MANAGING COEXISTING CATARACT AND GLAUCOMA

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Glaucoma is the most important cause of irreversible blindness worldwide. At least 70 million people are suffering from glaucoma of which 10% are bilaterally blind[1]. Elevated intraocular pressure (IOP) is the most important risk factor in the development of the disease. Lowering the IOP is most important for management of glaucoma.

According to the WHO, cataract is the main cause of reversible blindness worldwide. Within the aging population, it is increasingly frequent for cataract and glaucoma to coexist in the same patient. The treatment of coexistent cataract and glaucoma is a prevalently clinical challenge. The treatment of either condition can influence the course of the other.

In recent years, changes in surgical technique have greatly impacted the surgical method to patients with coexisting cataract and glaucoma. Especially, there has been an extensive tendency toward the application of combined phacoemulsification with intraocular lens (IOL) implantation and trabeculectomy (phacotrabeculectomy) as one choice of the surgical management for this situation[2].

This article will evaluate the different aspects that affect the choice and result of surgical treatment in patients with coexisting glaucoma and cataract.

PHACOEMULSIFICATION VS TRABECULECTOMY VS PHACOTRABECULECTOMY

Therapeutic options for coexisting cataract and glaucoma:

- Cataract surgery alone
- Sequential surgery – Trabeculectomy followed by cataract surgery
- Combined glaucoma and cataract surgery

In this article, we will be referring to phacotrabeculectomy for combined glaucoma and cataract surgery as it is the most preferred surgical technique for coexisting glaucoma and cataract.

Cataract Surgery Alone

Indications-

- Mild to moderate POAG/PACG well controlled on medical therapy with visually significant cataract
- Ocular Hypertensives with cataract
- Phacomorphic glaucoma with short history

Advantages-

- Lowers IOP in normal and glaucomatous eyes[2-4 mmHg]
- Reduction in the number of anti-glaucoma medications [41% reduction]

Mechanism Of Iop Reduction-

- Post-operative anatomic alterations or aqueous humor dynamic changes that could relate to an enhanced aqueous out flow through either the trabecular meshwork or the uveoscleral pathway

Disadvantages-

- Post-operative pressure spikes after cataract surgery [Elevation of IOP to 30mmHg in 55% of normal and 77% of glaucomatous eyes]

Intra/Post Operative-

- Clear corneal temporal incision is preferred
- Remove all the viscoelastic material at the end
- Monitor for post op IOP spikes
- Cautious use of steroids

PHACO VS PHACOTRAB: Combined cataract and glaucoma surgery may provide a small benefit in terms of controlling IOP than cataract surgery (phacoemulsification) alone[4] [Systematic Review 2015].

Sequential Surgery – Trabeculectomy followed by Cataract Surgery

Indications-

- Advanced glaucomatous damage requiring IOP in low teens
- Uncontrolled IOP with maximum tolerable medical therapy
- Moderate glaucomatous damage with visually insignificant cataract
- Presence of risk factors for filtration failure-conjunctival scarring/healed uveitis/neovascular glaucoma, etc.

Advantages-

- The success of bleb formation and IOP control is better with trabeculectomy alone as compared to combined surgery[5]

Disadvantages-

- Two separate surgical procedures
- Increased chances of cataract development
- High likelihood of loss of IOP control or bleb failure after lens extraction
- Eyes with previous successful trabs had higher IOPs and required more medications after subsequent cataract surgeries[6].

Intraoperative-

- A conventional superior filtration surgery with or without anti-metabolites may be performed initially and cataract extraction carried out later, preferably after 6 months
- Interval of fewer than 6 months- significant risk factor for loss of IOP control[7].

