

Non Phaco Sutureless Cataract Surgery with Small Scleral Tunnel Incision Using Rigid PMMA IOLS

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Purpose: A non-comparative study to experience the results of non-phaco sutureless small incision scleral tunnel cataract surgery using rigid polymethylmethacrylate (PMMA) intraocular lenses (IOLs).

Material and Method: The study was conducted at civil hospital Jacobabad and Author's Private Clinic. 200 eyes of 190 patients underwent sutureless small incision cataract surgery using rigid PMMA IOLs. 105 eyes were of males (52.5%) and 95 were females (47.5%) patients with mean age of 67.5 years. Patients with age related cataracts having no history of eye surgery and no ocular or systemic disease were included in the study.

Results: Keratitis was the commonest operative complication (36. 5%) irregular and ragged scleral tunnel was the next (19%). Surgically induced astigmatism ranged from ± 0.5 to $\pm 3.25D$ (1.87D mean) with good visual results (6/6 to 6/18) in 91% of cases after 4 week of follow up.

Conclusion: Due to high cost and difficult learning curve of phaco surgery small incision scleral tunnel sutureless cataract operation is a good alternative. It produces good visual results, quick rehabilitation and has an easy learning-curve.

The main objective of all eye surgeons is to minimize surgically induced astigmatism and achieve rapid postoperative visual recovery after cataract surgery¹. No doubt phaco is really useful to achieve this objective if equipment is available. Unfortunately phaco is not widely used in third world countries due to expensive equipment, difficult and prolonged learning curve and rising poverty line. A good and effective alternative to this goal is non phaco sutureless scleral tunnel small incision for cataract surgery².

This study was carried out at the department of ophthalmology civil hospital Jacobabad and at the

author's private Clinic. The purpose of study was to experience the results of sutureless cataract surgery using scleral tunnel small incision with the implantation of rigid PMMA IOLs. I present my experience in 200 cases using this technique.

MATERIAL AND METHODS

A total of 190 patients (200 eyes) under went cataract surgery during the period from March 2004 to June 2005. Patients having age related cataract without previous eye surgery and no pre existing ocular disorder or controlled systemic disease were included in this study.

A detailed history was taken and complete examination of anterior and posterior segments and systemic evaluation of every patient was done. Diopteric power of posterior chamber IOLs was calculated using SRK II formula after recording the keratometric and axial length measurements.

All surgeries were performed by the author using peri-bulbar or posterior sub-tenon anesthesia. In every operation two special disposable knives were used, crescent knife bevel up 2.25 mm (Alcon or Visitec) and slit knife 3.2 pointed bevel up (Alcon or visitec).

After surgical scrubbing, sterile drapping and bridle suture placement, a fornix based conjunctival flap was made. Sclera was bared of Tenon and minimum necessary cautery was then applied. The location and length of the incision was marked by a caliper set at 5.5mm to 7mm scales^{3,4}. All cases were approached superotemporally and frown shaped groove 0.25mm deep was made in the sclera with surgical knife No.15. The most anterior and central point of the groove was 2mm away from the peripheral corneal vascular arcade, the peripheral ends were approximately 4mm away from the peripheral vascular arcade. The length of the groove was 5.5 - 7mm depending upon the hardness of the nucleus. After completion of the groove, the crescent knife was engaged in the center of the groove, advancing the knife within sclera anteriorly and extending 1mm into the stroma of the clear cornea. The scleral tunnel was then extended from side to side at the lateral ends of the groove. After the completion of scleral tunnel, a pointed slit knife 3.2 was introduced in the centre of the tunnel and the corneal stroma was perforated with its tip to enter the anterior chamber. With outside in motions of the knife, the internal corneal cut was extended on either sides laterally to make internal corneal valve^{1,2,6}. Anterior chamber was filled with viscoelastic and capsulotomy was done. After hydrodissection and hydrilidelineation the nucleus was mobilized, loosened and displaced into the anterior chamber from where it was expressed out by hydroexpression with simco cannula or viscoexpression.

The remaining cortical matter was aspirated out. Anterior chamber and capsular bag was filled with visco-elastic and posterior chamber PMMA IOL. (5.5-6mm) was implanted with in the bag. Visco-elastic was then aspirated out by a two-way cannula. The wound was checked for any leakage and the conjunctival flap was repositioned and cauterized. At the end a subconjunctival injection of gentamycin 20

mg and 0.5-mg dexamethasone was given and an eye pad applied.

RESULTS

Two hundred eyes of 190 patients underwent this study. All patients had age related cataract with age ranging from 55 years to 80 years (mean 67.5 years). Out of 200 eyes, 105 eyes were of males (52.5%) and 95 were of females (47.5) (Table 1). The follow up was done on first postoperative day then at one week, one month and three-months postoperatively.

