

A Study of Surgical Induced Astigmatism

Rajeshwari M.¹, Shamshad Nadaf Begum², Kavita Salgar³, Rohit Patil⁴

¹Assistant Professor, Dept. of Ophthalmology, Gulbarga Institute of Medical Sciences, Kalaburagi, Karnataka 585101, India. ²MS Ophthalmology, Government General Hospital, Honnalli, Karnataka, India. ³Assistant Professor, Dept. of Ophthalmology, M.R. Medical College, Kalaburagi, Karnataka 585105, India. ⁴Senior Resident, Dept. of Ophthalmology, ESIC Medical College, Kalaburagi, Karnataka 585106, India.

Abstract

The present study included 200 cases. In this 6% in superior scleral incision showed up same level of astigmatism 82% patients showed astigmatism <1.00D in temporal group as compared to 48% in the superior scleral group. In the temporal scleral group there was a Significant reduction of preoperative against the rule astigmatism from 71% to 65% pre operative with the rule astigmatism increased from 25% to 26% at 21st post operative day following. However decay of mean astigmatism in superior scleral incision showed a distinct increase in against the rule astigmatism from 55% to 86% at 21st postoperative day, and with the rule astigmatism decreased from 27% to 80% post operatively. Surgically induced astigmatism of <1.00D was found in 88% cases from temporal scleral group whereas 62% cases from superior scleral group had <1.00D SIA.

Keywords: Astigmatism; Temporal Scleral Group; Superior Scleral Incision.

Introduction

The sclera tunnel incision was introduced in the early 1980s in an attempt to better healing with less surgically induced astigmatism, and wider incision nuclear cataract extraction, this became the favored technique along with some modification for phacoemulsification. In 1990 the suture less incision was developed, utilized a longer sclera tunnel with linear grooves in the floor of the tunnel in the meridian of the incision.

This incision could be stretched to admit a foldable lens, and when unsutured still retains watertight characteristics. The corneal entry was described as a one way valve or corneal lip incision, which enabled the incision to self seal. Subsequently the temporal sutureless clear corneal incision for cataract surgery was described in 1992, now it has become the favored technique for cataract surgery in conjunction with foldable or small incision IOL for many surgeons internationally [1].

Studies done by Gokhale N S . Sawhney S. in

Mumbai where they compared superior superotemporal and temporal incisions in manual SICS on 45 eyes, have shown that mean astigmatism induced surgery was 1.28*2.9 degrees for superior incision. 0.20*23.7 degrees for superotemporal incision and 0.37*90 degrees for temporal groups as compared to that in the superior group [2].

Another study done by Kimurra et al. have shown by vector analysis that surgically induced astigmatism is less with oblique incision(1.02*0.66D) than with a superior incision(1.41*0.72) [2].

Objectives

- To know how to minimize the postoperative astigmatism by changing the site of incision.

Corresponding Author: Rajeshwari M.,
Assistant Professor, Dept. of Ophthalmology
Gulbarga Institute of Medical Sciences
Kalburgi, Karnataka 585101, India
E-mail: drvijayanath@rediffmail.com

Received on 24.03.2017, Accepted on 07.04.2017

Materials and Methods

This is a randomized prospective study conducted to compare astigmatic outcome in superior v/s temporal scleral incision in MSICS at our Basaveshwar Teaching and General Hospital (BTGH) at M.R. Medical College, Gulbarga between November 2007 to June 2009.

The variable was the site of scleral tunnel incision 100 cases underwent cataract extraction with superior scleral incision of 6-7mm and remaining 100 cases were operated with temporal scleral incision ranging from 6-7mm.

All the patient included in the study were examined preoperatively and were selected for cataract surgery following a standard protocol. A detailed history of the patient was taken to rule out systemic diseases as well to exclude patients with

diabetes mellitus and systemic hypertension. Patients with history of uveitis in the past high refractive errors and history of glaucoma and other retinal pathology were excluded from this study.

Observation Results

In group A superior incision induced ATR in 97% of the patients and in group B temporal scleral incision induced WTR in 92% of the patients.

Final mean \pm Sd for superior scleral incision are 0.99 ± 0.58 Final mean \pm SD for temporal scleral incision are 0.66 ± 0.43 Z (calculated value) $4.62 > 2.58$ Z (tabulated value.) Therefore highly significant difference of surgically induced astigmatism is present between temporal and superior scleral incision for MSICS.