Combined Glaucoma and Cataract Surgery [Phacotrabeculectomy]

Figure 1(a): *Fornix based peritomy*

Figure 1(b): *Subconjunctival application of MMC soaked sponge*

Figure 1(c): *Rectangular superior scleral flap*

Figure 1(d): *Dissection of scleral flap 1-2 mm into the cornea*

Figure 1(e): *Entry into AC using keratome beneath flap*

Figure 1(f): *Phacoemulsification carried through main port under the flap*

Figure 1(g): *PCIOL insertion through the main port*

Figure 1(h): *Excision of deep scleral block and iridectomy*

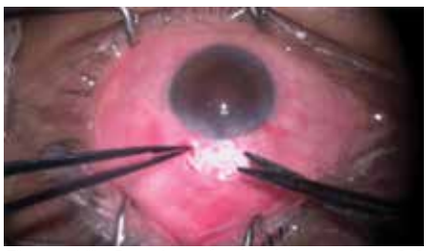

Figure 1(i): *Suturing of scleral flap using 10-0 nylon*

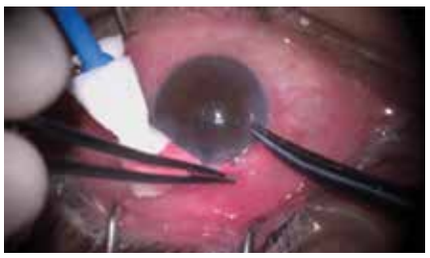

Figure 1(j): *Conjunctival suturing using 8-0 vicryl*

Indications-

- Mild /moderate or severe glaucoma with borderline/ uncontrolled IOP on maximum tolerable medical therapy with visually significant cataract
- Advanced glaucomatous optic atrophy at risk of damage due to post-operative IOP spikes
- Moderate to severe glaucoma, with controlled IOP, where there is an urgent need for visual recovery
- The need to eliminate medication because of non-compliance, allergies, side-effects, or unsustainable economic expenses

Advantages-

- Eliminates the risk of two invasive procedures
- Early visual rehabilitation as compared to trabeculectomy followed by cataract extraction
- Favorable outcome in elderly patients
- Better patient satisfaction, compliance and economy

Disadvantages-

- Increased intra operative manipulations, time, complications like vitreous loss, corneal endothelial damage and post-operative inflammation &hyphaema
- The risk of endophthalmitis is higher
- Compared to trabeculectomy, relatively lesser long term reduction in IOP and lower long term bleb success[8].

TRAB VS PHACOTRAB: Compared with trabeculectomy plus phacoemulsification, trabeculectomy alone is more effective in lowering IOP and the number of glaucoma medications, while the two surgeries cannot demonstrate statistical differences in the complete success rate, qualified success rate, or incidence of adverse incidents [Meta-analysis 2018].

SURGICAL TECHNIQUE OF ONE SITE PHACOTRABECULECTOMY [SCLERAL FLAP METHOD]

- A bridle suture or a corneal traction suture.
- Limbus based (8-9 mm behind limbus) or fornix based (incision at limbus extended 5-6 mm) conjunctival flap is made first (Figure 1a).
- Sponges soaked inMMC 0.2mg/ml are kept under the conjunctival flap for 2min and then washed throughly with BSS. (Figure 1b).
- A triangular (3mmx2mm) or rectangular (3mmx 4mm) superficial scleral flap is made and extended upto 1-2 mm on the cornea. (Figure 1c,d).
- Entry into AC is made either from side port or from main port and a CCC is made (Figure 1e).
- The main port entry is then used to complete steps of phacoemulsification and PCIOL implantation (Figure 1f,g).
- After completion of phaco, under intracameral pilocarpine to constrict the pupil, excision of deep scleral block is done with a Kelly's punch (or a vannas scissors) followed by a

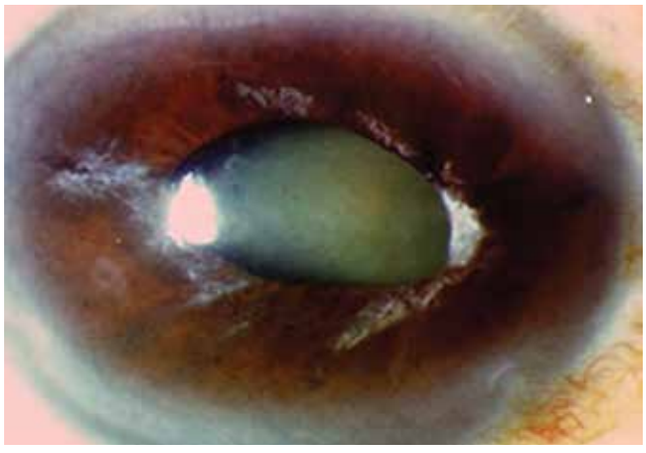

Figure 2(a): *Case of PACG with uncontrolled glaucoma on maximal medication and brown cataract.*

