Available online at http://www.journalcra.com

International Journal of Current Research
Vol. 10, Issue, 01, pp.63990-63992, January, 2018

INTERNATIONAL JOURNAL OF CURRENT RESEARCH

ISSN: 0975-833X

RESEARCH ARTICLE

SURGICALLY INDUCED ASTIGMATISM COMPARATIVE STUDY BETWEEN SUPERIOR VERSUS SUPEROTEMPORAL INCISION IN SMALL INCISION CATARACT SURGERY

Dr. Ajay R Kamath and *Dr. Pooja Kandula

Department of Ophthalmology, Kasturba Medical College, Mangalore, Manipal University, India

ARTICLE INFO

Article History:
Received 19th October, 2017
Received in revised form
05th November, 2017
Accepted 21st December, 2017
Published online 19th January, 2018

Key words:
Small incision cataract surgery,
Superotemporal incision,
Surgically induced astigmatism.

ABSTRACT

Introduction: Cataract surgery incisions have been known to influence astigmatism. It has been found by keratometric measurement, the degree of induced astigmatism was significantly less in superolateral compared to superior incision and the variability of astigmatism was also less. In view of this, we have made an effort to compare the astigmatism following conventional superior scleral incision and superotemporal scleral incision with posterior chamber intraocular lens implantation.
Objectives: Of the study were to compare and analyse the astigmatic profile produced by superior scleral incision v/s superotemporal scleral incision and its decay over a period of 6 weeks and the post- operative astigmatic profile in patients having pre- operative against the rule astigmatism
Materials and Methods: It was a prospective cross-sectional study done on 96 patients who underwent suture less small incision cataract surgery during the period of 2 years (2014-2016) All patients with cataract were included. All the surgeries were performed by a single surgeon.
Results: Most of the patients were in the age group of 50-60 years. Follow-up showed that 18.8% patients undergoing superior scleral incision had >2.5 D astigmatism at any given time, whereas none of the patients in superotemporal group showed such high induced astigmatism. On the contrary <1D astigmatism was seen in 37.5% patients undergoing superior scleral incision and in 85 % patients in Superotemporal group.6 weeks follow up of these patients showed significant difference in astigmatism.
Conclusion: Surgically induced astigmatism in superotemporal incision is significantly less compared to superior incision in SICS. Superotemporal incision did not show significant post op against the rule drift. It has the added advantage of being the incision of choice in deep set eyes and in situations where filtration surgery may be required at a future date.

Citation: Dr. Ajay R Kamath and Dr. Pooja Kandula, 2018. "Surgically induced astigmatism comparative study between superior versus superotemporal incision in small incision cataract surgery", *International Journal of Current Research*, 10, (01), 63990-63992.

INTRODUCTION

Cataract surgery incisions have been known to influence astigmatism. Corneal astigmatism has been a by-product of cataract surgery since the first limbal incision was put (year 1976). At the 103rd meeting of the American Ophthalmological Society in 1967, Harold Beasley reported the keratometric changes after intracapsular cataract extraction (John C Merrian *et al*., 2001). Significant astigmatism may be visually disabling causing diminution of visual acuity, glare, monocular diplopia, asthenopia and distortion.Per operative factors such as location and type of incision, size, configuration of wound, suture material, technique of wound closure, clearly influence the post op astigmatism. Among these, a major factor responsible is the location of incision (Ken Hayashi and Fuminoroi, 1994; Wolff's Anatomy of eye and orbit, Eighth edition). It has been reported that a lateral (Masket, 1989; Cravy, 1991) or superolateral incision (Kawano and Uemera, 1990; Kawano, 1993) can decrease and quickly stabilize surgically induced astigmatism (SIA). It has been found by keratometric measurement, the degree of induced astigmatism was significantly less in superolateral compared to superior incision and the variability of astigmatism was also less (Ken Hayashi and Fuminoroi, 1994). In view of this, we have made an effort to compare the astigmatism following conventional superior scleral incision and superotemporal scleral incision with posterior chamber intraocular lens implantation.

***Corresponding author:* Dr. Pooja Kandula,**
Department of Ophthalmology, Kasturba Medical College, Mangalore, Manipal University, India.

Objectives

1. To compare and analyse the astigmatic profile produced by superior scleral incision v/s superotemporal scleral incision and its decay over a period of 6 weeks.
2. The post- operative astigmatic profile in patients having pre- operative against the rule astigmatism.

