



COMPARISON OF POST OPERATIVE CORNEAL ASTIGMATISM FOLLOWING FROWN VERSUS CHEVRON INCISION IN MANUAL SMALL INCISION CATARACT SURGERY

Vabita Bhagat	Registrar, Department of ophthalmology ,GMC kathua.
Anu Radha Bharti*	Registrar, Department of ophthalmology ,GMC jammu. *Corresponding Author
Dinesh Gupta	Professor and HOD, Department of ophthalmology,GMC jammu.

ABSTRACT **Introduction:** To study the comparison of post operative corneal astigmatism following frown versus chevron incision in manual small incision in manual small incision cataract surgery.

Material and Methods: The study was conducted at govt. medical college jammu over a period of one year. The study includes a total of 100 pts. With age related cataract and were divided into two groups of 50 each. Detailed ocular examination of the cases with calculation of preoperative astigmatism were carried out in eye OPD.

Results: All cases were assessed postoperatively at 1st, 3rd, 6th and 12th week for surgical induced astigmatism. At the end of 1st week surgical induced astigmatism of more than 1D was seen in 72% pts. of group 1 with frown incision as compared to 48 % in group 2 with chevron incision. At the end of 12 weeks 54% of cases in group 1 with frown incision and only 8% in group 2 with chevron incision had astigmatism of more than 1 D. The difference between the two groups was statistically significant.

Conclusion: It is possible to reduce the amount of postoperative astigmatism significantly by choosing the incision shape. Surgical induced astigmatism is less seen in patients with chevron incision as compared to patients with frown incision.

KEYWORDS : Astigmatism, Chevron incision and frown incision.

INTRODUCTION

Cataract is defined as opacification of lens and its capsule. Yanoff M defined senile cataract as any cataract that occurs after the age of 50 yrs and that has no evident cause. In India as well as on global scale cataract has been documented to be the most significant and easily treatable cause of visual incapacity and bilateral blindness.

According to national survey on blindness 2006- 2007 the principal cause of blindness is cataract and the prevalence of blindness due to cataract accounts for 62.6% of all cases. The volume of cataract surgery has been increasing steadily with 3.8 million surgeries performed in 2002-2003 to 5.8 million cataract surgeries performed in 2008 and %age of surgeries with IOL implantation has also been rising with 77% in 2002 -2003 and 94% in 2008 as reported by JOSE R{2008}.

Though phacoemulsification is currently a well established technique of ECCE and has become a routine procedure for cataract extraction in most parts of the world, it requires more skill and sophisticated equipment which is quite costly. In an economically weaker country like India where there is a huge backlog of cataract we need a procedure which is cheap, effective and easy to perform at community level. In order to obtain the advantages of a self sealing sutureless incision at a low cost ophthalmologist developed another technique called MSICS.

In MSICS, incision size and postoperative astigmatism was lesser in comparison to conventional ECCE but it was not comparable to phacoemulsification therefore ophthalmic surgeons tried to modify MSICS by which they could achieve reduction in postoperative astigmatism. One such method is by altering the shape of incision in wound construction.

Shape of the external incision affects astigmatism significantly which is explained by incisional funnel. It is bounded by a pair of lines whose shape is based upon the relationship between astigmatism and two characteristics of incision; length and the distance from the limbus. Any incision made within this funnel will be astigmatically stable as described by Paul Koch.

Frown and chevron incision lie entirely within the funnel so these are astigmatically more stable incisions. This study is an attempt to find out surgically induced astigmatism and complications using frown and chevron incision in Manual Small incision cataract surgery.

MATERIAL AND METHODS

AIMS AND OBJECTIVES:

1. To compare the surgically induced astigmatism following Frown

versus Chevron incision in manual small Incision Cataract surgery.

2. To access the post operative complications in both the groups.

Patients with age related uncomplicated unilateral or bilateral cataract, patients of either sex, patients having keratometric astigmatism of ≤ 3 D, are included in the study. Patients having keratometric astigmatism of > 3 D, patients having co existing glaucoma, uveitis, subluxated lens, traumatic cataract, corneal opacity, corneal dystrophy or degeneration, exotropia or esotropia, highmyopia are posterior segment pathology were excluded from the study.

The study was conducted at GMC Jammu over a period of one year. This was prospective study in which 100 patients with age related cataract satisfying inclusion criteria were selected. They were divided into two groups of 50 each. Detailed history & Ocular examination of the cases were carried out in Out Patient Department like Visual acuity, Slit Lamp Examination, Lacrimal syringing, Fundus examination, IOP measurement, Keratometry, Axial Length measurement using A scan, IOL Power calculation using SRK-II formula.

