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Research Article

A randomized controlled trial comparing astigmatism rate in cases undergoing sutured and un-sutured anterior limbal incision in phacoemulsification

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ABSTRACT

Objective: To compare post-operative astigmatism in patients undergoing sutured and un-sutured anterior limbal incision in phacoemulsification.

Material and methods: This randomized controlled trial was conduct at DHQ Hospital Muzaffergarh from January 2017 to June 2017. Total 200 patients were enrolled by using non probability consecutive sampling technique.

Results: A total of 200 patients were examined. Mean age of the patients was 57.66 ± 7.35 years.Out of 100 patients of Group A, astigmatism was seen in 74 (74%) patients at 6th post-operative week. Among the 100 patients of Group B, astigmatism was found in 12 (12%) patients at 6th post-operative week. Highly significant (P = 0.000) difference between the proportion of astigmatism between the both group was seen.

Conclusion: Results of this study revealed that surgically induced astigmatism is more common in phacoemulsification when suture is applied for wound closure. It affects the visual outcome significantly which is not acceptable in this modern era. So we should improve our surgical technique of phacoemulsification and no suture be required for wound closure.

Key words: Phacoemulsification, astigmatism, cataract, incision, sutured and un-sutured wound

INTRODUCTION

Cataract is defined as any congenital or acquired opacity in the lens capsule or substance, irrespective of the effect on vision.[1]Cataract is the world's leading cause of avoidable blindness affecting an estimate of 20 million people and this figure is expected to increase to 50 million by the year 2020 if no additional interventions are implemented.[2]About 75% of the global blindness occurs in Asia and Africa.[3] In Pakistan cataract contributes to 66.7% of the total blindness.[4]Cataract surgery is the leading intraocular surgery being performed these days.[5]Now a day's small incision suture less cataract surgery has revolutionized the surgical procedure with minimal postoperative complications, swift visual rehabilitation and mobility of patient.[6] There is better postoperative visual acuity in patients who underwent phacoemulsification than those who underwent extracapsular cataract extraction at all postoperative intervals. Phacoemulsification is almost universally used today. [7,8]

A person with uncorrected astigmatism has to wear spectacles or contact lenses. Furthermore, persons using spectacles to correct astigmatism can have problems with tolerance of glasses,

decreased quality of vision, decreased field of vision and different optical aberrations. Use of contact lenses has its own adverse effects like susceptibility to ocular infections and inflammations.[9] Interest in reducing surgically induced astigmatism in cataract surgery has grown in recent years. SIA is mainly influenced by preoperative astigmatism as well as by the shape and length of anterior chamber incision, suture technique and wound healing.[10]There is no significant difference in SIA after clear corneal temporal or on-axis incision.[11]

Typically the tight sutures compress the wound in the vertical meridian initially producing with the rule astigmatism, then over a period of 03 months astigmatism becomes against the rule as the sutures loosen. Superior incision is recommended with at least 1.5 diopters of astigmatism and steep axis at 90 degrees. Temporal incision is recommended with astigmatism < 1.5 diopters and steep axis at 180 degrees. Nasal incision is recommended with at least 0.75 diopters of astigmatism and steep axis at 180 degrees.[12]

This study was conducted to compare frequency of post-operative astigmatism in patients undergoing sutured and unsutured anterior limbal incision in phacoemulsification. Results of this study may guide us that which one option (sutured or un-sutured) is better.

MATERIALS AND METHODS

This randomized controlled trial was conduct at DHQ Hospital Muzaffergarh from January 2017 to June 2017. Total 200 patients were enrolled by using Non probability consecutive sampling technique. Permission was taken from institutional review board and written consent was taken from every patient included in the study.Patients undergoing uncomplicated cataract surgery assessed by history and examination both male and female were included in this study. Patients with corneal scarring, seen by slit lamp, patients with preoperative astigmatism, measured by keratometer(>0.50D normal physiologic astigmatism), patients with pterygium, seen by slit lamp, patients with corneal degenerative conditions, seen by slit lamp, patients with corneal opacities, seen by slit lamp and patients with dislocation or subluxation of intraocular lens, seen by slit lamp were excluded from the study. Patients were divided in two groups A & B by random sampling.

The symptoms, their severity and duration were asked. Past medical and surgical history of the eye was asked. Examination included detailed anterior segment examination with slit lamp and detailed fundal examination was done. They were investigated for blood sugar random (BSR), visual acuity (VA) and intraocular pressure (IOP). Pre-operative astigmatism was measured in Diopters by keratometry.

All cases were operated by phacoemulsification with intraocular lens implantation by one surgeon. Incision was started 1mm posterior to the limbus in all patients. A stab incision was made at the end of the tunnel to penetrate the anterior chamber. After viscoelastic material was injected, a continuous curvilinear capsulorhexis, hydro dissection, phacoemulsification, aspiration of cortex and capsular bag refilling with viscoelastic solution was performed. The incisions were enlarged to 5.5 mm wide and a rigid PMMA IOL was implanted in the capsular bag. Wound closure in group A was done with one 10-0 monofilament nylon suture and in group B without suture with stromal hydration.

