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ORIGINAL ARTICLE

STUDY OF ASTIGMATISM IN SMALL INCISSION CATARACT SURGERY BETWEEN TEMPORAL AND SUPERIOR INCISSIONS

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ABSTRACT: Surgically induced astigmatism is a part of cataract surgery. Surgically induced astigmatism varies with distance the incision is made from limbus and site of incision. Small incision cataract surgery a suturless technique of cataract surgery can be done through both temporal and superior sclerocorneal incisions. Since majority of patients undergoing cataract surgery have an against the rule astigmatism, a temporal sclerocorneal incision is better than superior sclera incisions in respect to astigmatism

KEYWORDS: Astigmatism, Cataract, Small incision.

INTRODUCTION: corneal astigmatism is associated with cataract surgery since the first limbal incision was made. With increased patient expectations and improved techniques incision part of surgery has undergone metamorphosis and surgeons have been playing a closer attention to astigmatic effects of cataract surgery. The goal of present study is the ability to predict and eventually control the astigmatic changes that take place during and after cataract surgery.

MATERIALS AND METHODS: The present study was conducted on patients undergoing cataract surgery at a tertiary hospital from October 2010 to October 2012.All patients underwent surgery by a single surgeon.

Inclusion Criteria: All patients undergoing cataract surgery Ecce with PCIOL implantation by SICS under local anesthesia.

Exclusion Criteria:

1. Patients with corneal opacity with corneal astigmatism.
2. Traumatic cataract with corneal tear likely to alter corneal topography.
3. Associated conditions like pterygium, posterior synechiae, pseudoexfoliation, lens induced glaucomas, subluxated lens.
4. Post-operative complications like striate keratitis, vitreous touch syndrome, wound leak.

According to literature the prevalence of astigmatism 6 weeks after cataract surgery was 52%.[1] sample size was collected using the formula 4pq/L2 where p=prevalence, Q=100-P and L= Permissible error. Taking permissible error as 10%, the sample size works out to be 100.two types of incision superior and temporal incisions were used.[2]

All patients were admitted one day before surgery. Detailed history of each patient was taken and through anterior segment examination was performed on slit lamp. Visual acuity, retinoscopy and ophthalmoscopy were done in all cases. Intraocular pressure recording, lacrimal patency was tested. Keratometry was conducted using Bausch and lomb keratometer. Iol power calculation was done by biometry.

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The technique is same in all cases except for the surgical site.100 cases were assigned for temporal section and 100 cases for superior section.

All cases were done under local anesthesia with peribulbar technique. After cleaning and draping lid speculum was put. Conjunctival peritomy was made at superior or temporal limbus. Scleral cautery was never used to avoid possible influence on surgically induced astigmatism.6.5mm sclera groove was performed 2mm away from limbus superiorly or temporally. By tunneling forward into clear cornea for 1.5mm a corneal valve essential for proper wound strength was created. A side port entry of 1.5mm was made 3 clock hours away from the main wound. Anterior chamber was entered with an angled keratome. Viscoelastic was injected and continuous curvilinear capsulorrhexis approximately 6mm was created with a cystitome. The tunnel was extended to its full length of 6.5mm on either side with a keratome. By hydro dissection nucleus was prolapsed into the anterior chamber. Viscoelastic was injected in front and behind the nucleus and nucleus was brought by either by viscoelastic or irrigating vectis.

Thorough cortex was done and 6mm optic single piece implant was inserted into capsular bag. The viscoelastic aspirated and anterior chamber reformed with ringer lactate solution from side port to form a filled and firm eye. The incision was tested for water tightness by pressing a cellulose sponge on proximal wound. Sutures were not used for any eye.

There was no attempt in any case to modify preexisting astigmatism. Subconjunctival injection of amikacin and dexamethasone was given in all cases.

Post-operative treatment included topical steroid antibiotic combination drops were instilled 6 times per day from second postoperative day onwards. At time of discharge patients were informed about follow up visits.

Patients were examined periodically on I, 3 and 6 weeks postoperatively. The examination included keratometry and biomicroscopy. The course of post-operative astigmatic changes were determined by keratometry performed with a standard Bausch and lomb keratometer. At the end of 6 weeks a final best corrected subjective refraction was performed and spectacles prescribed. All changes of keratometry readings were recorded tabulated for each corresponding period of 100 cases.

RESULTS: The main purpose of study is to compare surgically induced astigmatism in superior vs. temporal sclera tunnel small incision non phaco sutureless cataract surgery. In this study we compared the post-operative surgically induced astigmatism in 100 cases of superior small incision cataract surgery with 100 cases of temporal small incision cataract surgery. All cases were selected by systemic random sampling. The present study was done over a period of 2 years from October 2010 to October 2012.The patients were followed regularly for 6 weeks after the surgery.

1) AGE AND SEX INCIDENCE: Out of the total number of 100 cases 39 were males and 61were females. The age varies between 30 to 80 years.

2) PREOPERATIVE VISUAL ACQUITY: About 46 cases subjected to superior section had a visual acuity in range of 1/60 to 6/60, 4 cases in range of 6/36 to 6/60 and 50 cases had visual acuity less than 1/60.

