evaluate outcomes of phaco- trabectome surgery in patients with cataract and primary open-angle glaucoma. **Methods:** A study including 22 patients (22 eyes) with primary chronic open-angle glaucoma, all patients suffering from cataract and medically uncontrolled IOP, progressive visual field loss, extensive glaucomatous damage to the optic disc, and an open chamber angle suitable for goniosurgery. Exclusion criteria were young age (<40 years), chronic angle-closure glaucoma and secondary glaucoma due to inflammation or trauma. **Results**: Mean preoperative variables were best corrected vision, 0.63 (SD 0.4) (20/100 Snellen); IOP, 19.8 (SD 5.3) mm Hg; and number of glaucoma medications, 1.8 (SD 0.8). Mean postoperative results were best corrected vision, 0.2 (SD 0.4) (20/40 Snellen); IOP, 15.8 (SD 3.4) mm Hg; and number of glaucoma medications, 0.4 (SD 0.7). Postoperatively, the mean decreases from baseline were 19.9% for IOP and 88.1% for number of glaucoma medications; 23% of eyes required fewer glaucoma medications and 77% of eyes were medication free, with IOP control. There were no significant postoperative complications. Intraoperative reflux bleeding occurred in 100% of cases. Complications have been minimal and not vision-threatening. **Conclusions:** The trabectome facilitates minimally invasive and effective glaucoma surgery, which spares the conjunctiva and does not preclude subsequent standard filtering procedures. Combined phacoemulsification and trabectome is a safe, effective, and stable alternative for patients with cataracts and glaucoma.
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Keyword: Phaco-trabictome , Phaco- Glaucoma surgery ,Combined cataract and glaucoma surgery.

1.Introduction

Pathological outflow obstruction within trabecular meshwork is the main key to increased intraocular pressure (IOP) in various forms of chronic open-angle glaucoma.[1] Conventional surgical procedures, such as goniotomy and trabeculotomy, aim at a mechanical dissection and disruption of trabecular tissue in order to create an aperture connecting the anterior chamber to Schlemm's canal. Both surgical modalities have been approved as reliable in treatment of glaucomas.[2, 3, 4,and 5]

Compared with previous methods of ab interno or ab externo trabeculotomy, the trabectome has been demonstrated to have equivalent or better short-term IOP outcomes in adults. The trabectome has a superior safety profile with substantially fewer serious or vision-threatening complications than trabeculectomy with mitomycin-C and is equivalent to those reported with other methods of trabeculotomy.[5, 6, 7, and 8] The only common complication reported with any method of trabeculotomy is intraoperative reflux bleeding, which clears rapidly without residual vision damage. As is often the case, previously described techniques that utilized similar approaches to opening Schlemm's to direct aqueous access should be acknowledged and appreciated.[9,and 10]

The combined surgical treatment of glaucoma and cataracts has been the subject of some controversy. Recent advances in cataract incisional techniques and in glaucoma medications have changed the indications for surgery by minimising the severity of complications. In the 1990s, phacoemulsification and the use of small incision foldable lenses increased the success of combined phacoemulsification/trabeculectomy surgery. Early studies showed promising results. [11]

The aim of the current study is to describe outcome with this surgical modality intervention, a new promising alternative in the non-filtering treatment of human chronic open-angle glaucoma associated with cataract.

2. Methods

Patients

A study including 22 patients with primary chronic open-angle glaucoma, all suffering from medically uncontrolled IOP, progressive visual field loss, extensive glaucomatous damage to the optic disc, and an open chamber angle suitable for goniosurgery all patients in the study had a visually significant cataract. Exclusion criteria were young age (<40 years), chronic angle-closure glaucoma and secondary glaucoma. Consent was obtained from all patients after they had been fully informed about the surgical intervention.

The preoperative data obtained for each patient included age, sex, ocular history, visual acuity, IOP, and number of glaucoma medications. Postoperatively, visual acuity, IOP, number of glaucoma medications, and complications were documented.

Anaesthesia was achieved with a peri/retrobulbar block of 0.75% Marcaine and 2% lidocaine in a 50:50 mixture. A sharp keratome was used to create a tunnel into the anterior chamber. After phacoemulsification(Fig. 1), a foldable Acrysof (Alcon Laboratories, Inc, Fort Worth, TX, USA) lens was placed into the capsular bag. Miochol was injected into anterior chamber then viscoelastic material (Healon GV) was injected in order to deepen the anterior chamber and to guarantee the best gonioscopic view of the angle structures. A1.7-mm clear cornea incision was made at a temporal position. A modified Swan-Jacob gonioscopic lens with a filling fluid (hydrox-ypropylmefhycellulose 2.5%) was placed on the cornea (Fig. 2). The trabectome was inserted into the anterior chamber and approached transcamerally close to the nasal chamber angle. A power-adjustable micro bipolar cautery is positioned so as to receive and ablate angle tissues fed into the spark as the tip is moved along an arc parallel and just anterior to the scleral spur under direct gonioscopic control arcs of tissue were ablated in both clockwise and counterclockwise directions totaling approximately 60° to 90° of arc (2+ clock-hours) or to the limit of an adequate view. Continual infusion during ablation helps avoid heat-related damage to adjacent tissues, and aspiration out through the instrument's shaft removes tissue debris (Fig. 3). In some cases, a single 10-0 nylon suture was placed across the corneal wound and an air bubble installed as an aid to internal tamponade (Fig. 4).