MATERIALS AND METHODS

Study design: Prospective cross-sectional study

Sample population: 96 patients who underwent suture less small incision cataract surgery.

Study period: 2 years (2014-2016)

Inclusion criteria: All patients with cataract

Exclusion criteria

Patients with corneal degeneration/dystrophies, traumatic cataract, uncooperative for pre-operative keratometry, preoperative oblique astigmatism were excluded from the study. A thorough pre-operative evaluation of the cases including pre-operative keratometry, slit lamp biomicroscopy and A-scan was done on the day of admission.Patients were randomly divided into two groups one undergoing manual SICS with superior incision and the other group with superotemporal incision. All the surgeries were performed by a single surgeon who has performed more than 4000 cataract surgeries. The type of incision was selected randomly on the table. The incisions in all cases were 6.5 mm long, 3mm behind the limbus, insuperior scleral. In superotemporal incision 6.5mm scleral groove was fashioned 3mm behind the limbus extending from 9 o clock to 11 o clock meridians. On the immediate post- operative day, keratometry readings were taken again in all the patients.

RESULTS

Total number of cases studied were 96. The majority of patients were in the age group of 50-60 years. Follow-up showed that 18.8% patients undergoing superior scleral incision had >2.5 D astigmatism at any given time, whereas none of the patients in superotemporal group showed such high induced astigmatism. On the contrary <1D astigmatism was seen in 37.5% patients undergoing superior scleral incision and in 85 % patients in Superotemporal group. In our study the incidence of post op ATR astigmatism increased in superior group from 48.9% to 72.9% i.e. 24% whereas in superotemporal it increased from 30.2% to 45 % i.e. by 14.8%, on the other hand WTR astigmatism decreased in superior incision group by 21.8% whereas superotemporal group the decrease was 13.1%. However the decay in ATR astigmatism in superotemporal group was from 0.868 +/-0.43D to 1.04 =/- 2.67D a change of 0.172 D whereas in superior group it was

Table 1. Age group

Age in years	Male	Female	Total
<40	3	3	6
41-50 years	11	10	21
51-60 years	17	14	31
61-70 years	11	19	30
71-80 years	5	3	8
TOTAL	47	49	96

Table 2. Sex

Male	47(48.96%)
Female	49(51.04%)

Table 3. Sample Distribution

Superior incision	52(54.17%)
Superotemporal incision	44(45.83%)

Table 4. Follow up of Astigmatism pattern in Superotemporal and superior incision

Astigmatism in Diopter	Number (Superior)	%	Number (Superotemporal)	%
<0.5	6	12.5	18	45
0.6-1.0	12	25	16	40
1.1-1.5	5	10.4	4	10
1.6-2.0	6	12.5	2	5
2.1-2.5	10	20.8	0	0
>2.5	9	18.8	0	0
TOTAL	48	100	40	100

Table 5. Percentage of Astigmatism

Post op weeks	Superior (ATR)	Superior (WTR)	Superotemporal (ATR)	Superotemporal (WTR)
1	23 (48.9%)	23 (48.9%)	13 (30.2%)	25 (58.1%)
3	20 (50%)	20 (50%)	17 (43.5%)	19 (48.7%)
6	35 (72.9%)	13 (27.1%)	18 (45%)	18 (45%)

Table 6. Significance test values between both the incisions

Comparison Pre-operative	Superior (t-value)	Superior (p-value)	Superior RESULT	Superotemporal (t-value)	Superotemporal (p-value)	Superotemporal RESULT
Week 1	6.943	0	p<0.05	1.49	0.143	p>0.005
Week 3	2.77	0.008	p<0.05	1.61	0.114	p>0.005
Week 6	4.18	0	p<0.05	2.14	0.045	p>0.005

more from 0.818+/- 0.67 D to 1.87+/-1.15 D a change of 1.052 D a change of 1.052 D thus implying that superotemporal is a better approach for patients with preoperative ATR astigmatism. Both superior and superotemporal groups showed an increase in gross astigmatism in the first post-operative week. In the superotemporal group there was a constant decline in the gross astigmatism from first to sixth week post-operative period. The mean astigmatism at 1 week after surgery following superotemporal incision was 0.833 D that declined to 0.532Dat the end of 3 weeks and to 0.487 D at 6 weeks. Thus the decline in astigmatism was 0.301 D between first and third and 0.045 between third and sixth week. In the superior scleral incision he decay was slower, a 0.690 D decrease between first and third week and then a 0.256 D increase between third and sixth week. This implies that a negligible (0.045D) change occurred in astigmatism from third to sixth week in superotemporal incision.

