

CORNEAL ASTIGMATISM AFTER MANUAL SMALL INCISION CATARACT SURGERYRajni Sharma¹, Mohd. Ayaz Bhat², Pallvi Jamwal³, Syed Tariq Qureshi⁴**HOW TO CITE THIS ARTICLE:**

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ABSTRACT: INTRODUCTION: Cataract is the leading cause of preventable blindness in India. Manual Small Incision Cataract Surgery is still the preferred method of cataract surgery because of its low cost and non-dependence on costly equipments. Postoperatively astigmatism is an important cause of poor uncorrected visual acuity after cataract surgery. **Purpose:** The purpose of this study was to assess corneal astigmatism in manual small incision cataract surgery in superior versus temporal incision. **MATERIALS AND METHODS:** A total of 100 patients were included in our study. 50 patients received superior incision and 50 patients received temporal incision. Surgically induced astigmatism was calculated in these patients postoperatively. **RESULTS:** We observed mean 1.16 D of surgically induced astigmatism in patients with superior incision and mean 0.62 D of astigmatism in patients with temporal incision at the end of 12th postoperative week. **CONCLUSION:** The results of the present study showed a favourable influence of temporal incision over superior incision in manual incision cataract surgery in terms of surgically induced astigmatism.

INTRODUCTION: Cataract surgery is one of the most frequently performed ophthalmic procedure. It was once considered a simple rehabilitative procedure. But over the years it has been transformed into an increasingly precise refractive surgery. The goal is no longer just being able to make the patient mobile and self-sufficient in looking after himself but to achieve emmetropia. High astigmatism is an important cause of poor uncorrected visual acuity after cataract surgery. The aim of the study is to compare the astigmatism induced by a superior and temporal incision in manual SICS.

MATERIALS AND METHODS: 100 patients (57 male/43 female) with a mean age of 56.8 years (range 51-80 years) were included in the study. The inclusion criteria were patients with age related uncomplicated cataract, keratometric astigmatism of 2.0 D or less, good fixation and cataract upto grade 4 nuclear sclerosis. They were sub divided randomly into two groups of 50 each. Group I received superior incision and Group II received temporal incision. Pre-operatively, a full ophthalmic examination including keratometry and "A" Scan biometry was done by the surgeon. All surgeries were done by one surgeon under peribulbar anaesthesia. The incision architecture was similar in both the groups. A 5.5-6.5 mm scleral frown incision, 1.5-2 mm from the limbus was made with no.15 disposable blade. A funnel shaped sclerocorneal pocket incision was created with a diamond crescent knife. Sideports were made with a diamond knife 15 degree to the right of Scleral funnel. With a diamond keratome, the anterior chamber was entered 1.5 mm into the clear cornea and the internal incision was enlarged sideways to 8 mm. A single piece PMMA IOL of 6 mm optic size and 12.5 mm total size was implanted into the capsular bag. Patients were examined on 1st post-op day and following at 1 week, 3 weeks, 6 weeks and 12 weeks for uncorrected and best corrected visual acuity, slit lamp examination, fundus examination, keratometry and refraction. Any complication if occurred was recorded.

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Preoperative and postoperative (12th weeks) keratometric readings and refraction (12 weeks) were used for analysis. Amplitude of pre-operative astigmatism was calculated from the difference in the keratometric value in the steeper and flatter meridian. Surgically induced astigmatism was calculated by simple subtraction method.

PURPOSE: The purpose of this study was to assess corneal astigmatism in Manual Incision Cataract Surgery in Superior versus Temporal Incision.