Table 1: Type of surgically induced astigmatism

Type	Superior	Temporal
ATR	97	3
WTR	3	92
Nil	0	5

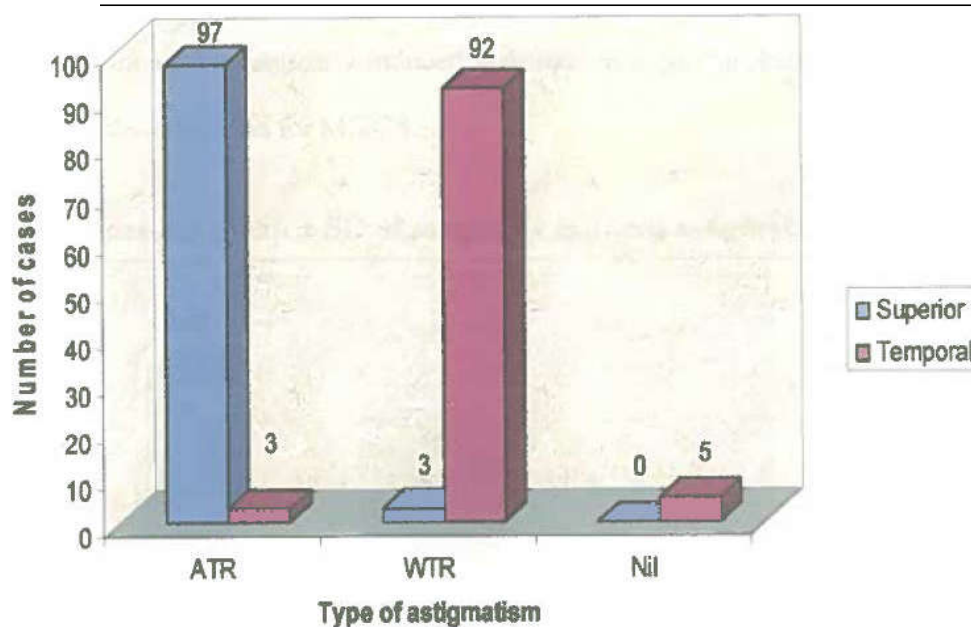


Fig. 1: Type of surgically induced astigmatism

Table 2: Mean \pm SD of surgically induced astigmatism

Type of incision	Mean \pm SD superior	Mean \pm SD Temporal
ATR	1.01 ± 0.61	0.33 ± 0.12
WTR	0.83 ± 0.83	0.69 ± 0.41
Nil	0	0
Total	0.99 ± 0.58	0.66 ± 0.43

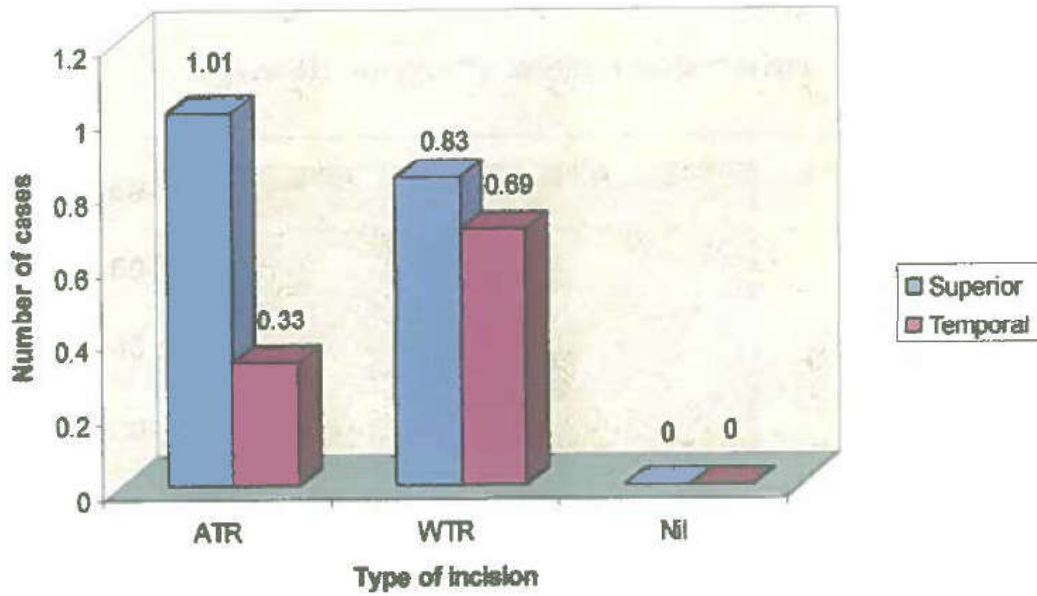


Fig. 2: Mean +/- SD of surgically induced astigmatism

Table 3: Surgically induced astigmatism

Astigmatism in diopters	Superior		Temporal	
	Numbers	%	Numbers	%
<0.50	29	29	55	55
0.51 to 1.0	33	33	33	33
1.01 to 1.5	26	26	10	10
1.51 to 2.0	6	6	2	2
2.01 to 2.5	3	3	0	0
>2.5	3	3	0	0