3) PREVALANCE AND TYPE OF PREOPERATIVE ASTIGMATISM: 36 cases included in this study for superior incision had with the rule astigmatism preoperatively, 42 cases had against the rule

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astigmatism and no astigmatism was seen in 22 cases. 34 cases included in this study for temporal incision had with rule astigmatism, 48 cases had against the rule astigmatism and no astigmatism was seen in 18 cases.

4) PATTERN OF POST OPERATIVE ASTIGMATISM: 72 cases subjected to superior section after 1st week showed against the rule astigmatism and 20 cases showed with rule astigmatism and 4 cases showed no astigmatism. 84 cases subjected to temporal section had with the rule astigmatism and 8 cases had against the rule astigmatism and 8 cases had no astigmatism.

3rd week: After 3 weeks 82 cases in superior section showed against the rule astigmatism and 14 cases showed with rule astigmatism and 4 cases showed no astigmatism. 84 cases subjected to temporal section had with rule astigmatism, and 8 cases had against the rule astigmatism and 8 cases showed no astigmatism.

6th week: After 6 weeks 86 cases in superior section showed against the rule astigmatism and 12 cases showed with rule astigmatism and 2 cases showed no astigmatism. 86 cases subjected to temporal section had with rule astigmatism, and 8 cases had against the rule astigmatism and 6 cases showed no astigmatism.

5) VARIATION OF PREOPERATIVE TO POST OPERATIVE ASIGMATISM: In superior section change of WTR to ATR was seen in 8 cases and ATR remained in 15.ATR was seen in 19 and ATR to WTR occurred in 2 cases. In temporal section change of ATR to WTR was seen in 7 cases and WTR remained in 10.WTR was seen in 16and WTR to ATR occurred in 2 cases.

MEAN SURGICALLY INDUCED ASTIGMATISM: In 1st week mean surgically induced astigmatism in superior SICS was0.72D, average ranging from 0.5D to 2.0D and ranging maximally from 0.5D TO 1.0D in 3rd week average being 0.99D and by end of six weeks from 0.5D to 1.5D with a mean of 1.10D.

In 1st week mean surgically induced astigmatism in temporal SICS was0.43D, average ranging from 0 D to 1.0D and ranging maximally from 0.5D TO 1.0D in 3rd week and by end of six weeks with a mean of 0.66D.

DISCUSSION: Astigmatism following cataract surgery is a known complication of cataract surgery from the time when cataract surgery started. Various factors like incision size and its location, suture material and its techniques influence postoperative astigmatism.[3]

A sutureless cataract surgery eliminates the effect of placement of sutures and suture materials on post-operative astigmatism. But it induces flattening of the cornea along the incisional meridian.[4] when an incision is placed superiorly there is flattening of vertical meridian hence against the rule astigmatism is seen, whereas temporally placed incision causes flattening of horizontal meridian causing with the rule astigmatism postoperatively.[5]

The temporally placed incisions induce less astigmatism than the incisions of identical length placed superiorly at same distance from the limbus. The two possibilities are anatomical distance between the visual axis and limbus, which is greater in temporal quadrant than the superior one. And continuous stoking of the upper lid which puts pressure on the superior wound.[6]

In the present study 50 cases of superior tunnel vs. 50 cases of temporal tunnel were compared and evaluated for temporally induced astigmatism.

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PREOPERATIVE ASTIGMATISM: The preoperative keratometric astigmatism was found in 79 of cases and no astigmatism was found in 21 cases. Out of which 39 were subjected for superior section and 40 cases for temporal section. The results of preoperative astigmatism were comparable to jaffe who found out that preoperative astigmatism was around 73%.

In our study 34% showed WTR, 45% showed ATR and no astigmatism in 21%.these results are comparable to jaffes study of 1557 eyes in which he recorded 30%WTR astigmatism, and 42.5% ATR, 1.7% oblique astigmatism and no astigmatism found in 25.8%.

In our study the mean with rule astigmatism was 1.141 and mean ATRV was 1.106 which are comparable to jaffes study in which he recorded mean astigmatism of 1.15 in WTRN and 1.02 in ATR.
In our study superior section showed a surgically induced astigmatism of ATR in more than 80% of patients from 1 to 6 weeks and more than 80% of patients showed WTR in temporal tunnel. These results are comparable with any other results in literature.[7]

These results show that temporal placed sclera incisions induce less astigmatism than similarly placed superior incisions.

At the end of 1st week visual acuity is better in temporal section than superior section but the final visual acuity at the end of 6 weeks is almost similar in both superior and temporal sections.
Some authors expressed that rate of endophthalmitis is more in temporal sections. But in our study we observed no significant and severe reactions in any of the patients.[8]

CONCLUSION: Postoperative astigmatism is a common sequel of cataract surgery. The amount and type depend on the location and the type of incision and suture materials and suturing techniques.[9]
The cataract surgeon can lessen the postoperative astigmatism by sutureless self-healing small incision cataract surgeries as effects of sutures and materials are avoided.[10]

Superior SICS causes against the rule astigmatism and temporal incisions cause with rule astigmatism.[11]

Depending on preoperative keratometric astigmatism incisions can be placed either superiorly or temporally to lessen surgically induced astigmatism.[12]

Temporal incisions can be preferred in patients with pre-existing against the rule astigmatism. Temporal incisions cause less astigmatism than superior sclera incisions.[13]

Temporal incisions have a good place in patients with preoperative no astigmatism as they are less astigmatic.[14]

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