ORIGINAL ARTCLE

Comparative Study of Post-Operative Astigmatism Following Phacoemulsification with Sutured Versus Un-Sutured Wound

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ABSTRACT

Purpose: To compare frequency of post-operative astigmatism in patients undergoing sutured and unsutured anterior limbal incision in phacoemulsification

Material and method: 120 patients for study were admitted from outpatient department. An informed consent was obtained and patients were divided in two groups A & B by random sampling. Phacoemulsifcation was done, with one stitch applied in group A while no stitch in group B. Removal of stitch was done at 3rd post operative week. Follow up visits was done at 6th post operative week. K readings were taken with keratometer and were recorded on a proforma.

Results: Surgically induced astigmatism (SIA) in group A was 73.3% and in group B was 11.7% in total of 120 patients with 60 patients in each group. The ***p value*** was less than 0.005 and by conventional criteria; this difference is considered to be statistically significant. .

Conclusion: Surgically induced astigmatism is more common in phacoemulcification when suture is applied for wound closure.

Key words: Cataract, Astigmatism, Incision, Phacoemulsification, Suture & 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 implimented.[2] 75% of the global blindness occurs in Asia and Africa. In Pakistan cataract contributes to 66.7% of the total blindnss.[3] Cataract surgery is the leading intraocular surgery being performed these days[4].

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[5]. There is better postoperative visual acuity in patients who underwent phacoemulsification than those who underwent extracapsular cataract extraction at all postoperative intervals[6]. Phacoemulsification is almost universally used today[7].

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.

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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[8]. There is no significant difference in SIA after clear corneal temporal or on-axis incision[9] . 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.[10]. Another comparative study 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.[11]

Typically the tight sutures compress the wound in the vertical meridian initially producing with the rule astigmatism, then over a period of 3 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]

MATERIAL & MATHOD

This randomized control trial study was carried out at Institute of Ophthalmology, Mayo Hospital, Lahore from October 2009 to June 2010.120 patients having age related, un-complicted cataract were admitted from outpatient department. The patients having

corneal scarring, corneal degenerative changes, corneal opacities, pterygium and pre-operative astigmatism more than 0.5 dioptres were excluded. An informed consent was obtained for applying the procedure and using their data in the study from all the patients prior to surgery. Patients were divided in two groups A & B by random sampling. The socio-demographic information like name, age, gender and address was recorded along with the history of present illness. 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.

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 the patients underwent phacoemulsification and intra-ocular lens (IOL) implantation by a single surgeon. Incision was started 1 mm posterior to the limbus in all patients. After completion of phacoemulsification, incision was enlarged to 5.5 mm and a rigid PMMA IOL was implanted in the capsular bag. Wound closure in Group A was done with a single 10/0 monofilament nylon suture and in Group B without suture with stromal hydration. Stitch of Group A patient was removed on third week post-operatively. Final follow-up was done at sixth post-operative week and astigmatism was measured by keratometry.

Data analysis: The collected information was entered into SPSS version 12.0 and analyzed through its statistical package. The qualitative variables like gender and astigmatism were presented as frequency and percentages. The quantitative variables like age, was also presented as mean and standard deviation. 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 120 patients were examined. Their ages ranged from 45 to 75 years (Table 1) and 67 (55.8%) were male and female were 53 (44.2%) (Table 2). Mean age was 58.31 years. In group A out of 60 patients 44(73.3%) showed post operative astigmatism of 2.0D or more at 6th post op week (Table 3) but other 16(26.7%) patients showed no or less than 2.0D astigmatism. In group B out of 60 patients 7(11.7%) showed post operative astigmatism of 2.0D or more at 6th post op week (Table 4) but other 53 (88.3%) patients showed no or less than 2.0D astigmatism. Both groups were compared by using chi-square test at 5% confidence interval and degree of freedom 1, chi-square test supports the hypothesis that sutureless phacoemulsification has less chances of postoperative astigmatism compared to phacoemulsification with suture applied. The ***p value*** was 0.0001 i.e. less than 0.005 and by conventional criteria; this difference is considered to be extremely statistically significant.