Topical steroids and antibiotics were applied. The patients were examined postoperatively.

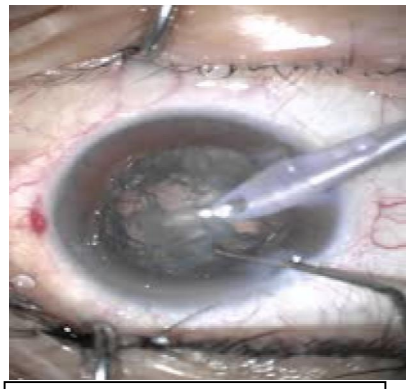

Fig.1 –phacoemuslifcation.

Fig.2- A modified Swan-Jacob gonioscopic lens placed on the cornea .

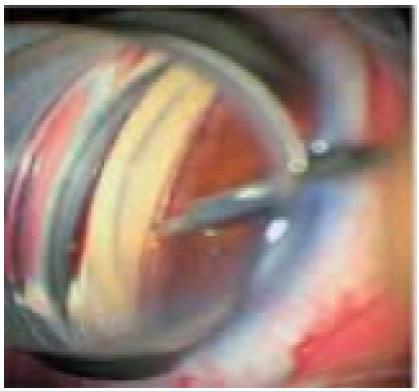

Fig. 3-Shows the trabectome inserted into the anterior chamber and approached transcamerally close to the nasal chamber angle.

Fig. 4- Air bubble installed as internal tamponade.

3.Results

Combined phaco/trabectome was performed on 22 eyes of 22 patients and followed up for a mean of 12 months (range 6–32 months). Forty eight per cent of the patients were male; average age was 76.5 (SD 10) years.

Mean preoperative variables were best corrected vision, 0.63 (SD 0.4) (20/100 Snellen); IOP, 19.8 (SD 5.3) mm Hg; and number of glaucoma medications, 1.8 (SD 0.8). Mean postoperative results were best corrected vision, 0.2 (SD 0.4) (20/40 Snellen); IOP, 15.8 (SD 3.4) mm Hg; and number of glaucoma medications, 0.4 (SD 0.7). Postoperatively, the mean decreases from baseline were 19.9% for IOP and 88.1% for number of glaucoma medications (Fig.5); 23% of eyes required fewer glaucoma medications and 77% of eyes were medication free , with IOP control (Fig.6). There were no significant postoperative complications. Intraoperative reflux bleeding occurred in 100% of cases. Complications have been minimal and not vision-threatening.

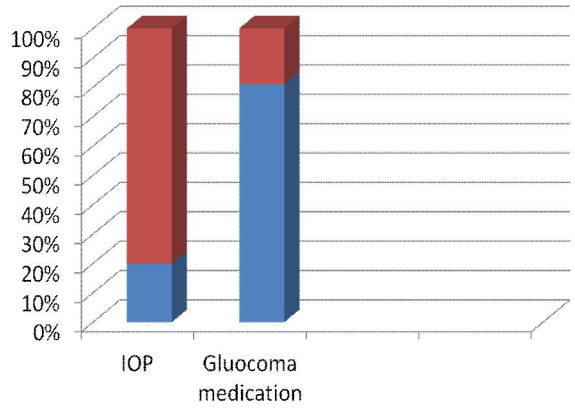

Figure (5): The mean decreases from baseline are 19.9% for IOP and 88.1% for number of glaucoma medications.

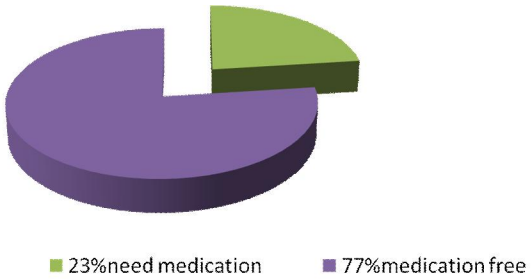

Figure (6): Shows 23% of eyes required fewer glaucoma medications and 77% of eyes are medication free.