OBSERVATIONS AND RESULTS: In Group I, mean age of Patients was 57.44 years (range 51-80 years); 28 patients were male and 22 were female. In Group II, mean age of patients was 56.50 years (range 51-80 years); 29 patients were male and 21 patients were female. Demographics of the patients is given in Table I.

| Group | Age-Median Range | Male | Female |
|----------|-------------------|------|--------|
| Group I | 57.44 (51-80 Yrs) | 28 | 22 |
| Group II | 56.50 (51-80 Yrs) | 29 | 21 |

Table I

The amplitude of pre-operative astigmatism was similar and it was around 0.68 D in both the groups. The amplitude of surgically induced astigmatism (SIA) at the end of 12th week was higher in Group I (1.16 D) than in Group II (0.62 D) as shown in Table II

| Astigmatism in diopters | Group I | Group II |
|-------------------------|---------|----------|
| 0 - 1.00 | 22 | 46 |
| 1.25 - 2.00 | 28 | 4 |
| Mean | 1.16 | 0.62 |

Table II: SIA at the end of 12th Week

Distribution of Type of Pre-operative and Post-Operative Corneal astigmatism (CA) shown in Table III

| Group | Pre-operative CA | | | Post-Operative CA | | |
|----------|------------------|-----|-----|-------------------|-----|-----|
| | Nil | WTR | ATR | Nil | WTR | ATR |
| Group I | 0 | 25 | 18 | 2 | 14 | 34 |
| Group II | 0 | 21 | 23 | 4 | 35 | 11 |

Table III

WTR - With the rule

ATR - Against the rule

As per pre-operative visual acuity there was no significant difference in the two groups. The difference in uncorrected visual acuity was significant in the two groups at the end of 12th Week as seen from Table IV.

| Uncorrected Visual Acuity (VA) | Group I | Group II |
|--------------------------------|---------|----------|
| 6/60 or less | 0 | 0 |
| 6/36 - 6/18 | 12 | 3 |
| 6/12 - 6/6 | 38 | 47 |
| Best corrected | | |
| 6/60 or less | 0 | 0 |
| 6/36 - 6/18 | 4 | 3 |
| 6/12 - 6/6 | 46 | 47 |

Table IV: Post-operative visual acuity at the end of 12th Weeks

There were few complications like uveitis in 3 patients in Group I and 2 patients in Group II; striae keratitis in 6 and 5 patients in Group I and II respectively.

DISCUSSION: Manual SICS is an alternative for phacoemulsification but the astigmatism is higher due to the larger size of incision. Burgansbey et al ¹ have shown an increase in astigmatism with an increase in incision size. In their study, the mean induced astigmatism was 0.6 to 0.3D for 6 mm incision, 0.75 ± 0.67 D for a 6.5 mm incision and 1.36 ± 0.77 D for a 7 mm incision.

Roman S et al² have shown that surgically induced astigmatism is less (0.53 D) in the temporal incision than in superior incision (0.98D).

Gokhale NS et al ³ have found that the amount of surgically induced astigmatism (SIA) was lower in the temporal incision group (0.62D) as compared to superior incision group (1.16D).

In our study, we have also found that the amount of SIA was lower in the temporal incision group (0.62) than in superior incision group (1.16D).

Also, the incision at the superior limbus induces a shift towards ATR astigmatism and the incision at the temporal limbus induces a shift towards WTR astigmatism as we found in our study. WTR astigmatism induced by a temporal incision is advantageous as most elderly cataract patients have pre-operative ATR astigmatism.

Madhu M et al⁴ reported a higher percentage of eyes in the temporal group had an uncorrected VA of 20/25 at different points of time.

Mukherji S et al⁵ reported that the uncorrected visual outcome was better in the temporal MSICS.

These findings correlate with our study as well.

In conclusion, it may be summarized that MSICS via temporal approach has several advantages over MSICS via superior approach because of following reasons:-

- Working at the temporal periphery, there is no need to turn the eye down, as when working over the brow and therefore the bridge sutures are not required.
- The temporal location allows greater access to the incision than working over the brow.
- At temporal location, the lateral canthal angle is directly beneath the incision. The irrigation fluid drains naturally as when working over the brow.
- The temporal location is farthest from the visual axis and thus the effect of any fluttering around the wound is less likely to affect the corneal curvature at the visual axis.

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- Incision at temporal location are more stable with respect to ATR shift.
- When the incision is located superiorly, both gravity and eyelid blink tend to scale on the incision. With temporally placed incision these forces are better neutralized because the incision is perpendicular to the vector of forces.
- At temporal location, the astigmatism induced is WTR. This is advantageous to the large majority of cataract patients where post operatives astigmatism is WTR.

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