Table I: Distribution according to age. (n=120)

Age (yrs)	Frequency	%	Valid %	Cumulative %
45	8	6.7	6.7	6.7
46	3	2.5	2.5	9.2
47	3	2.5	2.5	11.7
49	1	.8	.8	12.5
50	25	20.8	20.8	33.3
52	1	.8	.8	34.2
53	1	.8	.8	35.0
54	2	1.7	1.7	36.7
55	8	6.7	6.7	43.3
56	1	.8	.8	44.2
58	2	1.7	1.7	45.8
60	23	19.2	19.2	65.0
61	1	.8	.8	65.8
62	2	1.7	1.7	67.5
63	1	.8	.8	68.3
64	2	1.7	1.7	70.0
65	10	8.3	8.3	78.3
68	2	1.7	1.7	80.0
70	21	17.5	17.5	97.5
72	1	.8	.8	98.3
75	2	1.7	1.7	100.0
Total	120	100.0	100.0	

Mean age: 58.31 years., Standard deviation: 8.552 years, Median: 60 years, Mode: 50 years

Fig. I: Distribution according to age. (n=120)

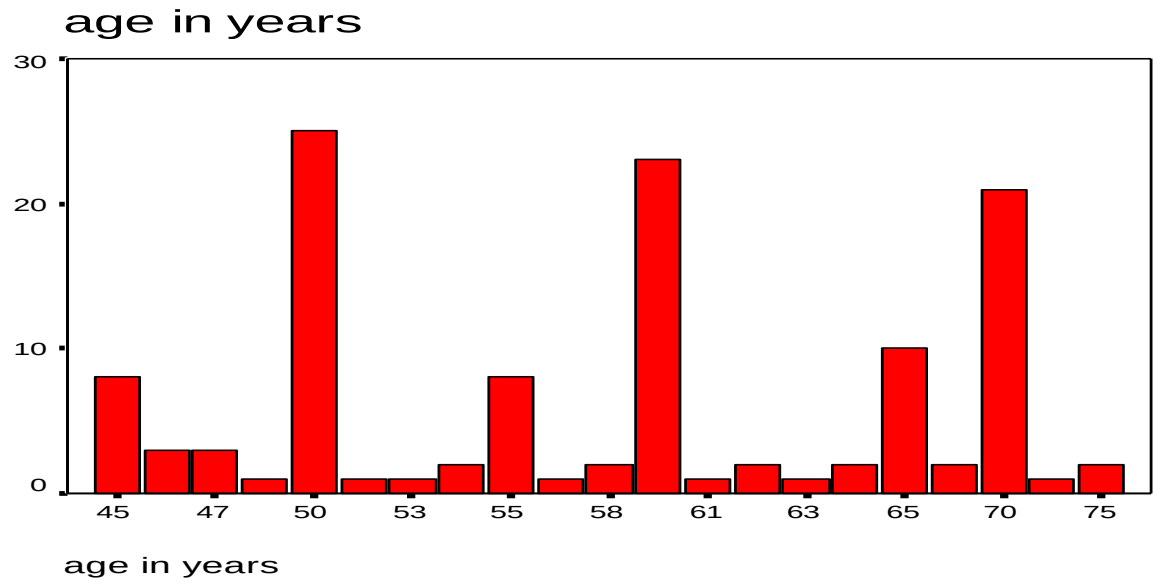


Table II: Distribution according to gender

Gender	Frequency	Percent %	Valid%t
Male	67	55.8	55.8
Female	53	44.2	44.2
Total	120	100.0	100.0

