

PAIRED OPPOSITE CLEAR CORNEAL INCISIONS TO REDUCE PREEXISTING CORNEAL ASTIGMATISM IN PHACOEMULSIFICATIONChandrakant¹, Narayan M², Srinivasulu³, Prabhu Chaitanya⁴, Inchara⁵, Sushma⁶, Padmini⁷**HOW TO CITE THIS ARTICLE:**

Chandrakant, Narayan M, Srinivasulu, Prabhu Chaitanya, Inchara, Sushma, Padmini. "Paired Opposite Clear Corneal Incisions to Reduce Preexisting Corneal Astigmatism in Phacoemulsification". Journal of Evolution of Medical and Dental Sciences 2015; Vol. 4, Issue 03, January 08; Page: 318-321, DOI: 10.14260/jemds/2015/50

ABSTRACT: BACKGROUND: To study the effect of paired opposite clear corneal incisions on the steep axis on preexisting corneal astigmatism in phacoemulsification. **MATERIALS AND METHODS:** This study was performed on 30 eyes of 30 patients who had keratometric astigmatism of more than 1 diopter. All patients underwent clear corneal phacoemulsification with a 3.2mm clear corneal incision on the steep axis. An additional similar incision was placed on the steep axis opposite to the first incision at the end of surgery. Preoperative keratometric astigmatism was compared with postoperative keratometric astigmatism at 6 weeks postoperatively. **RESULTS:** The difference between the median score of preoperative keratometric astigmatism and postoperative astigmatism was 1 diopter. Results were analyzed with wilcoxon signed rank test and were significant p value. (<1) **CONCLUSION:** Paired opposite clear corneal incisions is a simple method to correct mild to moderate corneal astigmatism in phacoemulsification.

KEYWORDS: Astigmatism, keratometry.

INTRODUCTION: Astigmatism may cause blurred vision, glare, monocular diplopia, asthenopia and visual aberrations.¹ Correction of astigmatism is one of the main purposes of modern cataract surgery, This has resulted in a shift towards small incision surgery using foldable intraocular lenses.²

Several methods have been employed for this purpose including changing the size and site of the incision,³ using corneal or limbal relaxing incisions,⁴ applying opposite clear corneal incision on the steep axis,⁵ implantation of toric Intraocular lens,⁶ and laser keratomileusis.⁷ All the above measures is to achieve acceptable uncorrected visual acuity.

Lever and Dahan were the first to apply a pair of opposite clear corneal incisions on the steep axis to correct preexisting astigmatism during cataract surgery.⁵

MATERIALS AND METHODS: This study included 30 eyes of 30 cataract patients between age group of 55 to 65 years who underwent cataract surgery between July 2013 and May 2014 at P.E.S.I.M.S.R, KUPPAM.

Inclusion criteria were preoperative keratometric astigmatism of more than one diopter. Cases with previous ocular surgery, scars, corneal degenerations, glaucoma and irregular astigmatism were excluded.

Preoperative evaluation included visual acuity, refraction, detailed Slit lamp Examination, applanation tonometry, dilated funduscopy and keratometry. Procedure was explained to the patients and consent obtained. Patients were started on topical moxifloxacin eye drops one day prior to surgery, Steep corneal axis was marked on the conjunctiva with the help of Mendez axis marker with patient in sitting position.

ORIGINAL ARTICLE

All patients underwent clear corneal phacoemulsification surgery with a 3.2 mm clear corneal incision on the steep axis under subtenons anesthesia and foldable IOL was placed. At the end of surgery full thickness 3.2 mm clear corneal incision was put on the opposite side on the steep axis and both wounds were checked for stability. Post operatively patients were put on moxifloxacin and steroid eye drops for 6 weeks duration. Patients were followed up on 3rd, 10th day and at 6 weeks, on each visit patients were examined for visual acuity, keratometry and refraction. Astigmatism was calculated by simple subtraction method and statistical analysis was done by Wilcoxon signed rank test.

RESULTS: Among 30 patients, 16 were male and 14 were female with a mean age of 60 years. 12 patients had against the rule astigmatism and 18 with the rule preoperatively. The median preoperative keratometric astigmatism score was 1.5 in the range of 1.0(D) TO 2.75(D) and the median postoperative keratometric astigmatism at 6 weeks was 0.5 in the range of 0.25(D) to 2.0(D).

This difference of median scores has been checked statistically using "Wilcoxon Signed rank test and was significant.

Results of Wilcoxon Signed rank test (TABLE 1):

Preoperative median score	Postoperative median score	P value
1.5D	0.5D	<0.001(significant)

DISCUSSION: The astigmatic effect of a single clear corneal incision studies have shown a flattening of between 0.28D and 0.5D in temporal incisions. It typically affects the hemisphere in which the clear corneal incision is present and no or minimal effect on the opposite hemisphere.⁵

Methods to reduce the preexisting astigmatism include.

