

Effect of Side Port Incision Size on Surgically Induced Astigmatism in Patients Undergoing Manual Small Incision Cataract Surgery – A Comparative Study¹Pavana Acharya, Assistant Professor, Department of Ophthalmology, Hassan Institute of Medical Sciences, Hassan²Shreyarani Patil, Postgraduate, Department of Ophthalmology, Hassan Institute of Medical Sciences, Hassan³Kavitha C. V, Professor, Department of Ophthalmology, Hassan Institute of Medical Sciences, Hassan.⁴Sandeep K, Associate Professor, Department of Ophthalmology, Hassan Institute of Medical Sciences, Hassan⁵Samruddhi S Shetty, Postgraduate, Department of Ophthalmology, Hassan Institute of Medical Sciences, Hassan**Corresponding Author:** Shreyarani Patil, Postgraduate, Department of Ophthalmology, Hassan Institute of Medical Sciences, Hassan.**How to citation this article:** Pavana Acharya, Shreyarani Patil, Kavitha C. V, Sandeep K, Samruddhi S Shetty, “Effect of Side Port Incision Size on Surgically Induced Astigmatism in Patients Undergoing Manual Small Incision Cataract Surgery – A Comparative Study”, IJMACR– October– 2026, Volume – 9, Issue – 5, P. No. 385 – 389.**Open Access Article:** © 2026 Shreyarani Patil, et al. This is an open access journal and article distributed under the terms of the creative common's attribution license (<http://creativecommons.org/licenses/by/4.0>). Which allows others to remix, tweak, and build upon the work non - commercially, as long as appropriate credit is given and the new creations are licensed under the identical terms.**Type of Publication:** Original Research Article**Conflicts of Interest:** Nil**Abstract****Background:** Manual Small Incision Cataract Surgery (MSICS) is one of the most commonly performed cataract surgeries in developing countries. Surgically induced astigmatism (SIA) remains an important factor affecting postoperative visual outcome. Side port incision size may influence corneal curvature and postoperative astigmatism.**Aim:** To compare the effect of side port incision size (2.6 mm versus 3.2 mm) on surgically induced astigmatism in patients undergoing MSICS (Manual small incision cataract surgery).**Materials and Methods:** This prospective interventional comparative study included 200 patients undergoing MSICS at the Department of Ophthalmology, Hassan

Institute of Medical Sciences, Hassan. Patients were divided into two groups. Group A underwent MSICS with a 2.6 mm side port incision, whereas Group B underwent MSICS with a 3.2 mm side port incision. All surgeries were performed using a standard superior frown incision of 6.5 mm by a single surgeon. Postoperative follow-up was conducted for 6 weeks. Keratometry and refraction were assessed at the end of follow-up and surgically induced astigmatism was compared between the groups.

Results: The mean age was 57 years. In Group A, 67 cases had SIA. Astigmatism was mild(<1D) in 27, moderate(1-2D) in 34, and high(2D) in 6 patients. In Group B 61 cases developed SIA in which 44 had mild, 12 moderate and 5 had high degree. Even though SIA

occurred equally in both groups, mild SIA was more in group B whereas moderate and severe degrees were more in group A.

Conclusion: This study demonstrates that a slightly larger side port incision size can reduce overall SIA by negating the astigmatic effect of the main incision.

Keywords: Manual Small Incision Cataract Surgery, Surgically Induced Astigmatism, Side Port Incision, Cataract Surgery, MSICS.

Introduction

Cataract is the most common cause of reversible blindness and surgery is the only intervention available till now. Phacoemulsification and manual small incision cataract surgery (MSICS) are the most commonly done procedures. In our country, there is a large volume of cataract backlog, mainly among the rural and suburban population. MSICS has emerged as a popular procedure of choice in the surgical treatment of cataracts as it is less expensive and is as effective as Phacoemulsification. However Surgically induced astigmatism (SIA) remains a common cause of poor postoperative visual recovery in these patients.¹ Small incision cataract surgery is considered a refractive surgery, targeting early visual rehabilitation and emmetropia in recent years. With the development of new technologies in the manufacturing of intraocular lenses and the introduction of new generation algorithms in biometry, eye surgeons are able to fully correct the spherical component of the refractive error. However, SIA poses a significant challenge during the postoperative period. Incision size (width and length) and configuration (one-, two-, and three-step), incision location relative to the limbus, and the axis on which the main incision was performed are the parameters that can affect SIA². In MSICS, Side port incision is done at 90

degrees away from main wound to perform intraocular procedures like capsulorhexis, cortical wash, IOL dialing. The size of sideport incision varies from 2.2 to 3.2 mm. Side port incision, 90 degrees away from frown incision is usually astigmatically neutral. However, not much data is available regarding the effect of side port incision size on the SIA. Hence we plan to evaluate the effect of varying side port incision size on SIA.

