

Small Incision Sutureless Cataract Extraction with and without Posterior Chamber Lens

M HUSSAIN S U REHMAN N DIN S AKHTAR A CHAUDHRY M WAQAS

Department of Ophthalmology, King Edward Medical College/Mayo Hospital, Lahore

Correspondence to Dr. Mumtaz Hussain, Associate Professor

A total of 27 cases were operated at LGH during the December 1992 to June 1996, over a period of 4 years. With a few complications, the procedure was encouraging. Good visual results were observed in 85% of the cases. Males were 19 and females were 8. The preferred choice of the patients was of younger age group. Posterior capsular rent occurred in 4 patients 3 patients did not like the PCL. And 24 underwent PECCE with PCL.

Key words: PECCE, Planned extra capsular cataract extraction, PCL posterior chamber lens

An attempt to perform the planned extracapsular cataract extraction (PECCE) without phacoemulsification, through small incision. The procedure involved the implantation of posterior chamber intraocular lens, without any sutures, and the self sealing of the wound gave encouraging results.

Material and design:

We conducted the study at LGH Lahore and selected the suitable patients from the out patients department. Age ranged from 23 to 68 years (mean 45.5 years). Male were 19 and female were 8, total being 27. Patients were advised to undergo this procedure and intraocular lens implantation was advised for better visual outcome. 3 patients did not agree for IOL implantation and 24 agreed for IOL. 3 were operated as such and later they were prescribed aphakic glasses.

Thorough clinical examination was done in all these cases to exclude the possibility of anterior chamber activity or corneal pathology like fuch's dystrophy, corneal opacity or deep or superficial visualization. Evidence of recent or old anterior chamber activity was observed, any posterior synechiae if present were not included in the study. Hypermature cataract was not suitable for this procedure. Posterior segment were examined with pupillary dilatation and B scan ultrasonography for better visual prognosis was done. In our series the intraocular pressure ranged from 12 to 18 mm Hg. Previous surgeries like drainage or trabeclectomy, Scheies' operation or simple iridectomy were excluded from this study. Preoperative visual acuity ranged from PL +ive to 3/60 with careful assessment of peripheral retinal function.

Table 1 Preoperative visual acuity:

Vision	n=	%age
PL+	7	29.6
HM+	5	18.5
FC+1	5	18.5
1/60	3	11.1
2/40	4	14.8
3/60	3	11.1

Routine clinical investigations, as blood for sugar and urine examination were carried out. Patients of COPD, low

cardiac status and prostatic hyperplasia causing urinary disturbances were also excluded. We performed keratometry and biometry in all patients for appropriate IOL power calculations.

Table 2. Age

Age	n=	%age
23-30 year	5	18.5
31-40 years	7	29.5
41-50 years	10	37
51-60 years	3	11.11
61-63 years	2	7.4

Biomicroscopic examination confirmed the quietness of corneal health in anterior chamber. Full pupillary dilatation made it possible to examine lenticular cataractous status. Majority of the cases were posterior subcapsular cataract, more concentrated in center with peripheral extension.

Surgical techniques:

All the patients were operated under local anesthesia by topical instillation of local anesthetic for which we used alcaine (proparacaine 2%) eye drops which provided us analgesia. Then the complete akinesia of the lids was achieved by infiltration by O'Brien & Von lintz' techniques. Retrobulbar injection stabilized the eye and made it akinetic by paralyzing the extraocular movements. Akinesia of orbicularis and extraocular muscles was obtained by infiltration of 2% xylocaine and lidocaine in 50-50 concentration, to get prolonged effect. Local massage was done to prolong the effect and to lower the IOP. We draped the patients after surface aseptic measures. Superior rectus suture was applied to stabilize the eyeball. Surgical steps were undertaken as under:

1. Fornix based conjunctival flap was retracted, sclera 5x5 mm exposed and cauterized to secure haemostasis.
2. Curved superficial half thickness scleral incision was made with convexity towards limbus, 3.5-4mm away from the limbus and 6-7mm in length.
3. Tunnel is undermined under the sclera with 15 no. blade very carefully to reach the limbus where we dissected the clear corneal tissue.