Significance test

The z test was used to compare the surgically induced astigmatism (SIA) between two groups and for the change in astigmatism at each follow up within the same groups. The p values for first, third and sixth week post-operative periods for superior was <0.05 and superotemporal was > 0.05 implying that superior SIA was statistically significant.

DISCUSSION

In our study we made an effort to analyse the difference in magnitude of SIA keeping other factors (length of incision and depth) uniform between a superior and a superotemporal incision in manual SICS.The stabilization of astigmatism following superotemporal incision was early and led to early visual recovery similar to Gokhale *et al*. study (Nikhil and Saurabh, 2005). The incision technique used was BENT technique which effectively minimises wound stretching forces and enables earlier stabilization of post-operative astigmatism. An added advantage is that it does not involve 12 o clock position thus allowing filtering surgeries if required at the superior limbus (Kawano, 1993). Most of the studies conducted in the west, Ewa Bilinska *et al*. (?), Altan Yaycioglu *et al*. (2007), have tried superotemporal approach mainly for phacoemulsification,in a developing country like India,where still majority of cases are SICS due to inadequate access to costly phacoemulsification equipment conversion toa superotemporal approach by surgeons is highly advocated to provide better post operative results with no extra expenditure on equipments.Post op ATR astigmatism increased in superior group by 24% whereas in superotemporal it increased by 14.8% in our study. On the other hand the decrease of WTR astigmatism in superior incision and superotemporal incisions were 21.8% and 13.1% respectively. Superotemporal is a better approach for patients with pre op ATR astigmatism as evidenced by the decay in ATR astigmatism in that group. Ken Hayashi *et al* study found that at the end of one month mean induced astigmatism in superior was greater 1.43+/- 1.21 compared to superotemporal 0.94+/- which was similar to our study. The temporal incision is farthest from the visual axis and any fattening in the wound is less likely to affect 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 are better neutralised with temporal incision. It also has an added advantage that it can performed easily in deep set eyes. However our study has certain shortcomings like short follow up period, small sample size.

Conclusion

Surgically induced astigmatism in superotemporal incision is significantly less compared to superior incision in SICS. Early spectacle correction by third week following surgery is possible as the decay in astigmatism from third to sixth week in superotemporal incision is negligible. Superotemporal incision did not show significant post op against the rule drift. It has the added advantage of being the incision of choice in deep set eyes and in situations where filtration surgery may be required at a future date.

REFERENCES

Altan-Yaycioglu R, AkovaYA, Akca S, Guru S. and Oktem C. 2007. Effect on astigmatism of the location of clear corneal incision in phacoemulsification of cataract. *Journal of Cataract and Refractive Surgery*, 23(5):515-518.

Cataract surgery and its complications. Norman S.Jaffe. *Sixthedition.*1976, Page 182.

Cravy TV. 1991. Routine use of lateral approach to cataract extraction to achieve rapid and sustained stabilization of post operative astigmatism. *Journal of Cataract and Refractive surgery*, 17:415-423.

Ewa B, Agata W, Aleksandra S. and Wojciech O. 2004. Surgically induced astigmatism after cataract phacoemulsification. *"KlinikaOczna"*, 106(6):756-759

John C Merrian, Lei Zheng, Masco Zaider, *et al*. 2001. Change on the horizontal and vertical meridian of cornea after cataract surgery. *Tr Am OphthSoc*., 99:187-197.

Kawano K. 1993. Modified corneoscleral incision to reduce post operative astigmatism after 6 mm diameter intraocular lens implantation. *Journal of Cataract and Refractive Surgery*, 19:387-392.

Kawano K. and Uemera A. 1990. The 6.5 mm superotemporal incision shows a small and stable amount of astigmatism. *Japan IOL society Journal*, 4:221-227.

Ken Hayashi and Fuminoroi N. 1994. Corneal topographic analysis of superolateral incision cataract surgery. *Journal of Cataract and Refractive Surgery*, Vol 20;43-47.

Masket S. 1989. Keratorefractive aspects of scleral pocket incision and closure method for cataract surgery. *Journal of Cataract and Refractive surgery*, 15:70-77.

Nikhil S G. and Saurabh S. 2005. Reduction in astigmatism in manual small incision cataract surgery through change of incision site. *Indian Journal of Ophthalmology*, 53:201-203.

Wolff's Anatomy of eye and orbit. Eighth edition. 268-278.

****