Preoperative antibiotic drops were instilled topically two hourly a day before surgery. All the patients were operated using peribulbar block using 5cc of 2% Xylocane & 5cc of 5% Bupivacaine with hyalase. All the surgeries were carried out by single senior surgeon.

Incision site in both cases is placed in superior meridian about 1.5mm behind the limbus centered at 12' clock in sclera at a depth of .25 to .3mm edges of Frown were 3mm from limbus & edges of chevron were 4mm from limbus. Frown incision is 5.5 to 6.5mm in length whereas the distance between two ends of limbus is 5mm.

In both groups I & II, patients were scanned on 1st postoperative day & follow-up at one week, 03 week, 06 week & 12 weeks for BCVA, SLE, Fundus, Post operative astigmatism was calculated at 12 weeks.

RESULTS

In this study 50% cases underwent MSICS with PCIOL implantation by giving frown incision and rest 50% cases by giving chevron incision. All the patients were in age group 51-80 years. 40% of patients were up to 70 yrs of age in group-I [frown incision] and 40% of patients were in 60 years of age in group-II [chevron incision]. In group-I, 52% patients were males and 48% were females. In group II, 56% were males and 44% were females. 90% in group-I and 88% in group II had preoperative corneal astigmatism of ≤ 1 D and 6% in group I and 10% in group II had preoperative corneal astigmatism of 1.25D -2.00D. 45% patients had with the rule astigmatism, 42% had

against the rule astigmatism of <1D when assessed preoperatively. Surgical induced astigmatism was calculated at the end of 1st week, 3rd week, 6th week and 12th week. At the end of 1st week 72% patients in group-I and 48% in group-II had surgical induced astigmatism of 1.25-2.00 D. This difference was found statistically significant at the end of 1st week. At the end of 3rd week 68% patients in group-I and 24% in group-II had surgical induced astigmatism of 1.25D-2.00D. At the end of 6th week, 60% in group-I and 10% in group-II had surgical induced astigmatism of 1.25-2.00D. This difference in surgical induced astigmatism was found highly significant $\chi^2_{(1)}=27.45$, $P < 0.0001$ (highly significant). At the end of 12th week 54% patients in group I and 8% in group II had surgical induced astigmatism of 1.25D-2.00D, 46% in group I and 92% in group II had astigmatism of <1 D. The difference between the two groups was statistically significant implying that group-II patients i.e. patients with chevron incision had less surgical induced astigmatism at the end of 12th week of small incision cataract surgery as compared to patients in group-I i.e. patients with frown incision therefore chevron incision is astigmatically more stable. 46% patients in group-I and 48% patients in group-II had with the rule astigmatism postoperatively at the end of 12th week.

Most common immediate postoperative complications seen was striate keratitis 14% in group-I and 16% in group-II, descemet's folds in 6% and 10% respectively, postoperative discomfort, redness and irritation were noted equally in both the groups. All these patients responded well to postoperative treatment and by the end of 3rd weeks none of the patients had any sign of corneal oedema or uveitis and their vision improved significantly.

Table 1: Age Distribution of Patients

Age (yrs.)	Group I		Group II	
	No.	%age	No.	%age
51-60	17	34	20	40
61-70	20	40	16	32
71-80	13	26	14	28
Total	50	100	50	100

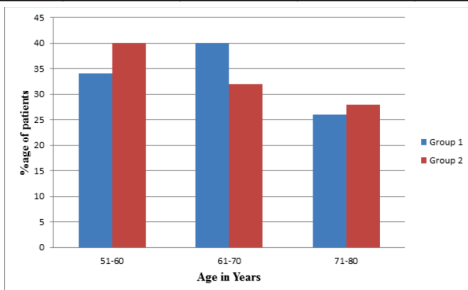


Figure 1: Age Distribution of The Patients

Table 2: Gender distribution of Patients

Sex	Group 1		Group 2	
	No.	%age	No.	%age
Male	26	52	28	56
Female	24	48	22	44
Total	50	100	50	100

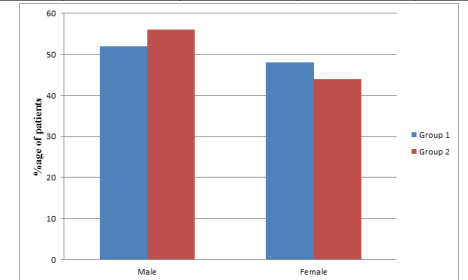


Figure 2: Gender Distribution of Patients

Table 3: Pre-operative Corneal Astigmatism

Astigmatism in Diopters	Group 1		Group 2	
	No.	%age	No.	%age
0.00-1.00	45	90	44	88
1.25-2.00	3	6	5	10