4. By means of cystitome entered through the tunnel into anterior chamber, anterior capsulotomy was done by cane opener technique. These small incisions were joined with each other and the disc of anterior capsule was removed. Subluxation of the nuclear and cortical matter was done in the capsular bag.
5. Then we opened up the anterior chamber completely with 15no. Knife blade, and through the same tunnel we passed the wirevectus into the AC and brought the ring of wirevectus behind the nucleus. The needle of cystitome with its broken tip was passed into the AC in front of the nucleus with viscoelastic material filled into the AC completely. Wirevectus and needle were pressed against each other to break the nucleus into 3 pieces.
6. These pieces were brought out through the scleral tunnel under the viscoelastic cover one by one. The retained cortical matter was then left in the recess of capsular bag.
7. Cortical matter was irrigated and aspirated out, with Simco's cannula. The posterior capsule was polished.
8. Anterior chamber was filled with viscoelastic material and IOL was implanted within the capsular bag through the tunnel by Kratz lens holding forceps and we dialed the lens in the appropriate position if that was needed.
9. We performed peripheral iridectomy and used carbachol to miose the pupil.
10. AC was washed with irrigation and aspiration . Tunnel was cleaned of any debris and conjunctival flap was raised back onto the limbus. Subconjunctival injection was given into the retracted conjunctiva. This swelled it up and stretched onto the scleral incision well forward onto the limbus. Thus tapping the limbus did not lose the AC.
11. The eye was applied pad and bandage.
12. After 24 hours the eye was opened and cleaned. Antibiotic and steroid drops were instilled.

Results:

These results were taken and compared at 1 week, 2 weeks and 12 weeks. We assessed our patient for visual acuity, keratometry, activity of anterior chamber, intraocular pressure and any associated complications.

Visual acuity :

Visual acuity gradually increased as the healing took place and the eye started taking up its natural contours. Best corrected visual acuity was taken and tabulated as under after 12 weeks. In one study, the astigmatic change was generally against the rule at initial stages but ultimately it changed to with the rule by the end of 12 weeks time.

Visual acuity at 1 week was more than 6/18 in 19 patients (70.3%). This was improved in 3 weeks time in 20 patients (74.0%). At the end of 12 weeks more than 6/18 was 26 patients (96.2%)

Table 3. Visual acuity :

Vision	n=	1 week	2 nd week	12 weeks
3/60	2	2	1	0
6/60	2	2	3	1
6/36	2	2	1	0
6/24	2	2	2	0
6/18	3	3	4	6
6/12	6	6	6	8
6/9	5	5	5	6
6/6	5	5	5	6

Keratometry:

Initially the against the rule was astigmatic error noted in our series which was later with the rule at the end of 12 weeks. Generally the astigmatic error noted was upto 1.0D.

I.O.P:

The intraocular pressure was raised in 2 cases upto 24 and 29 mmHg, which became normotensive in 1 week time with steroids and mydriatics. This was attributed with retained visco-elastic material, otherwise IOP ranged 14-18mmHg in our series.

Anterior chamber activity:

Routine anterior chamber activity was observed in our series. 0.2 cells per field and the mild to moderate flare. Pigment cells were observed behind the corneal surface. No significant sight threatening reaction was seen.

Complications :

This procedure is more care demanding and one should be expert to handle the delicate tissue. A few complications were observed which were managed easily without drastic results.

Table 4. Complications :

Complications	n=	%age
Striate keratopathy	8	29.6
Accidental iridectomy	2	7.4
Posterior capsular rent	3	11.1
Posterior scleral lamellar rent	2	7.4
Pseudophakic subluxation	1	3.7

Corneal edema or striate keratopathy occurred in one series because of manipulations in the anterior chamber. Endothelial trauma was the basis of it. This was all treated and with simple steroid drops, decadron. The problem was solved within one week.

Posterior capsular rent occurred in series in these cases. In one case it occurred while cracking the nucleus and on two eyes, while cleaning the cortical lens substance. The rent was small and we could easily manage with vitrectomy and visco-elastic. The support for IOL was enough for implantation. The first case had IOL subluxated next day, because of lack of support. In one case, heptic was broken while implanting the IOL so this was postponed for IOL implantation.

Discussion

The procedure is more care demanding and stable hands are required to handle the delicate tissue. There are no extraordinary instruments which are required for performing this procedure. At the sametime we can avail almost the same benefits of small sutureless incision, without costly instruments like phacoemulsification. This should not be considered as substitution for phacoemulsification. This satisfies your mind because the space for improvements and to go high are still empty and one should try to improve.

Repeated attempts refines the procedure and one gains experience with improvements of the surgical results. Younger patients are more suitable for the beginners because of the softness of the nucleus, it can be cracked easily in small space and is easy to bring out of the anterior chamber. Endothelium is more viable to withstand the surgical trauma.

Since no sutures are applied and there is no chance of getting them tight, loose or broken, limbal girdle is left as such and no distortion of its basic anatomy occurs. So we get less astigmatic errors.

Feils.S.H.et al¹ in their series describes unpredictability of astigmatic changes. Towler-H² and Manners-TD. et al³ hence described the presence of organism in aqueous humor which may cause even endophthalmitis, due to sutureless incisions. Aspergillus endophthalmitis after sutureless cataract surgery was reported by Oxford KW.et al⁴, where they advised suturing the wound. Bacterial endophthalmitis has been reported by Perlstein SH⁹ after small sutureless incision.

