

MAGNITUDE OF POST OPERATIVE CORNEAL ASTIGMATISM AFTER PHACOEMULSIFICATION THROUGH 3.2MM TEMPORAL CLEAR CORNEAL INCISIONNeeraj Sharma¹**HOW TO CITE THIS ARTICLE:**

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ABSTRACT: Surgically induced astigmatism (SIA) is a common obstacle for achieving excellent uncorrected visual acuity after Phacoemulsification with implantation of foldable IOL. The aim of the study was to determine the magnitude of surgically induced post-operative astigmatism after phacoemulsification with intraocular lens implantation through a temporal clear corneal incision. This study included 16 eyes with senile cataract which were operated using phacoemulsification with implantation of a foldable intraocular lens through a temporal clear corneal incision. Temporal incision at 180 degree was used for all cases. Astigmatism was measured by autorefractometer preoperatively and at 6 weeks postoperatively. The mean surgically induced astigmatism was 0.53 D (Diopter) with the Rule. The vertical component of astigmatism increased postoperatively than preoperatively. Horizontal component of astigmatism decreased in majority of cases postoperatively.

KEY WORDS: Cataract surgery, temporal clear corneal incision, surgically induced astigmatism.

INTRODUCTION: The cataract is defined as opacity in the lens capsule or its substance with or without loss of vision. It is most common cause of preventable blindness in the world. Presently cataract surgery is the only option offered for its treatment. There had been a paradigm shift in the methodology of cataract surgery till late. At present, Phacoemulsification with implantation of foldable IOL is considered to be the gold standard for cataract surgery.

On the other side, surgically induced astigmatism (SIA) is still a common obstacle for achieving excellent uncorrected visual acuity.¹ Architecture and location of incision are the important factors influencing surgically induced astigmatism. Corneal astigmatism is directly proportionate to the cube of length of incision and the second, that, it is inversely related to the distance from limbus.² Smaller corneal incision also implies less change in corneal curvature post operatively. Peripheral incision at sclera and limbus result in a less surgically induced change in corneal contour than those that involve cornea. Clear corneal incisions are located either on superior limbus (90 degree) or at temporal side (180 degree). A superior incision is closer to the corneal apex than temporal incision. This could explain the greater effect of superior incision on the central corneal curvature.³

This study proposes to analyze post-operative corneal astigmatism after phacoemulsification with intraocular lens implantation through 3.2mm temporal clear corneal incision.

MATERIAL AND METHOD: A prospective randomized interventional study was conducted with 16 patients (16 eyes) who had underwent phacoemulsification with foldable IOL implantation with a temporal clear corneal incision.

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Inclusion Criteria: Patients with clear cornea with no previous history of ocular trauma or surgery were included in this study. Cases with 70 degree to 110 degree axis were considered as with the Rule (WTR) astigmatism and cases with 160 degree to 20 degree axis were considered as Against the Rule (ATR) astigmatism.

Exclusion Criteria: Patients with previous history of glaucoma, traumatic cataract, corneal pathology, poorly dilating pupils, corneal scarring or degeneration, irregular astigmatism were excluded.

METHOD: Preoperative assessment of each patient was according to the predesigned proforma. Ocular and adnexal examination was conducted and noted. Visual acuity measurement was done with snellen chart at darkroom. Slit lamp biomicroscopy was done to grade the cataractous change in those study subjects. Tonometry was done for routine IOP measurement by Goldmann Applanation Tonometry. Fundus examination was done using indirect ophthalmoscope and 90 D examination.

Preoperatively Corneal curvature measurement was conducted using Topcon autorefracto Keratometer and was noted. The room lights were dimmed to make the mires more easily visible. The instrument is Turn on and confirms that the bulb is lit by looking into the front of the instrument from the patient's point of view.

The patient is adjusted comfortably with their chin firmly in the chin rest and forehead against the band. The patient is instructed to look into the center of the instrument and occlude the other eye.

The mires are seen when looking into the eyepiece. The focusing knob is adjusted aligned, and elevated to focus the double circle into a single clear circle with the cross in the center. The horizontal reading is obtained by turning the left, or horizontal measuring drum until the plus signs overlap. For an accurate measurement this must be performed after the keratometer has been aligned on the correct axis. The vertical reading is obtained by turning the right or vertical drum (picture left) until the minus signs are superimposed. The horizontal axis is read from the horizontal mark, and the vertical axis is read from the mark on top of the keratometer.

