



A COMPARATIVE STUDY ON POST OPERATIVE ASTIGMATISM IN SUPERIOR VERSUS SUPERO-TEMPORAL SCLERAL INCISION IN MANUAL SMALL INCISION CATARACT SURGERY

Ophthalmology

Dr. Sandhya*	MBBS MS Ophthalmology, Assistant Professor, Department Of Ophthalmology, Yadgiri Institute Of Medical Sciences. Yadgiri 585202 *Corresponding Author
Dr. Koli Rakesh Vannura	Post Graduate, Department Of Ophthalmology, Raichur Institute Of Medical Sciences, Raichur 584101
Dr. Shruthi Bidari	MBBS MS DNB, Consultant Ophthalmologist, Vasan Eye Care Shivamogga 577202

ABSTRACT

Title - Study on post operative astigmatism in superior versus supero- temporal scleral incision in MSICS

Purpose : To study the incidence and type of surgically induced astigmatism between superior and supero-temporal scleral incision in MSICS, **Material and Method :** It is randomized and comparative study in 50 patients attending ophthalmology OPD at Raichur Institute of medical science, Raichur with senile cataract within a period of one year and underwent MSICS. 25 of them were chosen randomly for superior incision and rest 25 of them for supero- temporal incision in MSICS with unsutured 6mm scleral incision in all. All were examined post operatively on day 1 , day 7, week 4 and week 6 and astigmatism was evaluated and compared in both groups. **Result :** Patients with supero- temporal incision on post operative week 6 had better visual acuity and least amount of astigmatism compared to patients with superior incision. **Conclusion :** This study concludes that supero- temporal incision cause least surgically induced astigmatism and better visual acuity compared to superior incision.

KEYWORDS

INTRODUCTION

1. Astigmatism is a condition in which a point of light is not formed on retina which occurs when toricity of any of refractive surfaces of the optical system produces two principal foci delimiting an area of intermediate focus called "conoid of sturm"⁽¹⁾.

High astigmatism is an important cause of poor uncorrected visual acuity after cataract surgery⁽²⁾.

2. Cataract surgery is known as 'refractive surgery' because it aims to correct preexisting refractive errors and remove cataracts⁽⁶⁾.

3. Corneal astigmatism being commonly associated with manual small incision cataract surgery postoperatively, planning out the modifications of the surgical intervention especially the incision according to the state of astigmatism present pre operatively is necessary to reduce or correct existing refractive error or astigmatism. Thus control of post operative astigmatism is key to good post operative vision without spectacles⁽¹⁾.

AIM

- To compare the incidence and type of surgically induced astigmatism between superior versus supero-temporal scleral incision in manual small incision cataract surgery (MSICS)

MATERIALS AND STUDY DESIGN :

This is a prospective comparative study among 50 patients with age related senile cataract attending out patient department of Raichur institute of medical science, Raichur

- Informed consent was taken from all the patients prior to the surgery. Pre operatively a full ophthalmic examination including keratometry using Bausch and Lomb keratometer and 'A' scan biometry was done.
- On the previous day of surgery all were advised to instill antibiotic eye drops and xylocaine test dose was given, patients were randomly allocated into two groups

Group SI: Patients who underwent MSICS through superior scleral incision(SI) with implantation of intraocular lens(IOL)

Group STI: Patients who underwent MSICS through superotemporal scleral incision(STI) with implantation IOL

- After preparing eye for surgery, peribulbar anaesthesia was given. In Group SI, fornix based conjunctival flap was taken between 10 o'clock and 2 o'clock position of bare sclera, and a straight scleral incision of about 6.5mm was placed 2 mm behind the limbus using 11 number Bard Parker blade.
- In group STI, fornix based conjunctival flap was taken from 12 o'clock to 3 o'clock position and 6.5mm straight scleral incision was placed 2 mm behind the limbus using 11 number Bard Parker blade.

clock to 3 o'clock position and 6.5mm straight scleral incision was placed 2 mm behind the limbus using 11 number Bard Parker blade.

- Remaining steps are done similarly in all 50 cases according to conventional manual SICS procedure.
- Post operative treatment included topical antibiotic and steroid combination for about 6 weeks in a tapering dose.
- Patients were examined on 1st postoperative day, 1st week, 4th week, 6th week after surgery for keratometry readings and visual acuity

INCLUSION CRITERIA

- Male and female Patients who were diagnosed with age related senile cataract
- No associated ocular disorders like previous ocular surgeries, history of trauma, glaucoma
- No associated systemic disorders

EXCLUSION CRITERIA

- Age below 50 and above 80 years
- Combined surgical procedures at the time of surgery like trabeculectomy, pterygium excision.
- Patients unable to co-operate for pre and post operative keratometry.
- Inability to give informed consent

RESULTS:

Table no.1:

Age	No of patients
50 to 60	9
60 to 70	26
70 to 80	15

1. AGE DISTRIBUTION

50 patients were randomly distributed into two equal groups for MSICS with PCIOL by superior and superotemporal incisions

2. VISUAL ACUITY:

Table no. 2: PRE OPERATIVE

Visual acuity	No of patients in SI	No of patients in STI
Perception of light(PL) + to counting fingers (CF)	5	2
CF ½ metre to CF <3m	5	7
CF 3m to CF 5.5m	7	8
> 6/60	8	8
Total	25	25