Materials and Methods

Study Design and Setting: This prospective comparative study conducted over a period of 18 months. The study aimed to compare the effect of side port incision size (2.6mm versus 3.2 mm) on post operative astigmatism in patients undergoing manual small incision cataract surgery.

Study Participants: A total of 200 patients attending the Ophthalmology outpatient department for cataract surgery were enrolled after satisfying the eligibility criteria.

Inclusion criteria

- Patients with senile cataract of grade 1-3.
- Preoperative astigmatism of $< 0.5D$.

Exclusion criteria

- Preexisting astigmatism both with the rule and against the rule $> 0.5D$.
- Lenticular abnormalities like-Lenticulus, subluxated lens, microstrophakia.
- Corneal disorders -preexisting corneal opacity, keratoconus, corneal dystrophies.
- Intraoperative complications like -PC rent, sutured tunnels, zonular dehiscence.
- Postoperative wound abnormalities like wound leak
- Preexisting gross fundus abnormalities

Methodology

Patients who met the inclusion criteria were recruited into the study. The aims and objectives of the study were thoroughly explained to the participants, and informed written consent was obtained. Patient data were recorded using a standardized proforma. A comprehensive medical history and examination were conducted, along with the necessary investigations. A detailed ophthalmological assessment was performed, including measurement of visual acuity and best-corrected visual acuity (BCVA) using the Snellen chart, anterior segment examination with slit-lamp biomicroscopy, keratometry using an autorefractometer, and axial length measurement using A-scan ultrasonography. The patients were posted for Manual Small Incision Cataract Surgery (MSICS) after obtaining physician fitness for surgery.

The patients were divided into two groups: Group A and Group B. Both groups underwent MSICS with a standard 6.5 mm superior frown incision. In Group A, a 2.6 mm side-port incision was created, whereas in Group B, a 3.2 mm side-port incision was made. A rigid PMMA intraocular lens was implanted in the capsular bag in all patients. All surgeries were performed by a single surgeon.

Postoperatively, both groups received moxifloxacin and dexamethasone eye drops in tapering doses over six weeks, along with nepafenac eye drops administered as one drop three times daily (TID).

Both groups were followed up for six weeks after surgery. At the end of the six-week follow-up period, all patients underwent refraction and keratometry. The type and degree of astigmatism were compared between the two groups.

Results

The mean age was 57 years. In Group A, 67 cases had SIA. Astigmatism was mild (<1D) in 27, moderate (1-2D) in 34, and high (2D) in 6 patients in group A. In Group B 61 cases developed SIA in which 44 had mild, 12 moderate and 5 had high degree. Even though SIA occurred equally in both groups, moderate and severe degrees were more in group A.