ARCUATE KERATOTOMY: In which 6-7 mm length incisions of 80% thickness are performed on the steep axis, however arcuate keratotomy near the limbus heals quickly leaving minimal astigmatic correction effect and if it is away from limbus, it results in unstable refraction.⁸

TORIC IOL: The results are predictable, but the lenses are expensive, decentration is the main complication. (10%-15%).⁶

LIMBAL RELAXING INCISIONS: This method involves limbal incisions (600 in depth) of varying sizes depending on the degree of astigmatism made on the steep axis. Early refractive stability is achieved but needs diamond knife and normograms.⁴

EXCIMER LASER: Excimer laser can be used postoperatively to correct preexisting astigmatism in cataract patients. Cost and a decentred zone, flap complications and regression must be kept in mind.⁹

OPPOSITE CLEAR CORNEAL INCISIONS: construction of opposite clear corneal incisions is a relatively simple technique requiring no extra instrumentation. It is relatively easy to learn and opposite clear corneal incisions is useful in managing mild to moderate preexisting astigmatism.

ORIGINAL ARTICLE

Lever and Dahan reported 33 patients that 3.5 mm opposite clear corneal incisions straddling the steep axis decreased preexisting astigmatism by a mean value of 2 D.⁵ Corresponding figures using this method have been reported to be 1.5D by khokhar et al.¹⁰ in our study the difference between the preop median and postop median score was 1D.

Disadvantages of clear corneal incisions include the theoretical risk of endophthalmitis due to additional full thickness incision. Also it is difficult to use in oblique astigmatic axis¹⁵ and further studies are needed to develop the nomograms correlating the incision length, width and age of the patients with preexisting astigmatism to be corrected.

REFERENCES:

1. Rashand k M; laser in situ keratomileusis for myopic astigmatism. Journal of refractive surgery 1999; 15 (6): 635-660.
2. Hoffer K. J; Biometry of 7500 cataractous eyes. American journal of ophthalmology 1980; 90 (3); 360-368.
3. Akura J, Kaneda S, Hatta s and Matsuiira K: Controlling astigmatism in cataract surgery requiring relatively large self-sealing incisions, J Cataract refractive surgery 2000; 26 (11); 1650-1659.
4. Muller Jensen K, Fisher P, Siepe U; Limbal relaxing incisions to correct astigmatism in clear corneal cataract surgery. J Refractive surgery 1999; 15 (5); 586-589.
5. Lever J, Dahan E; Opposite clear corneal incision to correct preexisting astigmatism in cataract surgery. J Cataract refractive surgery 2000; 26 (6); 803-805.
6. Till J S, Yoder PR Jr, Wilcox TK, Speilman LJ. Toric intraocular lens implantation; 100 consecutive cases. J Cataract refractive surgery 2002; 28; 295-301.
7. Rushwurm I, Scholz u, Zehetmayer M. Astigmatic correction with a foldable toric intraocular lens in cataract patients. J Cataract refractive surgery. 2000; 26 (7); 1022-1027.
8. P fleger T, Skorpik C, Menapace R, et al. Long term course of induced astigmatism after clear corneal incision cataract surgery. J Cataract refractive surgery 1996; 22; 72-77.
9. Yang C N, Shen EP, HU F R. Laser in situ keratomileusis for the correction of myopia and myopic astigmatism. J Cataract refractive surgery. 2001; 27; 1952-60.
10. Khokhar S, Lohiya P, Murugeisan V and Panda A. Corneal astigmatic correction with opposite clear corneal incisions or single corneal incision; comparative analysis cataract; J Cataract refractive surgery. 2006; 32 (9); 1432-7.

AUTHORS:

1. Chandrakant
2. Narayan M.
3. Srinivasulu
4. Prabhu Chaitanya
5. Inchara
6. Sushma
7. Padmini

PARTICULARS OF CONTRIBUTORS:

1. Assistant Professor, Department of Ophthalmology, P. E. S. Institute of Medical Sciences and Research, Kuppam.
2. Professor & HOD, Department of Ophthalmology, P. E. S. Institute of Medical Sciences and Research, Kuppam.
3. Senior Resident, Department of Ophthalmology, P. E. S. Institute of Medical Sciences and Research, Kuppam.
4. Resident, Department of Ophthalmology, P. E. S. Institute of Medical Sciences and Research, Kuppam.

5. Resident, Department of Ophthalmology, P. E. S. Institute of Medical Sciences and Research, Kuppam.
6. Resident, Department of Ophthalmology, P. E. S. Institute of Medical Sciences and Research, Kuppam.
7. Resident, Department of Ophthalmology, P. E. S. Institute of Medical Sciences and Research, Kuppam.

NAME ADDRESS EMAIL ID OF THE CORRESPONDING AUTHOR:

Dr. Chandrakant,
3, P. G. Quarters,
P. E. S. I. M. S. R Campus,
Kuppam-517425, Andhra Pradesh.
E-mail: chandrakantpujar@rediffmail.com

Date of Submission: 13/11/2014.
Date of Peer Review: 14/11/2014.
Date of Acceptance: 29/12/2014.
Date of Publishing: 06/01/2015.