



COMPARISON OF ASTIGMATISM PROFILE IN PATIENTS UNDERGOING PHACOEMULSIFICATION BY 2.8MM VERSUS 5.2 MM TEMPORAL INCISION

Ophthalmology

Pooja Peethambaran	Postgraduate student, Dept. of ophthalmology, Father Muller Medical College and Hospital, Kankanady, Mangalore 575002.
Sripathi Kamath*	Associate Professor, Dept of ophthalmology, Father Muller Medical College and Hospital, Kankanady, Mangalore 575002. *Corresponding Author
Sunayana Bhat	Professor, Dept. of ophthalmology, father Muller medical college and hospital, Kankanady, Mangalore 575002

ABSTRACT

Purpose: Purpose of study is to see astigmatism from large incision at appropriate location is comparable to small incision **Methods:** A total of 150 patients were grouped in to two groups, 75 in each group. Group A used foldable IOL 6mm optics and 2.8mm temporal clear corneal incision. Group B used rigid aurolab 5mm optics and 5.2 mm temporal limbal incision. Comparison of mean BCVA at 4 week follow up. **Results:** Clinical outcomes of both surgeries were similar, as there was no significant statistical difference in astigmatism at one month of follow up. **Conclusion** 5.2 mm temporal incision with Rigid PMMA in patients showed comparable result with 2.8mm temporal incision with foldable IOL. Therefore 5.2mm temporal incision with rigid IOL can be considered for patients undergoing cataract surgery in economically weaker sections and camp sections

KEYWORDS

Astigmatism, Cataract Surgery, Incision size, Foldable IOL, Rigid PMMA

INTRODUCTION

Since it first emerged, cataract surgery has made a number of advancements. Couching, an ancient technique, gave way to intracapsular cataract surgery, which in turn led to the development of modern phacoemulsification cataract surgery. The main challenge is surgically induced astigmatism (SIA), but the primary goal is a good postoperative visual rehabilitation without correction with immediate mobilization. Surgeons have worked hard and developed new incisions over time in an effort to lower the SIA. Numerous variables, including the incision, technique, kind of surgery, method of intraocular lens (IOL) insertion, and kind of IOL, affect how a cataract surgery turns out.⁽¹⁾ Self-sealing clear corneal incisions have become increasingly popular globally due to their numerous advantages over traditional sutured limbal incisions and scleral tunnels.⁽²⁾ The location, size, and architecture of the wound, as well as the surgeon's comfort and posture during the operation, all affect postoperative SIA..⁽³⁾ Less SIA results from the small size incision's quick and stable optical recovery. ⁽⁴⁾ Bhaskar Reddy's study revealed that astigmatism was more common in SICS than phacoemulsification. ⁽⁵⁾ Following cataract surgery, poor uncorrected visual acuity can be attributed in part to high astigmatism.⁽⁶⁾ The corneal incision's size has been gradually decreasing recently, and earlier research has shown that smaller incisions are linked to earlier refraction stabilization as well as less variation and magnitude in SIA ^(11,12,13,14,15).

Because the temporal location of a temporal incision is farther from the visual axis than the superior location, any flattening resulting from the wound is less likely to affect the corneal curvature at the visual axis, which causes a small amount of WTR astigmatism.⁽⁸⁾ here was a 0.3D difference in astigmatism between 5.5-mm and 3.2-mm phacoemulsification incisions in a prospective trial conducted in Japan. ⁽⁹⁾ We aim to compare astigmatism undergoing phacoe mulsification by 2.8mm versus 5.2 mm temporal incision to see large incision at appropriate location is comparable to small incision.

OBJECTIVES

Comparison of Astigmatism profile in patients undergoing Phacoemulsification by 2.8mm versus 5.2 mm Temporal incision.

METHODS

A hospital based retrospective comparable study was conducted in 150 patients conducted in father muller medical college. Prior approval from institutional ethical committee was obtained for conducting the study. The study period was for 3 months.

Inclusion criteria

1. Patients with clinically significant cataract.
2. Age group selected was between 30-80 years.

Exclusion criteria

1. Patient with high astigmatism (> 3DC)
2. Patient with irregular astigmatism
3. Pterygium
4. Intraoperative iris prolapse
5. Intraoperative wound leakage
6. Suture required intraoperatively

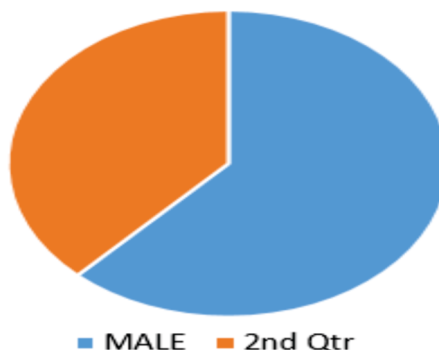
METHODOLOGY

Patients fulfilling the inclusion criteria were recruited in to study. Patients were divided in to 2 groups, group A and group B, in which 75 patients in each group. We used Alcon infinity phacoemulsification system. In GROUP A used foldable IOL ,6.0 mm optics and length 13.0mm and in GROUP B used rigid Aurolab IOL,5mm optics and length 12.0mm. Pre op astigmatism were calculated using k1k2 value .In group A used 2.8mm temporal clear corneal incision and in group B used 5.2 mm temporal limbal incision. Post op follow up called in 1 week and 1 month. 1 month best corrected visual acuity (BCVA) were used to calculate mean astigmatism.