Contact A scan biometer aided in IOL power calculation. Syringing of the Naso lacrimal duct was done. Pre Anesthetic checkup and fitness for surgery was evaluated by anesthetist.

All patients were operated by same surgeon under peribulbar anesthesia. Three step temporal clear corneal incision 2.8mm in size was made with 2.8mm steel keratome. Tunnel length was 1.75mm to 2mm. Phacoemulsification was performed using Zeiss visalis 100 phacoemulsification system. Incision was enlarged to 3.2mm and foldable acrylic IOL was implanted in capsular bag. Postoperative medication included Dexamethasone and ciprofloxacin eye drops six times per day. Medications were tapered in next 6 weeks.

Post-operative corneal measurements were recorded at 6 weeks interval.

RESULTS: Keratometric readings were recorded using Topcon auto refractometer. Pre-operative keratometric readings and 6 weeks post-operative keratometric readings were analyzed. 16 eyes were included in the study. Magnitude of induced astigmatism was calculated using algebraic analysis of pre and post-operative K readings. Mean induced astigmatism was 0.53 Diopter WTR. Also preoperative cases were divided into two groups 8 eyes were having ATR astigmatism pre

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operatively while 8 eyes were having WTR astigmatism pre operatively. Induced astigmatism in ATR group was 1 Diopter WTR and in second WTR group 0.37 Diopter WTR.

DISCUSSION: The Temporal location is farthest from visual axis and any flattening which is caused by wound is less likely to affect corneal curvature at the visual axis. Our study shows flattening of horizontal axis by temporal incisions, therefore temporal incision can be used in cases having ATR astigmatism pre operatively.

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Sl. No.	Pre-operative Keratometry	Pre-Operative Astigmatism	Post-operative Keratometry	Post-operative astigmatism	Surgically induced Astigmatism
1	Kh 47.25D Kv 45.50D	1.75D, ATR	Kh 47.75D Kv 47.50 D	0.25D, ATR	1.50 D, WTR
2	Kh 45.00 D Kv 46.50 D	1.50 D, WTR	Kh 45.75D Kv 47.00D	1.25 D, WTR	0.25 D, WTR
3	Kh 44.50D Kv 45.50 D	1.0 D, WTR	Kh 44.75 D Kv45.50 D	0.75 D, WTR	0.25 D, WTR
4	Kh 45.00 D Kv 44.50 D	0.50 D, ATR	Kh 44.75D Kv 45.25 D	0.50 D, WTR	1.00 D, WTR
5	Kh 42.00D Kv 40.75 D	1.25D, ATR	Kh 42.00 D Kv40.75 D	1.25 D, ATR	Zero
6	Kh 44.00 D Kv 44.25 D	0.25 D, WTR	Kh 43.50 D Kv 44.00 D	0.50 D, WTR	0.25 D, WTR
7	Kh 45.50 D Kv 46.75 D	1.25 D, WTR	Kh 45.50 D Kv 46.75 D	1.25 D, WTR	Zero
8	Kh 40.75 D Kv 40.25 D	0.50 D, ATR	Kh 40.25 D Kv 41.00 D	0.75 D, WTR	1.25 D, WTR
9	Kh 41.50 D Kv 40.50 D	1.00 D, ATR	Kh 41.25 D Kv 40.75 D	0.50 D, ATR	0.50 D, WTR

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10	Kh 42.25 D Kv 42.50 D	0.25 D, WTR	Kh 42.25 D Kv 42.75 D	0.50 D, WTR	0.25 D, WTR
11	Kh 45.00 D Kv 44.25 D	0.75 D, ATR	Kh 44.75 D Kv 44.00 D	0.75 D ATR	Zero
12	Kh 43.50D Kv 44.00 D	0.50 D, WTR	Kh 43.50 D Kv 44.50 D	1.00 D, WTR	0.50 D, WTR
13	Kh 43.50D Kv 44.00 D	0.50 D, WTR	Kh 44.50 D Kv 43.75 D	0.75 D, ATR	1.25 D, WTR
14	Kh 42.25 D Kv 42.75 D	0.50 D, WTR	Kh 42.50 D Kv 42.75 D	0.50 D, WTR	0.25 D, WTR
15	Kh 41.00 D Kv 39.00 D	2.00 D, ATR	Kh 42.25 D Kv 42.00 D	0.25 D, ATR	1.75 D, WTR
16	Kh 46.50 D Kv 45.50 D	1.00 D, ATR	Kh 46.00 D Kv 47.00 D	1.00 D, WTR	2.00 D, WTR

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