During the procedure moderate reflux bleeding from Schlemm's canal was seen in each treated eye, but trabectome could always be safely accomplished without loss of gonioscopic visualization. No inadvertent intraoperative damage to the cornea or crystalline lens occurred. In most cases intracameral blood was resorbed during the 1 day. In two patients a small blood clot arises on postoperative day 3.

4. Discussion

Cataract surgery in patients with open angle glaucoma requires careful monitoring of postoperative pressure spikes; combined procedures can reduce the frequency and magnitude of this complication.[12] Many authors have outlined the indications for a combined procedure,[13] but no simple technique without the use of antimetabolites and with a low complication rate has been presented.

Over the past decade, antimetabolite agents such as 5 - fluorouracil (5 - FU) and mitomycin C (MMC) have been used in glaucoma surgeries to ensure functional success in bleb survival. However, many investigators have reported an increase in late onset bleb associated endophthalmitis since the advent of antimetabolite agents.[14,15and16] Other potential complications include postoperative hypotony, corneal erosions, endothelial toxicity, and wound instability.[17,18] With MMC, the overall incidence of bleb leaks and infections appears to be constant over time: 1.3% per year for endophthalmitis and 4.4% per year for any complication (bleb leak, blebitis, or endophthalmitis), which means that after 5 years, up to 23% of eyes may develop a complication.[19]

The Trabectome surgical device was cleared by the US Food and Drug Administration in January 2004 for the treatment of adult and juvenile open-angle glaucoma. The concept is similar in principle to ab interno trabeculotomy, the key difference being that a microelectrocautery device is used to ablate a strip of the trabecular meshwork and inner wall of Schlemm's canal, thus allowing direct access of aqueous to the collector channels. This theoretically bypasses the main site of resistance to aqueous outflow and reestablishes the natural drainage passageway out of the eye. [20]

Compared to mechanical goniotomy or trabeculotomy, the trabectome has a superior safety profile with substantially fewer serious or vision-threatening complications than trabeculectomy with mitomycin-C and is equivalent to those reported with other methods of trabeculotomy[21,22]. The only common complication reported with any method of trabeculotomy is intraoperative reflux bleeding, which clears rapidly without residual vision damage. As is often the case, previously described techniques that utilized similar approaches to opening Schlemm's to direct aqueous access should be acknowledged and appreciated.[23, 24]

Moderate reflux bleeding was assessed as an intraoperative sign of fully penetrating opening of the inner wall of Schlemm's canal, which is continuous

with episcleral veins. Due to intracameral injection of viscoelastics this sort of bleeding can always be kept under control. In one patient, residual intracameral blood induced a transient IOP elevation that was kept under control by oral acetazolamide during the first 2 days after operation. In most cases intracameral blood was resorbed during the 1 day. In tow patient a small blood clot arise on postoperative day 3.

Postoperative hypotony (IOP< 10 mmHg) or flattened anterior chamber occurred in none of the treated eyes. Theoretically, all outflow drainage structures beyond Schlemm's canal remain intact when performing trabectome, thus limiting the risk of the excessive outflow in the early postoperative period that is seen with laser sclerostomy or Elliot's trephination. This is a logical and constant advantage of trabecular surgery over any kind of filtering surgery. Inadvertent trabectome application to the subciliary space resulting in a -induced cyclodialysis in the treatment area was not observed by either gonioscopy or by ultrasound biomicroscopy in any of the patients. Inadvertent cyclodialysis or iridodialysis and a direct damage to the neighboring corneal endothelium should be avoided by correct applying the tip under the highest available gonioscopic magnification.

The combined phaco/trabectome is a reasonably safe and effective procedure. Ninety four per cent of eyes in our series had improved visual acuity postoperatively. Less than 6% of patients lost two to three lines of BCVA. Fewer than 2% of patients required an increase in the number of glaucoma medications postoperatively. Complications were rare.

The efficacy of a procedure is measured by the number of patients who achieve a desired result, and visual acuity improved postoperatively in 94% of eyes in our series. Preoperatively, 61% of patients had a BCVA of 20/60 or worse; postoperatively, 80% had a BCVA of 20/40 or better. Control of IOP was improved postoperatively. The mean drop in IOP from baseline was 19.9% and the mean drop in number of glaucoma medications was 81%. Seventy seven per cent of eyes were medication free at the time of last follow up.

Combining the cataract operation with the trabectome offers the main advantage of requiring only one operation to achieve a lower IOP after cataract surgery. [25]

In summary, our cases of combined phaco/trabectome resulted in excellent IOP control, substantial visual recovery, and a decrease in the number of glaucoma medications with few complications. This combined technique adds to our armamentarium a surgery that is reasonably safe, effective, predictable, and stable.