RESULTS

- Mean age :56.5 +/-5.1 years old
- Male :93 and female :57

SEX



	N	Mean	Std. Deviation
Group1 preop	75	.9933	.51329
Group 1 postop	75	.5767	.58120
Group1 difference	75	.4167	.22636
Group2 preop	75	.9967	.46225
Group 2 postop	75	.7167	.57294
Group2 difference	75	.2800	.22496

Independent sample t test (to compare difference of astigmatism in group 1 and 2)

Group	Mean (of difference)	Mean difference	SE of mean difference	95% CI of mean difference	t value	p value
Group 1	0.4167	0.13667	0.03685	0.06385 to 0.20949	3.709	<0.001
Group 2	0.2800					

Clinical outcomes of both surgeries were similar, as there was no significant statistical difference in astigmatism at one month of follow up

DISCUSSION

Astigmatism is lower with the clear corneal temporal approach than with the superior clear corneal incision. (⁶) The effectiveness and stability of astigmatism by incision size were investigated by Moon et al4 (¹⁶). A small incision results in a quick and stable optical recovery, which reduces astigmatism caused by a large incision (¹⁶). As is well known, the cost of rigid IOL is lower than that of foldable IOL.

In our study, we compare astigmatism between temporal incision 2.8 mm with foldable IOL and temporal limbal incision 5.2mm with rigid IOL. Smooth keratome entry was observed by making a limbal incision.

Since the limbus is known to be a vascular structure, the incision healed properly without the need for a suture.

There were no intraoperative complications such as zonular dialysis, Descemet's detachment, floppy iris, or iris prolapse.

There was no surgical induced astigmatism postoperatively in our study.

In our study, there was no post-operative complications such as wound leakage, hypotony, and corneal edema. There was no statistical significance between the two groups. So, patients with poor socio economic status and less affordable status this approach with temporal incision 5.2mm rigid iol and phacoemulsification can be very effective, safe and low cost.

CONCLUSION

- 5.2 mm temporal incision with Rigid PMMA in patients showed comparable result with 2.8mm temporal incision with foldable IOL.
- Therefore 5.2mm temporal incision with rigid IOL can be considered for patients undergoing cataract surgery in economically weaker sections and camp sections.

Financial support and sponsorship

Nil

There are no conflicts of interest

REFERENCES

1. Aykut V, Kirgiz A, Gulay B, Celik U. Comparison of pre-incision and single-stepped clear corneal incision in phacoemulsification cataract surgery. *Eur Rev Med Pharmacol Sci*. 2014;18:1698–1703.
2. Lin H, He M, Congdon N, et al. Clinical evaluation of three incision size-dependent phacoemulsification systems. *Am J Ophthalmol*. 2012;153(5):831–839.
3. Pakravan M, Nikkhar H, Yazdani S, Shahabi C, Sedigh Rahimabadi M. Astigmatic outcomes of temporal versus nasal corneal phacoemulsification. *J Ophthalmic Vis Res*. 2009;4(2):79–83.
4. Moon SC, Mohamed T, Howard Fine I. Comparison of surgically induced astigmatism after clear corneal incisions of different sizes. *Korean J Ophthalmol*. 2007;21(1):1–5.
5. (Ann Ophthalmol (Skokie) 2007 Fall;39(3):209-16. doi: 10.1007/s12009-007-0020-y.)
6. Clin Ophthalmol. 2018; 12: 65–70. Published online 2018 Jan 3. doi: 10.2147/OPTH.S149709
7. Yorston D, Gichuhi S, Wood M, Foster A. Does prospective monitoring improve cataract surgery outcomes in Africa? *Br J Ophthalmol*. 2002;86:543–7.
8. Gokhale N, Sawhney S. Reduction in astigmatism in manual small incision cataract surgery through change of incision site. *Indian J Ophthalmol*. 2005;53:201.
9. Oshika T, Nagahara K, Yaguchi S, Emi K, Takenaka H, Tsuboi S, et al. Three year prospective, randomized evaluation of intraocular lens implantation through 3.2 and 5.5 mm incisions. *J Cataract Refract Surg*. 1998;24:509–14.
10. Moon SC, Mohamed T, Howard Fine I. Comparison of surgically induced astigmatism after clear corneal incisions of different sizes. *Korean J Ophthalmol*. 2007;21(1):1–5.
11. Wang J, Zhang EK, Fan WY, Ma JX, Zhao PF. The effect of micro-incision and small-incision coaxial phaco-emulsification on corneal astigmatism. *Clin Experiment Ophthalmol*. 2009;37:664–9.
12. Wei YH, Chen WL, Su PY, Shen EP, Hu FR. The influence of corneal wound size on surgically induced corneal astigmatism after phacoemulsification. *J Formos Med Assoc*. 2012;111:284–9

13. Long DA, Monica ML. A prospective evaluation of corneal curvature changes with 3.0- to 3.5-mm corneal tunnel phacoemulsification. *Ophthalmology*. 1996;103:226–32.
14. Kohnen T, Dick B, Jacobi KW. Comparison of the induced astigmatism after temporal clear corneal tunnel incisions of different sizes. *J Cataract Refract Surg*. 1995;21:417–24.
15. Luo L, Lin H, He M, Congdon N, Yang Y, Liu Y. Clinical evaluation of three incision size-dependent phacoemulsification systems. *Am J Ophthalmol*. 2012;153:831–9.
16. Wang J, Zhang EK, Fan WY, Ma JX, Zhao PF. The effect of micro-incision and small-incision coaxial phaco-emulsification on corneal astigmatism. *Clin Experiment Ophthalmol*. 2009;37:664–9.
17. Barequet IS, Yu E, Vitale S, Cassard S, Azar DT, Stark WJ. Astigmatism outcomes of horizontal temporal versus nasal clear corneal incision cataract surgery. *J Cataract Refract Surg*. 2004;30:418–23.