Eye pad was removed on first post-operative day and patient was discharged. Stitch of group A patients was removed on 3rdpost-operative week. Each patient received 0.5% chloramphenicol eye drops and 0.1% dexamethasone eye drops four times per day. The medicines were tapered in 6 weeks duration. Analgesics were used whenever required.Follow up was done at 6th post op week and astigmatism was measured by keratometry. All this information was collected through specially designed proforma.

All the collected data were entered in SPSS version 18 and analyzed. Mean and SD was calculated for numerical data. Categorical data

was presented as frequencies and percentages. Frequency of astigmatism was compared in both groups by using Chi-square test. A *p* value of ≤0.005 was taken as significant.

RESULTS

A total of 200 patients were examined. All the patients were with cataract and underwent phacoemulsification and intraocular lens implantationwith a 5.5 mm wide anterior limbal incision. Mean age of the patients was 57.66 ± 7.35 years. Male patients were 118 (59%) and female patients were 82 (41%).(Fig. 1)

Out of 100 patients of Group A, astigmatism was seen in 74 (74%) patients at 6th post-operative week. Among the 100 patients of Group B, astigmatism was found in 12 (12%) patients at 6th post-operative week. Highly significant (P = 0.000) difference between the proportion of astigmatism between the both group was seen. (Table 1)

Fig. 1: Gender Distribution

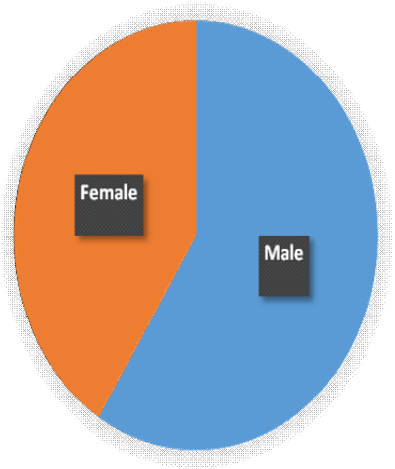

Table 1: Comparison of post-op astigmatism between two groups at 6th post-op week.

Group	Astigmatism		Total	P. value
	Yes (%)	No (%)		
A (%)	74 (74)	26 (26)	100	**0.000**
B (%)	12 (12)	88 (88)	100	

DISCUSSION

The aim of modern cataract surgery is to achieve a good/desirable refractive outcome postoperatively.[13] Many clinicians have documented their experiences with various cataract surgical techniques, with or without sutures and several methods of calculating astigmatic change have been developed.[14] Differences in surgical technique and analysis of astigmatism make it difficult to compare reports but it is generally recognized that sutureless phacoemulsification is better than sutured.[15]

The scleral tunnel incision in cataract surgery was introduced in the early eighties in an attempt to provide better wound healing with less surgically induced astigmatism. The length of the incision varies from 5 to 8 mm; however it is still called small incision cataract surgery since the architectural design renders suture less, self-sealing property to the incision.[16]

The quantification of astigmatic change may give the impression of a greater degree of precision than is justified. Serial keratometric measurement of the axis and Diopters of astigmatism of normal cornea vary. Computerized topography may improve the accuracy and reproducibility of such measurements but does not eliminate error.[17]

Postoperative astigmatism is dependent on factors like the site and width of the incision and whether the wound was closed with suture or not. SIA is mainly influenced by preoperative astigmatism as well as by the shape and length of anterior chamber incision, suture technique and wound healing.[18] There is no significant difference in SIA after clear corneal temporal or on-axis incision.[19] A study in Pakistan suggests that implantation of 5.5mm rigid IOLs after sutureless phacoemulsification is a safe procedure with acceptable levels of post-operative astigmatism.[20] Studies have also shown the importance of corneal relaxing incisions preoperatively, in order to minimize the astigmatism further. Although the advent of small incision surgery using foldable IOLs has been revolutionary, the surgical outcome varies greatly with the amount of pre-existing astigmatism which is still a complex hurdle. Now a day's small incision suture less cataract surgery has

revolutionized the surgical procedure with minimal postoperative complications, swift visual rehabilitation and mobility of patient.[6]

In our study, out of 100 patients of Group A, astigmatism was seen in 74% patients at 6th post-operative week. Among the 100 patients of Group B, astigmatism was found in 12% patients at 6th post-operative week. Highly significant (P = 0.000) difference between the proportion of astigmatism between the both group was seen. A study conducted by Mirza et al in Pakistan shows that after 6 weeks, 62.5% of eyes in sutured group and none of eyes in unsutured group had more than 2.0D (diopter) SIA.The difference of these results from our study might be due to factors like surgeon, surgical technique, and site of incision, wound healing factors and keratometric techniques.[20]

CONCLUSION

Results of this study revealed that surgically induced astigmatism is more common in phacoemulsification when suture is applied for wound closure. It affects the visual outcome significantly which is not acceptable in this modern era. So we should improve our surgical technique of phacoemulsification and no suture be required for wound closure.

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