Figure 1: Age Distribution

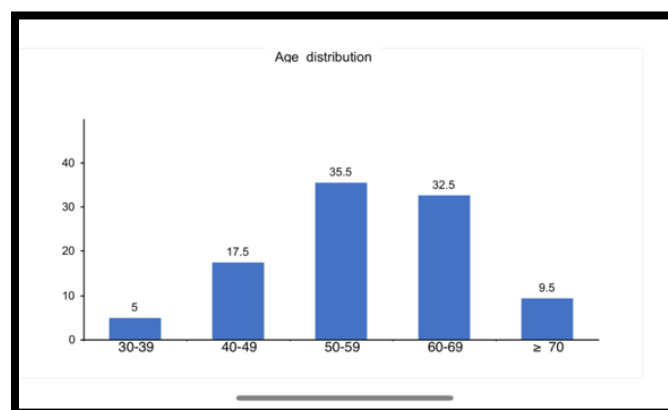


Figure 2: Sex Distribution

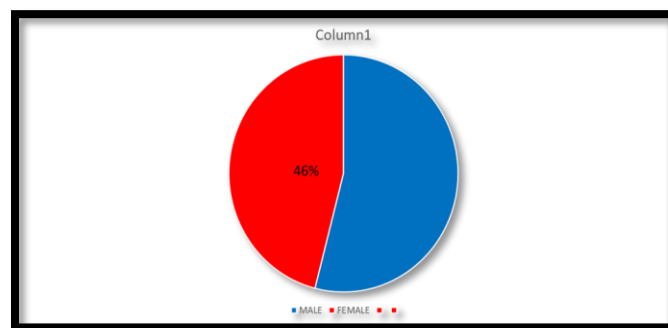


Figure 3: Severity of SIA (Mild, Moderate, High)

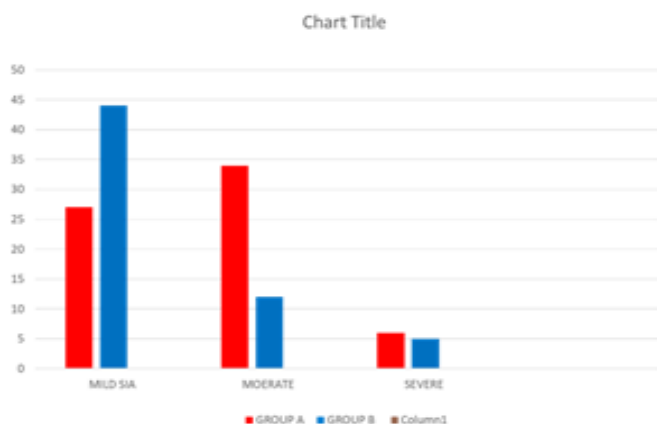


Table 1: SIA distribution

Group	SIA	No SIA	Total
Group A	67	33	100
Group B	61	39	100
Total	128	72	200

Table 2: Severity of astigmatism

Degree of Astigmatism	Group A (n=67)	Group B (SIA, n=61)
Mild (<1.0 D)	27	44
Moderate (1.0–2.0 D)	34	12
High (>2.0 D)	6	5

Table 3: Percentage distribution of severity

Degree	Group A (%)	Group B (%)
Mild	40.3	72.1
Moderate	50.7	19.7
High	9.0	8.2

Discussion

Surgically induced astigmatism (SIA) is an important factor affecting visual outcomes after Manual Small Incision Cataract Surgery (MSICS). While the effect of the main incision on SIA is well established, the influence of side port incision size has been less extensively studied. In the present study, although the overall incidence of SIA was similar in both groups, patients with a 3.2 mm side port incision had a lesser

proportion of moderate and high astigmatism, whereas those with a 2.6 mm side port incision had more moderate and high astigmatism. This suggests that a slightly larger side port may partially neutralize the astigmatic effect of the superior main incision, thereby reducing the severity of SIA.

Our findings are consistent with those reported by Theodoulidou et al., who investigated the influence of side port incision characteristics on postoperative corneal astigmatism following cataract surgery. In their prospective study of 333 eyes, the authors demonstrated that the position of the side port relative to the main tunnel incision significantly affected both the magnitude and axis of postoperative astigmatism. They concluded that a side port placed approximately 90°–110° from the main incision produced the most astigmatically neutral effect, whereas greater or smaller angular separations resulted in significantly greater changes in corneal curvature. Their study highlighted that even a small auxiliary incision can alter corneal biomechanics and contribute to postoperative refractive outcomes.

Similarly, Gupta et al. reported that the configuration of corneal incisions, including the size and location of the side port, influences postoperative keratometric changes and the magnitude of surgically induced astigmatism in MSICS. Their study suggested that careful planning of incision architecture can reduce postoperative corneal distortion and improve uncorrected visual acuity. They emphasized that optimization of the side port incision represents a simple surgical modification that can enhance refractive outcomes without increasing operative time or surgical complexity.

The present study suggests that side port incision size influences surgically induced astigmatism following MSICS. It demonstrates that a slightly larger side port

incision size can reduce overall SIA by negating the astigmatic effect of the main incision. thereby enhancing the visual outcome.

Optimizing side port incision size may therefore improve postoperative visual and refractive outcomes in MSICS.

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