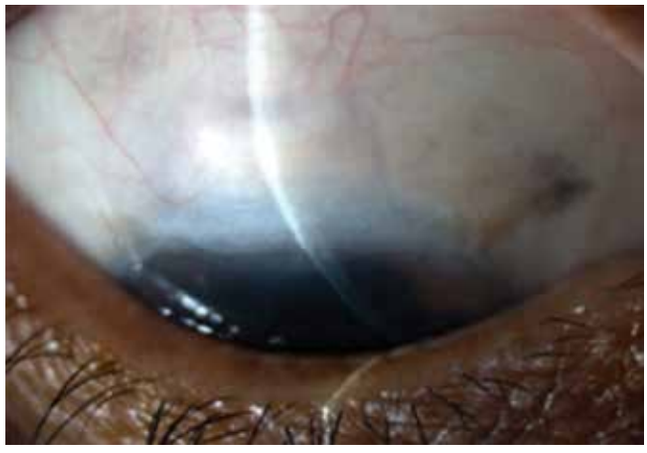

Figure 2(b): *Same eye post single site phacotrabeculectomy showing diffuse moderately elevated and vascularized bleb.*

peripheral iridectomy (Figure 1h).

- Suturing of scleral flap with 10-0 nylon (a releasable suture is preferable) under viscoelastic in AC to prevent a shallow AC. (Figure 1i).
- The releasable sutures may be of two types: Wilson's or Cohen's technique.
- Viscoelastic material is removed through irrigation/aspiration.
- Suturing conjunctival flap with 8-0 or 10-0 vicryl with an additional corneal attachment to ensure zero leakage is the next step (Figure 1j).
- (Figure 2a,b) illustrates a case of Primary Angle closure Glaucoma uncontrolled on maximal medical therapy with brown cataract successfully treated with one site phacotrabeculectomy.

VARIATIONS IN SURGICAL TECHNIQUE OF PHACOTRABECULECTOMY: ONE SITE VS TWO SITE

ONE SITE technique-

Advantages:

- Saves Time
- One wound is made
- No need for the surgeon to change his/her position and the microscope

Disadvantages:

- More post-operative inflammation
- Excessive conjunctival manipulation
- Longer visual recovery
- Care needed to avoid spillage of antimetabolites into the anterior chamber, if used after creation of a scleral flap.

TWO SITE technique-

Advantages:

- Improved exposure for cataract extraction through temporal clear corneal approach especially helpful in deep set eyes, narrow palpebral fissure
- Less inflammation and less manipulation of the conjunctiva superiorly enhances bleb survival and facilitates rapid visual recovery.

Disadvantages:

- May take longer
- Surgeon needs to change position

> **ONE SITE VS TWO SITE:** Both techniques yielded similar results concerning final BCVA and IOP reduction. However, the two-site group had less induced astigmatism and a better postoperative IOP control with less required postoperative anti-glaucoma medications compared to the one-site group .

NEWER MODALITIES OF COMBINED SURGERY:

Although phacotrabeculectomy is still the most widely performed surgery for coexisting cataract and glaucoma, there have been various other newer techniques coming up with promising results:

1. Microincision cataract surgery [MICS] and trabeculectomy: MICS permits phacoemulsification through clear corneal wounds <1.5 mm using a sleeveless phaco tip and irrigating chopper. It can be combined with trabeculectomy in which the IOL is implanted through the trabeculectomy site thus, avoiding the need for larger corneal wound. Moreover, the trabeculectomy fistula is not traumatized by phaco energy.

> **MICS +TRAB VS PHACOTRAB:** MICS + trabeculectomy provided 1 year IOP control comparable to that with two-site phacotrabeculectomy with similar amount of complications and similar final BCVA

2. Others- there are few other modalities of combined surgery which are not routinely performed in Indian scenario and require further long term studies to establish their effect. To enumerate a few:

1. Phaco- viscocanalostomy
2. Phaco- deep sclerectomy
3. Phaco- trabectome
4. Phaco- ExPRESSminishunt
5. Phaco- iStent
6. Phaco-canaloplasty
7. Phaco-endoscopic cyclophoto-coagulation

CONCLUSION

To conclude, phacotrabeculectomy with MMC is considered to be a safe and effective treatment for glaucoma patients with cataracts. It eliminates the risk of two invasive procedures and simultaneously provides a satisfactory IOP reduction and good visual outcome as compared to trabeculectomy alone. However, careful patient selection is essential in order to avail maximal benefit of this surgery.