References

1. Lee WR: The pathology of the outflow system in primary and secondary glaucoma. Eye.1995; 9:1-23
2. Harms H, Dannheim R : Trabeculotomy: results and problems. Adv Ophthalmol. 1970; 22:121-131
3. Morgan KS, Black B, Ellis FD, Hel-veston EM : Treatment of congenital glaucoma. Am J Ophthalmol. 1981; 92:799-803
4. Skuta GL, Parrish II RK: Wound healing in glaucoma filtering surgery. Surv Ophthalmol. 1987; 32:149— 170
5. Tanihara H, Negi A, Akimoto M, Ter-auchi H, Okudaira A, Kozaki J, Take-uchi A, Nagata M : Surgical effects of trabeculotomy ab externo on adult eyes with primary open angle glaucoma and pseudoexfoliation syndrome. Arch Ophthalmol. 1993; 111: 1653-1661
6. Chinhara E, Nishida A, Kodo M, et al. Trabeculotomy ab externo: an alternative treatment in adult patients with primary open-angle glaucoma. Ophthalmic Surg. 1993; 24:735–739.
7. Quaranta L, Hitchings RA, Quaranta CA. Ab-interno goniotrabeculotomy versus mitomycin C trabeculectomy for adult open-angle glaucoma. Ophthalmology. 1999; 106:1357–1362.
8. Wormald R, Wilkins MR, Bunce C. Post-operative 5-Fluorouracil for glaucoma surgery. Cochrane Database Syst Rev. 2003;(3):CD0011.
9. Moses RA. Electrocautery puncture of the trabecular meshwork in enucleated human eyes. Am J Ophthalmol. 1971; 72:1094 –1096.
10. Maselli E, Galantino F, Pruneri F, et al. Diathermo-trabeculotomy ab externo: indications and long-term results. Br J Ophthalmol. 1977;61:675 – 676.
11. Parker J S, Stark W J. Combined trabeculectomy, cataract extraction, and foldable lens implantation. J Cataract Refract Surg 1992. 18582–585.5855.
12. Krupin T, Feitl M E, Bishop K I. Postoperative intraocular pressure rise in open‐angle glaucoma patients after cataract or combined cataract filtration surgery. Ophthalmology 1989. 96579–584.584.
13. Shields M B. Combined cataract extraction and glaucoma surgery. Ophthalmology 1982. 89231–237.237.]
14. Jampel H D, Quigley H A, Kerrigan‐Baumrind L A. *et al* Risk factors for late‐onset infection following glaucoma filtration surgery. Arch Ophthalmol 2001. 1191001–1009.1009.
15. Greenfield D S, Suner I J, Miller M P. *et al*

Endophthalmitis after filtering surgery with Mitomycin. Arch Ophthalmol 1996. 114943–949.949.
16. Higginboham E J, Stevens R K, Musch D C. *et al* Bleb‐related endophthalmitis after trabeculectomy with mitomycin‐C. Ophthalmology 1996. 103650–656.656.
17. Suner I J, Greenfield D S. Hypotony maculopathy after filtering surgery with mitomycin C. Ophthalmology 1997. 104207–215.215.
18. DeBry P W, Perkins T W, Heatley G. Incidence of late onset bleb related complications following trabeculectomy with mitomycin. Arch Ophthalmol 2002. 120297–300.300.
19. Lochhead J, Casson R J, Salmon J F. Long term effect on intraocular pressure of phacotrabeculectomy compared to trabeculectomy. Br J Ophthalmol 2003. 87850–852.852.
20. Francis BA, See RF, Rao NA, Minckler DS, Baerveldt G: Ab interno trabeculectomy: development of a novel device (Trabectome) and surgery for open-angle glaucoma. J Glaucoma. 2006 Feb;15(1):68-73.
21. Minckler DS, Baerveldt G, Alfaro MR, et al. Clinical results with the Trabectome for treatment of open-angle glaucoma. Ophthalmology. 2005;112:962–967.
22. Francis BA, See RF, Rao NA, et al. Ab interno trabeculectomy: development of a novel device (Trabectome) and surgery for open-angle glaucoma. J Glaucoma. 2006;15:68–73.
23. Mendicino ME, Lynch MG, Drack A, et al. Long-term surgical and visual outcomes in primary congenital glaucoma: 360 degrees trabeculotomy versus goniotomy. JAAPOS. 2000;4:205–210.
24. Hoffmann E, Schwenn O, Karallus M, et al. Long-term results of cataract surgery combined with trabeculotmy. Graefes Arch Clin Exp Ophthalmol. 2002;240:2–6.
25. Tanito M, Ohira A, Chihara E. Surgical outcome of combined trabeculotomy and cataract surgery. J Glaucoma. 2001;10:302–308.

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