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## Surgery induced Astigmatism following Nonphaco Manual Small incision Cataract Surgery in relation to different Postoperative period

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### ABSTRACT

**Purpose-**To find out surgery induced astigmatism following SICS at the end of first week, third week, and sixth week during the study period from 2013-2014.

**Materials and Methods;** Cataract surgeries were carried out in patients with no systemic diseases all senile cataracts were included and complicated cataracts were excluded from the study. Hundred patients underwent manual small incision cataract surgery 6-6.5mm incision size superior incision made about 1.5mm away from limbus and PMMA posterior chamber intraocular lens was implanted after biometry. Postoperatively patients received oral antibiotic for five days and antibiotic-steroid eye drops for six weeks. Patients were followed-up at the end of first week, third week and sixth week and postoperative astigmatism was recorded with the help of Bausch and Lomb keratometer and standard automated refractometer.

**Results and Conclusions:** A total 100 patients were included in this study. Postoperative average astigmatism at the end of 1<sup>st</sup> week was 2.4D, 3<sup>rd</sup> week 2D, 6<sup>th</sup> week 1.8D. Initially astigmatism was with the rule gradually shifted to the against the rule at the end of 6<sup>th</sup> week.

**Key words:** small incision cataract surgery, astigmatism, with the rule, against the rule

### Introduction

Cataract is the major cause of curable Blindness in India. As estimated 4million people became blind because of cataract every year, which is added to a backlog of 10 million operable cataracts in India, whereas only 5million cataract surgeries are performed annually in the country. In addition to the backlog, an additional 3.8 million become blind each year because of cataract.<sup>[1]</sup>

Cataract surgery is the only way to cure the cataract patients. In addition to improving visual acuity [VA], one of the goals of modern cataract surgery is to reduce pre-existing astigmatism, a factor that may reduce visual acuity and affect the quality of vision<sup>[3]</sup>.

Various strategies currently available to the cataract surgeon can safely and effectively reduce corneal astigmatism during lens based surgery. These techniques require careful pre-operative

surgical planning particularly as regards incision design and site. Employing advanced enhancement techniques such as corneal relaxing incision and toric intraocular lens technology may also help surgeons to achieve postoperative emmetropia [4].

While phacoemulsification remains the more advanced and technically superior method of cataract surgery, it is not always appropriate either from a cost perspective or density of the cataracts involved [5].

Small incision cataract surgery is the first choice alternative to phacoemulsification retains most of the advantages of “phaco” giving visual results equivalent to phaco at lower cost. However, the larger incision used induced greater astigmatism than phacoemulsification [6].

But even if the desired corneal curvature is obtained at the end of operation the final post operative astigmatism is still not fully predictable. The healing processes are subject to many variables and these often lead to change in postoperative astigmatism.

### Materials and Methods

A total of 100 eyes of 100 patients [70female/, 30male] with age range 38-80 years having various grades of senile cataracts were included in the study. Complicated cataracts, pterygium, corneal opacity, cataract with glaucoma were excluded.

Preoperatively a full ophthalmic examination was done including best corrected visual acuity [B CVA], keratometry, A-scan biometry. All patients also signed an informed consent.

The patients were scheduled for non phaco manual small incision cataract surgery at the department of ophthalmology Government medical college and associated Maharani Hospital jagdalpur during the period of 2013-2014 All the cases were operated by two ophthalmic surgeons .All surgeries were done under peribulbar anaesthesia .A 6-6.5mm sclera straight incision ,1.5mm away from limbus was made and a single piece PMMA IOL of 6mm optic size and 12.5mm total size implanted in to posterior chamber no sutures were given.

Postoperatively, topical moxifloxacin and prednisolone acetate 1% eye drops were given six times a day in the first week and gradually tapered every week over six week, systemically oral ofloxacin 200mg twice a day for 5days and ibuprofen tablet 400mg two times a day for 5 days was given.

Patients were thoroughly examined and all of them were followed-up postoperatively and keratometry was done at the end of 1<sup>st</sup> week, 3<sup>rd</sup> week and 6<sup>th</sup> week and suture induced astigmatism was recorded Spectacles were prescribed at the end of 6<sup>th</sup> week.