Table no. 3: POST OPERATIVE

Visual acuity	No of patients in SI	No of patients in STI
Perception of light(PL) + to counting fingers (CF)	5	2
CF ½ metre to CF <3m	5	7
CF 3m to CF 5.5m	7	8
> 6/60	8	8
Total	25	25

3. PRE OPERATIVE ASTIGMATISM**Table no. 4:**

Type of astigmatism	SI	STI
WTR	9	8
ATR	12	14
NA	4	3
TOTAL	25	25

4. POST OPERATIVE ASTIGMATISM**Table no. 5: SUPERIOR INCISION**

Pre operative	Post operative change	Post operative on 4 th week
WTR(9)	Increase	3
	Decrease	5
	Same	1
ATR(12)	Increase	8
	Decrease	3
	Same	1
NA (4)	WTR	1
	ATR	3
	Same	0

Table no. 6 : SUPERO TEMPORAL INCISION

Pre operative	Post operative change	Post operative on 4 th week
WTR(8)	Increase	5
	Decrease	2
	Same	1
ATR(14)	Increase	4
	Decrease	9
	Same	1
NA (3)	WTR	2
	ATR	1
	Same	0

DISCUSSION:

- Pre existing astigmatism present in over 60% of all patients scheduled for cataract surgery⁽⁵⁾
- One aspect which has confounded the cataract surgeons is the postoperative induced astigmatism. Uncorrected astigmatism causes blurred image, glare, monocular diplopia. Even with appropriate spectacle correction the meridional magnification may create distortion⁽⁴⁾
- The pre-operative astigmatic state shows that ATR is more common type of astigmatism in this group of patients undergoing cataract surgery group. 1,8 This is because in normal healthy eyes stiff upper tarsal plate causes pressure on cornea resulting in with the rule astigmatism but with increasing age this pressure gradually decreases resulting in against the rule astigmatism⁽⁷⁾
- Manual SICS is an alternative for phacoemulsification but the astigmatism is higher due to larger size of incision. Burgansky et al have shown an increase in astigmatism with an increase in incision size⁽²⁾
- The temporal location is farthest from visual axis and any flattening due to the wound is less likely to effect the corneal curvature at the visual axis. When the incision is located superiorly, both gravity and eyelid blink tend to create a drag on the incision. These forces are neutralized better with temporally placed incisions because the incision is parallel to the vector of the forces⁽²⁾
- The results of our study shows that superior incision causes more ATR shift than the WTR. This may be due to the fact that the incision on superior meridian causes flattening of the vertical meridian and steepening of the horizontal meridian leading to more ATR shift post operatively⁽³⁾
- Whereas in superotemporal incision the shift of astigmatism was more towards WTR, this is because the superotemporal incision causes flattening of the horizontal meridian and steepening of vertical meridian leading to more WTR shift⁽³⁾

- This may be advantageous as most of the elderly patients will have ATR astigmatism pre operatively⁽³⁾
- Superotemporal incision also provides other advantages like better wound strength due to minimal separation force of lid pressure and gravity, preservation of functioning filter bleb in previous glaucoma surgery. It is preferred in deeply seated eyes and eyes with coloboma of iris. This incision site also causes less central endothelial loss⁽¹⁾

CONCLUSION

- Post operative astigmatism, being a common complication to cataract surgery, can be reduced or avoided with modification of location of incision
- To sum up, the results in this clinical study reveal that manual SICS through superotemporal incision has better visual outcome and has relatively mild influence on the incidence on surgically induced corneal astigmatism post operatively.
- Most patients present with with-the-rule astigmatism.
- Such a surgical approach brings benefits to blindness prevention for the population, which deserves widespread application in the basic level hospitals of India

REFERENCES

- Abrams D. Duke-elders practice refraction. New Delhi, India: Elsevier; 1993.
- Gokhale NS, Sawhney S. Reduction in astigmatism in manual small incision cataract surgery through change of incision site. Indian J Ophthalmol [Internet]. 2005;53(3):201-3.
- Hoovayya, D. K. S. (2019). Comparative study of surgically induced astigmatism: superior versus superotemporal scleral incision performed in rural hospital. Tropical Journal of Ophthalmology and Otolaryngology, 4(2), 86-91.
- Amod Bhaskarrao Gadikar. A comparative study between superior, supero temporal and temporal incision for corneal astigmatism after small incision cataract surgery with PCIOL MedPulse International Journal of Ophthalmology. November 2020; 16(2): 17-20
- Hazra S, Saha TK. A comparative study of post-operative astigmatism in superior versus superotemporal scleral incisions in manual small incision cataract surgery in a tertiary care hospital. Int J Clin Exp Ophthalmol. 2021; 5: 009-015
- Laliwala F, Patel S, Prajapati V, Patel L, Wanjari MB, Singhal D. Comparative Evaluation of Astigmatic Changes Induced by Superior and Temporal Corneal Incisions in Sutureless Phacoemulsification Surgery: A Case Series. Cureus. 2023 Oct 31;15(10):e48084
- Krishnadeo Vishnu Nalavade, Smita Dileep Javadekar. Post operative outcome of superior & temporal incision in manual small incision cataract surgery. International Journal of Contemporary Medicine Surgery and Radiology. 2020;5(1):A88-A91.