Table 1: Patient's Profile

No ofPatients	Age in years	Sex	
		Male	Female
190 (200 eyes)	55-80 (mean 67.5)	52.2%	47.5%

Table 2: Operative Complications (200 Eyes)

Complications	Numbers (%)
Striate Keratopathy	73 (36.5)
Irregular internal corneal valve	21 (10.5)
Ragged and notched wound edges	17 (8.5)
Uneven tunnel	10 (5)
Capsulotomy extension	10 (5)
Button hole in the outer flap of scleral tunnel	8 (4)
Partial descemet membrane detachment	8 (4)
Hyphema	8 (4)
Eccentric IOLs	5 (2.5)
Iris prolapse	4 (2)
Capsular disinsertion with vitreous prolapse	3 (1.5)
Iris disinsertion	1 (0.5)

Ragged and notched edges of scleral wound developed in 17 cases (8.5%). Button hole in the sclera was seen in 8 cases (4%). Uneven and improper scleral

tunnel developed in 10 cases (5%), rregular internal corneal valve incision encountered in 21 patients (10.5%). Eight (4%) developed hyphema during operation. Iris prolapse was seen in 4 cases (2%). Iris disinsertion was seen in one case (0.5%), apslar disinsertion with vitreous prolapse encountered in 3 cases (1.5%), apsulotomy extension occurred in 10 cases (5%). The tunnel had to be enlarged in 15 patients (7.5%) where nucleus was unexpectedly hard and large to pass through usual 6mm tunnel. In 5 cases (2.5%) one stitch was applied due to uneven and ragged tunnel and to prevent iris prolapse and anterior chamber collapse (Table 2). Partial descemet membrane detachment adjacent to the inner corneal valve incision seen in 8 cases (4%).

On first postoperative day no wound leakage was seen in any case. No case of wound infection or endophthalmitis was noted. Anterior chamber was well maintained and PC IOL was in the bag except in 18 cases (9%) where it was tilted or eccentric. Eccentric IOLs were noted in 5 cases (2.5%). Tilted IOLs was noted in three cases (1.5%).

Striate keratopathy was the most common complication seen in 73 cases (36.5%). This complication was high in initial days of the surgery when the surgeon was in the learning phase. As the time passed by more confidence and expertise gained complication rate and severity declined. Now no central corneal edema is seen and mild peripheral keratitis in one in ten cases (1%) which clears in a few days.

The wound stability led to quicker rehabilitation and encouraging visual results. On first postoperative day the vision was 6/6 in 23 patients (11.5%) 6/60 in 35 patients (17.5%) with average 6/12 unaided in 142 patients (71%). Mean surgically induced astigmatism (defined as the change in the corneal curvature determined by the difference between the preoperative and postoperative keratometry measured by simple subtraction)^{5,6} was found to be $\pm 1.87D$ (range ± 0.5 to $\pm 3.25D$).

At the end of 4 weeks postoperatively final correction of glasses was prescribed. After three months of follow up the best corrected visual results were as follows:

Best Corrected Visual Acuity	Patients	Percentage
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6/6	49 (24.5%)	91%
6/9	85 (42.5%)	
6/12	28 (14%)	
6/18	20 (10%)	9%
6/24	13 (6.5%)	
6/36	3 (1.5%)	
6/60	2 (1%)	

DISCUSSION

One of the basic rights of an individual is to have good health facilities within his or her reach and it includes sight. Cataract is one of the leading cause of preventable blindness in third world countries and this is due to poverty on one hand and increasing cost of good cataract surgery particularly phaco on the other hand. Phaco surgery is difficult to learn because the machine and its accessories are expensive and their maintenance is costly. The ultimate cost is paid by the patients.

Eye surgeons have been trying to have good alternative to phaco and these attempts now seem to be successful. Non phaco small incision scleral tunnel surgery has considerably encouraging and comparable visual results, low learning curve and cost effectiveness^{1,2}. The complication rate is low and no vision threatening complication is seen showing that the scleral tunnel surgery is relatively safe⁷.

In the study by Henning¹ the visual results are rewarding and encouraging and are in accordance with the guidelines and recommendations given by world health organization (W.H.O) (Table 3) Immediate postoperative visual results were low due to keratitis but it was transient and after a few days the cornea became clear and vision improved. This complication and decreased visual results were seen in initial days of learning after a few weeks when the author gained confidence and experience no central corneal edema was seen and visual recovery improved.

Table 3: W.H.O guide lines and recommendations for postoperative outcome of cataract surgery with intraocular lens implantation.

Vision	Outcome	Uncorrected	Corrected
Good	6/6 - 6/18	80%+	90% +

Border line	< 6/18-6/60	15%	< 5%
Poor	< 6/60	< 5%	< 5%

CONCLUSION

Cataract extraction using phacoemulsification is superior to small incision cataract surgery but this is a good alternative in remote rural areas of Pakistan where cataract population is high but near to the poverty line. This is the way we can provide our people quality vision care facility at affordable price and at their door steps.

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