### Results

All hundred patients underwent SICS with posterior chamber IOL implantation under local anaesthesia by two surgeons .Age of patients ranged from 38-80 years.

Postoperatively average surgery induced astigmatism was 2.4D at the end of 1<sup>st</sup> week,2D at the end of 3<sup>rd</sup> week and1.8D at the end of6<sup>th</sup> week .Initially astigmatism was with the rule gradually

shifted to against the rule at the end of 6<sup>th</sup> week. Postoperative best corrected visual acuity was 6/12[snellens chart] or better in 80% of cases. The

common cause of uncorrected visual acuity of 6/12 or less was astigmatism in majority of cases.

### Post Operative Astigmatism

Average	1 <sup>st</sup> Week				3 <sup>rd</sup> Week				6 <sup>th</sup> Week				
	WR	AR	OA	Nil	WR	AR	OA	Nil	WR	AR	OA	Nil	
0.5-1	5	2		1	3	2		1	1	1		2	
1-1.5	4	11	5		11	12			9	25	2		
1.5-2	16	10			15	30	3		11	6	4		
2-2.5	6	9			5	10	2		2	26	2		
2.5-3	15	10			4	2				9			
3-4	6	-											
Total	52	42	5	1	38	56	5	1	23	67	8	2	

### Average Astigmatism

1<sup>st</sup> Week-2.40D

2<sup>nd</sup> Week-2.00D

6<sup>th</sup> week-1.8 D

### Discussion

High astigmatism is an important cause of poor uncorrected visual acuity after cataract surgery. Astigmatism was considered with the rule if the steeper meridian was between 75 degree to 105 degree and against the rule if steeper meridian was between 165 degree to 0-15 degree. Values in between these were considered oblique astigmatism.

In present study, the average astigmatism at the end of 1<sup>st</sup> week was 2.4 D, 52% had astigmatism with the rule, 42% against the rule, 5% had oblique astigmatism and 1% had no astigmatism. At the end of 3<sup>rd</sup> week average astigmatism was 2D, 38% had with the rule 56% had against

the rule, 5% oblique astigmatism, 1% had no astigmatism.

At the end of 6<sup>th</sup> week astigmatism declined to 1.8D, in 23% cases with the rule, 67% cases against the rule and 8% cases oblique and 2%

had no astigmatism. Our readings of against the rule shift in astigmatism in SICS is similar to that reported by Reddy B et al he found average astigmatism of about 1.92 +/- 0.53.<sup>[7]</sup>

Radawan AA et al also reported average astigmatism of 2.1D with superior scleral tunnel incision against the rule.<sup>[8]</sup>

### Astigmatism lesser than our series:

Sinsky and Stoppel studied 55 consecutive patients who had cataract extraction with 6mm no stitch frown incision and implantation of 6mm optic

IOL lens .Induced astigmatism for this 0.7D at one day , 0.76D at one week, 0.5D at one month ,0.5D at three months.Which is quiet lesser than our series.<sup>[9]</sup>

Haldipurkar et al. reported 1.2D in SICS.<sup>[10]</sup> Karad H T et al. reported astigmatism of 1.33D with 6.5mm superior incision and 1.25D with 6mm superior incision.<sup>[11]</sup> Gokhale et al. found 1.28D astigmatism for superior tunnel.

Davison compared the post operative astigmatism following 4mm and 5.5mm scleral tunnel incision .An insignificant difference in induced astigmatism was found between two groups at one day ,two weeks and one year after surgery.<sup>[12]</sup>

#### **Surgery induced astigmatism higher than our series:**

Hosamani et al. noted astigmatism of 2.5D following SICS which is higher than our series.<sup>[13]</sup>

Our findings suggested that most patients develop ATR astigmatism, thus more with the rule astigmatism occurs in early post operative period..

#### **Conclusion**

Surgery induced astigmatism was initially higher and with the rule at the end of 1<sup>st</sup> week,gradually shifted to against the rule at the end of 6<sup>th</sup> week and amount of astigmatism also declined gradually.

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