Fig. II: Distribution according to gender

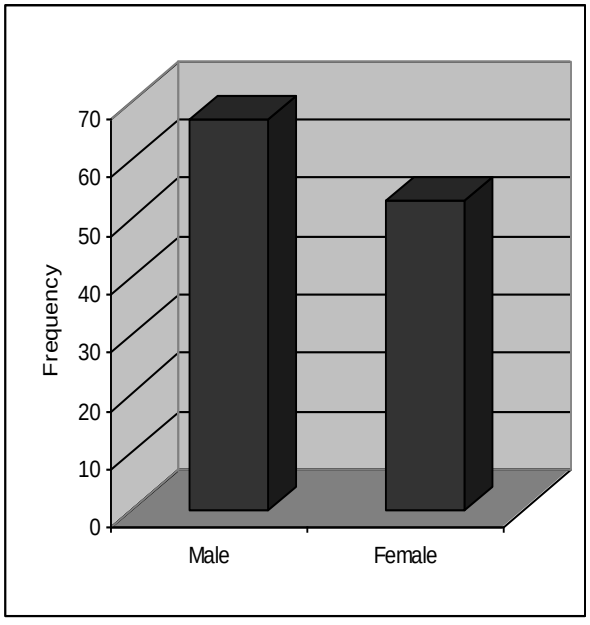


Fig. III: Distribution of post-op astigmatism (2 Diopters or more) in group A at 6th post-op week (Group A)

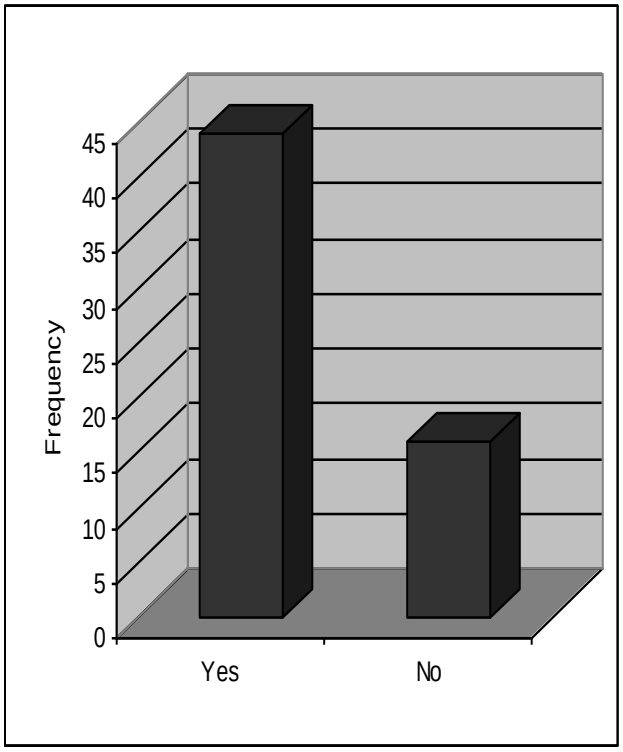


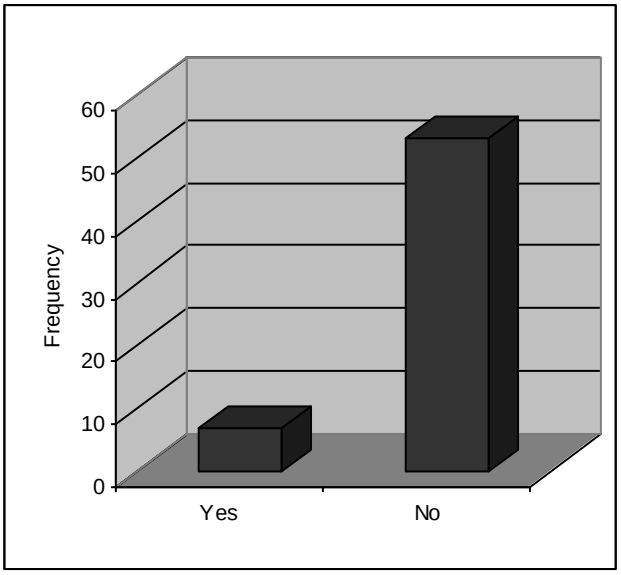
Table III: Distribution of post-op astigmatism (2 Diopters or more) in group A at 6th post-op week

Astigmatism	Frequency	%	Valid %
Yes	44	73.3	73.3
No	16	26.7	26.7
Total	60	100	100