Hayashi.K.et.al⁵ suggested minimal astigmatic change in small incision of 3.2 mm size, than larger size incisions whereas Nielson .PJ⁶ and Maloney MF⁷ suggested keratotomy incision can help changing the asitgmic values.

Mikeghbali-A⁸ has suggested that scleral incision of larger size with a few sutures can help in implanting the larger sized IOL with better wound security.

Master U.et al¹⁰ have described a technique to close the small incisions after IOL implantation by fibrin adhesions, where they suggested that against the rule astigmatism can be reduced.Olsan RJ¹¹ and Crandell AS¹¹ also favored the small incisions without suture. In early healing and setting of the wound. Clear corneal incisions induce greater with the rule astigmatism than scleral incisions where stability of wound is delayed while the scleral incisions provide more stability to the wound. This was observed by Huang FC¹² and TsengSH.¹²

Post operatively, the anterior chamber angle deepens in cases of small incisions surgery as has been described

by Kurimeto Y.ct.al¹³ with phacoemulsification and PCL, but in one series, this observation was similar on qualitative basis.

Intraocular pressure was same as pre-operative assessment, with a few exceptions when IOP was raised which was due to post-operative reaction in those eyes. John CE¹⁴ and Tong JI & Miller KM¹⁵ have remarked that there is 1.5-2.5mmHg pressure lowering in post-operative stage on long term basis.

References

1. Feil SH, Crandall AS, Olsan RJ. Astigmatic Decay following small incision self sealing cataract surgery one year follow up. *J. Cataract-refract. Surg* 1995 Jul ; 21(4) : 433-6.
2. Towler H. Aqueous contamination during small incision cataract surgery, a lesson in study design. *Br. J Ophthalmol.* 1995 Oct ; 79 (10) : 873.
3. Manners TD, Chitkara D.K Marsh PJ Stoddart MG. Anterior chamber aspirate cultures in small cataract surgery. *Br. J Ophthalmol.* 1995 Oct ; 79(10) : 878-80.
4. Oxford KW, Abbott RL, Fung WE, Ellis DS. Aspergillus endophthalmitis after sutureless cataract surgery. *Am. J. Ophthalmol* 1995 Oct : 120(4) : 534-5.
5. Hayashi K Hayashi H, Nakaol , Hayashi F.The correlation between incision size and corneal shape changes in sutureless cataract surgery. *Ophthalmology* 1995 Apr : 102(4) : 550-6.
6. Nielsen PJ. Prospective evaluation of surgically induced astigmatism and astigmatic keratotomy effect of various self sealing small incisions. *J. Cataract- refract. Surg.* 1995 Jan : 21(1): 43-8.
7. Maloney-MF, Shipars. DR Transverse astigmatic keratotomy: an integral part of small incision cataract surgery. *J. Cataract- refract. Surg.* 1992; 18(2):190-4.
8. Nikeghbali A. :Scleral flap incision for cataract surgery. *Ophthalmic Surg.* 1994; 25(4): 222-5.
9. Perlstein SH, Edelstein. MS, Chubak GS. Bacterial endophthalmitis following sutureless cataract surgery. *Arch. Ophthalmol* 1994; 112(3): 301-2.
10. Mester U, Znche M, Ranber M. Astigmatism after phacoemulsification with posterior chamber lens implantation: small incision technique with fibrin adhesive for wound closure. *J. Cataract- Refract Surg.* 1993; 19(5): 616-9.
11. Olsan-RJ, Crandall AS. Prospective randomized comparison of phacoemulsification cataract surgery with 3.2mm vs a 5.5mm sutureless incision. *Am. J. Ophthalmol.* 1998; 125(5): 612-20.
12. Huang-FC, Tseng SH. Comparison of surgically induced astigmatism after sutureless temporal clear corneal and scleral frown incision. *J Cataract-refract. Surg.* 1998; 24(4) : 477-81.
13. Kucimoto 7, Pank M., Sakane H, Kondo T. Changes in anterior segment configuration after small incision cataract surgery with posterior chamber IOL. *Am. J Ophthalmol.* 1997 Dec: 124(6) : 775-80.
14. Jahn. CE. Reduced intraocular pressure after phacoemulsification and posterior chamber IOL implantation. *J. Cataract-refract. Surg.* 1997; 23(8): 1260-4.
15. Tong J.; Miller KM. Intraocular pressure change after sutureless phacoemulsification and foldable posterior chamber lens implantation. *J. Cataract- Refract. Surg.* 1998; 24(2): 256-62.
16. Errest PH. Lawery KT, Hazariwala K. Occurrence of pigment precipitates after small incision cataract surgery. *J. Cataract Refract. Surg.* 1998; 24(1): 91-7.