Astigmatism in Diopters	Group 1	Group 2
0.00-1.00	45	44
1.25-2.00	3	5
2.25-3.00	0	0
Total	50	50

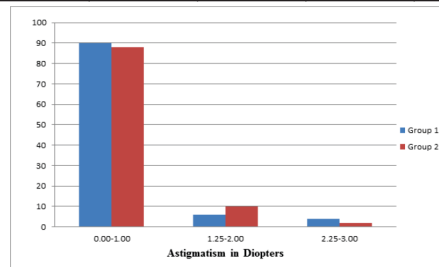


Figure 3: Pre-operative Corneal Astigmatism

Table 4: Surgical Induced Astigmatism at the End of 1st Week

Astigmatism in Diopters	Group 1		Group 2	
	No.	%age	No.	%age
0.00-1.00	11	22	26	52
1.25-2.00	36	72	24	48
2.25-3.00	3	6	0	0
Total	50	100	50	100

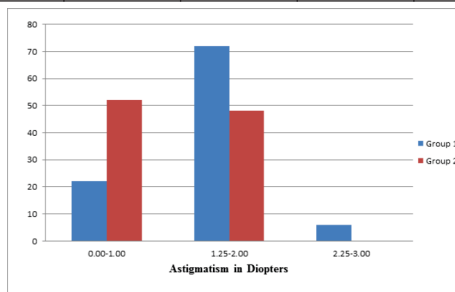


Figure 4: Surgical Induced Astigmatism at the End of 1st Week

Table 5: Surgical Induced Astigmatism at the End of 6th Week

Astigmatism in Diopters	Group 1		Group 2	
	No.	%age	No.	%age
0.00-1.00	20	40	45	90
1.25-2.00	30	60	5	10
2.25-3.00	0	0	0	0
Total	50	100	50	100

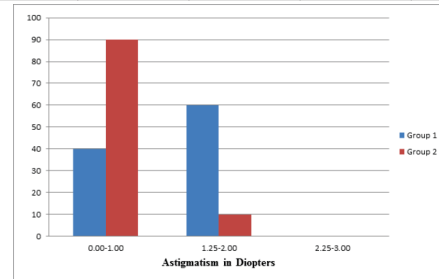


Figure 5: Surgical Induced Astigmatism at the End of 6th Week

Table 6: Surgical Induced Astigmatism at the End of 12th Week

Astigmatism in Diopters	Group 1		Group 2	
	No.	%age	No.	%age
0.00-1.00	23	46	46	92
1.25-2.00	27	54	4	8
2.25-3.00	0	0	0	0
Total	50	100	50	100

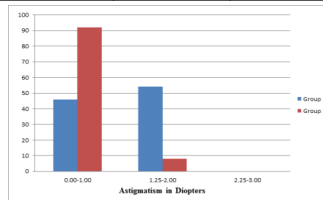


Figure 6: Surgical Induced Astigmatism at the End of 12th Week

DISCUSSION

In the present study an attempt has been made to show that surgical induced astigmatism can be reduced by changing the shape of incision. In our study at the end of 1st week, 72% patients in group I with frown incision had surgical induced astigmatism of >1D and 48% patients in group II had surgical induced astigmatism of >1D. The difference was statistically significant. At the end of 6 weeks 60% patients in group I and 10% of patients in group II showed surgical induced astigmatism >1D. At the end of 12th week 54% patients in group I with frown incision and only 8% patients in group II with chevron incision had surgical induced astigmatism of >1 D. The difference between the two groups was statistically highly significant. There was no statistical difference in terms of best corrected visual acuity. Though the intraoperative and post operative complications were more with chevron incision than manual small incision cataract surgery with frown incision but the results were comparable in between the two groups.

CONCLUSION

It is possible to reduce the amount of postoperative astigmatism significantly by choosing the incision shape. Although both frown incision and chevron incision lies entirely within the incisional funnel, our study shows that manual small incision cataract surgery with chevron incision has several advantages over the manual small incision cataract surgery with frown incision like chevron incision gives lesser amount of astigmatism, geometrically more stable because of its triangular configuration. A straight side of the V incision when pressed sideways by a nucleus exiting the or an IOL inserted into the eye assumed an oval shape and allowed a larger nucleus or IOL to pass through than the 5mm base of the incision. Another advantage of chevron incision is that the fulcrum in the crotch of the V provides easier access to the anterior chamber for instrument manipulation and the termination of the scleral tunnel entry posterior to the cornea lessens the likelihood of corneal folds that may interfere with visualisation during surgery.

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