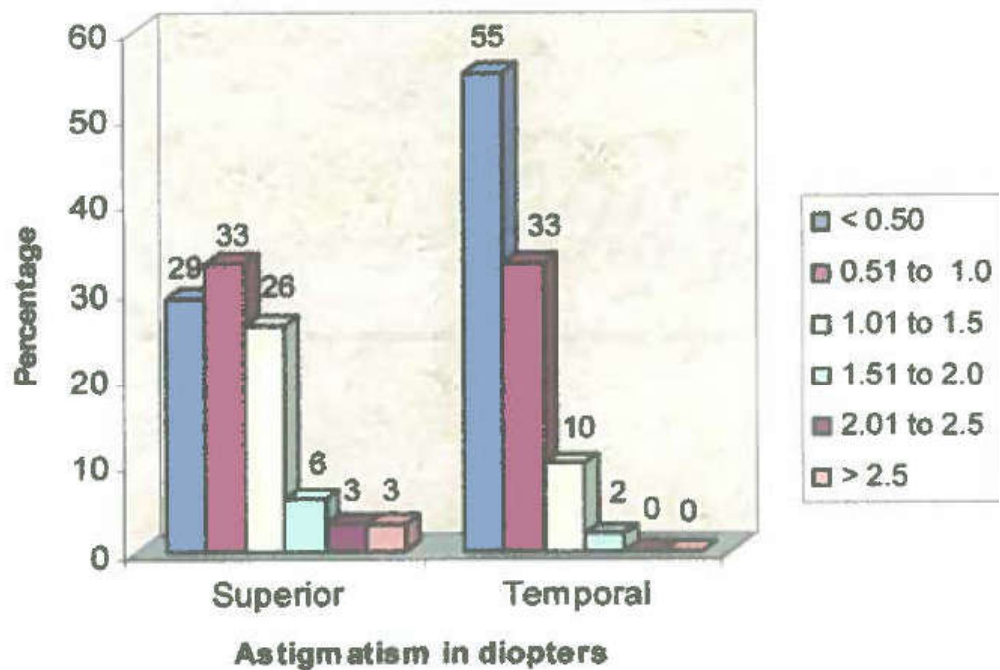


Fig. 3: Surgically induced astigmatism

In group (A) 62% of the patients had <1.00D of surgically induced astigmatism (29% of the patients had <0.5 of astigmatism and 33% had between 0.50D to 1.00D astigmatism) 26% had between 1.00D to 1.50D of SIA.

In group (B) 88% of the patients had <1.00D of SIA and 10% had between 1.00D to 1.50D of SIA.

More than 2.50D SIA was found in 3% of patients with superior scleral incision and Nil temporal scleral incision.

Hence temporal scleral incision induces less surgically induced astigmatism compared to superior incision.

Discussion

Surgically induced astigmatism is surgeon dependent and varies from surgeon to surgeon although identical procedure were to be performed. This study showed that 88% cases of temporal scleral group had surgically induced astigmatism of <1.00D as compared to 62% of superior scleral group.

This study was similar to the study performed by Christopher Wirbeluer et al who studied that after 5 months of cataract surgery SIA was significantly higher in superior incision group (1.16 \pm 0.44SD) than in temporal scleral group (0.66 \pm 0.32)

The mechanism by which temporal approach is associated with reduced post operative decay in keratometric astigmatism is unproven. It is generally recognized that there is a tendency towards ATR shift in astigmatism associated with aging in the absence of anterior segment surgery. The incessant stocking of superior limbus by the upper lid is probably responsible. Mechanically it is easy to visualize the separational force of the upper lid as it crosses nearly perpendicular to much of the traditional superior scleral incision, By comparison the upper lid courses generally parallel to the lateral incision and produces very little spreading effect upon the wound margin also the inter lamellar strength between the temporal and superior periphery of the cornea differs therefore early healing is seen temporal scleral incisions.

Uncorrected visual acuity is a little better in temporal (group B) incision in early post operative period compared to the superior (group A) incision. In both the groups there was slight variation in uncorrected visual acuity at 21st day. Visual acuity

was more than 6/18 in 91 cases in group B and 83 cases in group A. The amount of this study is consistent with previous reports that MSICS induces a small amount of astigmatism and gave early rehabilitation to patients within 3 weeks. For majority of patients with in 3 weeks. For majority of patients spectacle correction were given at 6 weeks.

Although the present study clearly shows the added advantages of the temporal scleral incision. It has to be concluded that the series is small and followup is inadequate to be statistically significant. A large series preferably a controlled random study would be required to make the study statistically comparable.

Conclusion

Superior scleral incision shows a significant post operative post operative against the rule astigmatic shift as compared to temporal scleral incision. Therefore superior scleral incision should not be done in patients with preexisting ATR astigmatism. Surgically induced astigmatism of <1.00D was seen in 88% in temporal scleral incision as compared to 62% in superior scleral incision. This implies that temporal scleral incision produces less astigmatism when compared to superior scleral incision. Temporal scleral incision gives a substantial improvement in surgical exposure especially in patients with deep eyes or prominent eye brows. Temporal scleral incision is more advantageous than superior scleral incision in Astigmatically neutral patients Patients with ATR astigmatism; Patients with WTR astigmatism up to <1.00D. Superior scleral incision is preferred only if with the rule astigmatism is >1.00D.

References

1. Fine Howard, Parker, Mark, Hoffiman Richards Chapter No.47 small incision cataract surgery in Mayren Yanoff Jay S Ducker'S Ophthalmology 6th edition 2004;1:349.
2. Gokhale N.S Sawhney S. Reduction in astigmatism in manual small incision cataract surgery through change of incision site. Indian journal of ophthalmology 2005;53:201-203.
3. Donald Dugman MD. The cornea in Peyman's principles and Practice of ophthalmology 1st edition, Chapter No 6, page.360-371.