REFERENCES

1. Quigley HA, Broman AT. The number of people with glaucoma worldwide in 2010 and 2020. Br J Ophthalmol2006;90:262-267.
2. Casson RJ, Salmon JF. Combined surgery in the treatment of patients with cataract and primary open-angle glaucoma. J Cataract Refract Surg. 2001;27:1854-1863.
3. Kim DD, Doyle JW, Smith, IOP reduction following phacoemulsification cataract extraction with PC implantation in glaucoma patients Ophthalmic surg. 1999;30:37-40
4. Zhang ML, Hirunyachote P, Jampel H. Combined surgery versus cataract surgery alone for eyes with cataract and glaucoma. The Cochrane database of

systematic reviews. 2015;7:CD008671.
5. Derick et al combined phacoemulsification and trabeculectomy vs trabeculectomy alone Ophthalmic Surg. lasers 1998
6. Kass M, cataract extraction in an eye with filtration bleb Ophthalmology, 1982; 89:871 Steve et al Opthalmicsurg lasers 1996
7. Chen PP, Weaver YK, Budenz DL, Feuer WJ, Parrish II RK. Trabeculectomy function after cataract extraction1. Ophthalmology. 1998;105:1928-35.
8. Jiang N, Zhao GQ, Lin J, Hu LT, Che CY, Wang Q, Xu Q, Li C, Zhang J. Meta-analysis of the efficacy and safety of combined surgery in the management of eyes with coexisting cataract and open angle glaucoma. International journal of ophthalmology. 2018;11:279.
9. Moschos MM, Chatziralli IP, Tsatsos M. One-site versus two-site phacotrabeculectomy: a prospective randomized study. Clinical interventions in aging. 2015;10:1393.
10. Bayer A, Erdem Ü, Mumcuoglu T, Akyol M. Two-site phacotrabeculectomy versus bimanual microincision cataract surgery combined with trabeculectomy. European journal of ophthalmology. 2009;19:46-54.

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DELHI OPHTHALMOLOGICAL SOCIETY

NOTICE & ANNOUNCEMENTS

DOS ELECTION-2019

Nominations are invited from the valid Delhi Members of the Delhi Ophthalmological Society for the following posts:

1.	Vice President	(1 Post)
2.	Secretary	(1 Post)
3.	Joint Secretary	(1 Post)
4.	Treasurer	(1 Post)
5.	Editor	(1 Post)
6.	Library Officer	(1 Post)
7.	Executive Members	(8 Posts)
8.	DOS Representatives to AIOS	(2 Posts)

Nomination form can be collected from the DOS Secretariat during working hours. The valid Delhi Members have to fill this form, duly proposed and seconded by a Delhi DOS Member **(not in arrears)**.

The hard copy of duly filled nomination form should reach the Secretary's Office on or before March 15th, 2019 at 2.00 pm.

Dates to Remember:-

Nominations filing Opens	March 1, 2019, 10:00 am
Nominations filing Closes	March 15, 2019, 2:00 pm
Last Date of withdrawal of Nomination	March 22, 2019, 5:00 pm
Date of Scrutiny of Nomination	March 23, 2019
Date of Election	April 14, 2019 (Time 10.00 am - 3.00 pm) at Venue of the Annual Conference 2019

Note:

1. All the contestants have to follow the guidelines issued by Chief Election Commissioner. Any violation of guidelines issued by Chief Election Commissioner may result in disqualification of candidature of the candidates.
2. One member is allowed to contest the election for one POST Only.
3. Secretariat reserves its right to verify the address of the contestants.
4. For all other posts except editor DJO the members cannot contest 2 consecutive terms.
5. The registrar of the Society has been requested to provide the original constitution of the DOS and amendment if any approved by the registrar vide my letter dated 1st January 2019. The notice may be modified or changed after receiving the clarification.
6. Voter list will be made av available once it is verified by the Treasure.

Eligibility of various posts on page no. 56.

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