Table IV: Distribution of post-op astigmatism (2Diopters or more) in group B at 6th post-op week

Astigmatism	Frequency	Percent%	Valid %
Yes	7	11.7	11.7
No	53	88.3	88.3
Total	60	100	100

Fig. IV: Distribution of post-op astigmatism (2Diopters or more) in group B at 6th post-op week (Group B)



Chi-Square Test Comparison of frequencies in group A and group B

Table V: Group A frequency

Group A

	Observed N	Expected N	Residual
yes	44	30.0	14.0
no	16	30.0	-14.0
Total	60		

Table VI: Group B frequency

group B

	Observed N	Expected N	Residual
yes	7	30.0	-23.0
no	53	30.0	23.0
Total	60		

VII: Chi-Square test statistics

Test Statistics

	Group A	group B
Chi-Square[a]	13.067	35.267
df	1	1
Asymp. Sig.	.000	.000

a. 0 cells (.0%) have expected frequencies less than 5. The minimum expected cell frequency is 30.0.

DISCUSSION

Cataract is the leading cause of blindness throughout the world and cataract extraction is most commonly performed surgical procedure in the field of ophthalmology. The most frequent immediate complication in case of uneventful cataract extraction is post operative inflammatory reaction and astigmatism.

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.

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. There is no significant difference in SIA after clear corneal temporal or on-axis incision. 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. 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.

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, site of incision, wound healing factors and keratometric techniques.

I conducted this study to analyze the most important complication of phacoemulcification that significantly affects the visual outcome so that we can reassess and re-evaluate our surgical techniques according to modern advancements is ophthalmology.

CONCLUSION

We have concluded from our study that surgically induced astigmatism is more common in phacoemulcification 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.

REFERENCES

1. Kanski JJ. Clinical Ophthalmology. 6th ed. London: Butterworth Heinemann; 2006.
2. Zaman M, Iqbal S, Khan Y M, Khan M T, Jadoon M Z, Qureshi M B, et al. Manual small incision cataract surgery (MSICS). Review of first 500 cases operated in microsurgical training center. Pak J Ophthalmol 2006; 22:14 -22.
3. Khan A Q, Qureshi B, Khan M D. Rapid assessment of cataract blindness in age 40 years and above in District Skardu, Baltistan, Northern Areas of Pakistan. Pak J Ophthalmol 2003; 19:84-9.
4. Qazi ZA. Corneal endothelium tissue that demands respect [editorial]. Pak J Ophthalmol 2003; 19:1-2.
5. Ahmad A, Ahmad J. Combined phacoemulsification, intraocular lens implantation and trabeculectomy. Pak J Ophthalmol 2000; 16: 26-8.
6. Yi DH, Sullivan BR. Phacoemulsification with indocyanine green versus manual expression extracapsular cataract extraction for advanced cataract. J Cataract Refract Surg 2002; 28: 2165-9.
7. Chakrabarti A, Singh S. Phacoemulsification in eyes with white cataract. J Cataract Refract Surg 2000; 26: 1041-7.
8. Susiv N, Brajkovik J, Kalauz I, Surac. Analysis of postoperative corneal astigmatism after phacoemulsification through a clear corneal incision. Acta Clin Croat 2007;46(suppl):37-40
9. Borasio E, Mehta JS, Maurino V, Surgically induced astigmatism after phacoemulsification in eyes with mild to moderate corneal astigmatism: Temporal versus on-axis clear corneal incisions. J Cataract Refract Surg 2006;32:565-72
10. Iftikhar S, Kiani SA. Sutureless Phacoemulsification with implantation of 6mm PMMA IOLs. Pak J Ophthalmol 2004;20:74-6.
11. Mirza AB, Jehangir S, Kadri WMD. Phacoemulsification: The first 50 cases J Rawal Med Coll 2007;12:74-8.
12. Tejedor J, Murube J. Choosing the location of corneal incision based on pre-existing astigmatism in phacoemulsification. Am J Ophthalmol 2005:139:906-7