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A Clinical Study to Evaluate the Effect of Site of Incision and IOL Placement on Astigmatism in Small Incision Cataract Surgery

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ABSTRACT

Cataract is the leading cause of avoidable blindness in India and cataract surgery forms the major workload of most ophthalmic units in the country. An estimated 4 million people become blind because of cataract every year, which is added to a backlog of 10 million operable cataracts in India, whereas only 5 million cataract surgeries are performed annually in the country. A clinical study to evaluate the effect of site of incision and IOL placement on astigmatism in small incision cataract surgery. This prospective observational study was conducted at Venkateshwara Institute of Medical Science, Amroha, Uttar Pradesh. A total of 200 participants were included as the sample size for the study. The study period extended from September 2023-May 2024, during which data collection and analysis were carried out to achieve the research objectives. In Group I, the mean 2 month (mean±s.d.) of patients was 1.21±0.56.In Group II, the mean 2 month (mean±s.d.) of patients was 0.94±0.70. Distribution of mean 2 month with Group was statistically significant (p=0.005).In Group I, the mean 3 month (mean±s.d.) of patients was 1.21±0.56.In Group II, the mean 3 month (mean±s.d.) of patients was 0.94±0.70. Distribution of mean 3 month with Group was statistically significant (p=0.005). The study highlights that the site of incision and the placement of the intraocular lens (IOL) significantly impact postoperative astigmatism in small incision cataract surgery (SICS). Superior incisions tend to induce more astigmatism compared to temporal incisions, while precise IOL placement minimizes refractive errors.

INTRODUCTION

Cataract is the leading cause of avoidable blindness in India[1] and cataract surgery forms the major workload of most ophthalmic units in the country. An estimated 4 million people become blind because of cataract every year[2], which is added to a backlog of 10 million operable cataracts in India, whereas only 5 million cataract surgeries are performed annually in the country[3]. In India cataract has been reported to be responsible for 50-80% of the bilaterally blind in the country[4]. Despite giant leaps in medical technology no therapeutic agent has been discovered to cure and prevent cataract. Thus, surgery remains the only modality of treatment and constant evolution in the techniques of cataract surgery that are not only safe and effective but also economical and easy to master has always been the need of the hour. Nowadays, conventional extracapsular cataract surgery (ECCE), MSICS and phacoemulsification (phaco) are the three most popular forms of cataract surgery in India and also rest of the world. This evolution is the result of constant research and refinement in cataract surgery. Early surgeons practised the art of couching, first hand written description of which came from Sushruta (1000 BC). This method is still practiced by some quacks in some remote areas of our country. Jacques Daviel[5], father of modern cataract surgery, introduced incisional extraction of cataract in 1753. Since then, there were many advances and modifications in cataract surgery and in 1910 Smith 8 described the expression technique of ICCE through a corneal dissection. With further advancement, the technique of ECCE was developed in which instead of removing the whole lens, the lens nucleus is delivered out by removing a part of anterior capsule and the posterior capsule is kept intact The complications related to ECCE are almost the same as ICCE, but the incidence and severity are less. Studies of the outcome of cataract extraction in Asia have shown that presenting acuity following surgery is >6/60 in 15-20% of eyes. Many of the poor outcomes are due to uncorrected refractive error. This can be reduced by the use of IOL, but residual refractive error, particularly postoperative astigmatism, remains a problem[6]. Astigmatism bears a direct relationship with the position and length of corneoscleral incision and suturing of section. So, the ophthalmic surgeons needed to find a technique of cataract extraction which requires small incision and minimum or no suture at all. Other than methods of surgery there are factors such as errors in keratometry and biometry, IOL formula based position of IOL placement.

METERIALS AND METHODS

Study Design: Prospective observational study.

Place of Study: This study was study conducted at Venkateshwara institute of Medical Science, Amroha (UP).

Sample Size: 200.

Period of Study: September 2023-May 2024.

Inclusion Criteria:

- Patients with uncomplicated senile cataract of either sex above 40 years of age.

Exclusion Criteria:

- Any ocular co-morbidity capable of compromising vision like glaucoma.
- Patients with systemic diseases viz. uncontrolled diabetes mellitus, uncontrolled hypertension, collagen vascular diseases.
- Patients requiring combined procedures.
- Patients with corneal pathologies like corneal opacity and pterygium.
- Patients with diseases of posterior segment like macular degeneration, diabetic retinopathy, hypertensive retinopathy.
- Prior surgery in the eye.

Statistical Analysis: For statistical analysis, data were initially entered into a Microsoft Excel spreadsheet and then analyzed using SPSS (version 27.0., SPSS Inc., Chicago, IL, USA) and Graph Pad Prism (version 5). Numerical variables were summarized using means and standard deviations, while categorical variables were described with counts and percentages. Two-sample t-tests, which compare the means of independent or unpaired samples, were used to assess differences between groups. Paired t-tests, which account for the correlation between paired observations, offer greater power than unpaired tests. Chi-square tests (χ^2 tests) were employed to evaluate hypotheses where the sampling distribution of the test statistic follows a chi-squared distribution under the null hypothesis., Pearson's chi-squared test is often referred to simply as the chi-squared test. For comparisons of unpaired proportions, either the chi-square test or Fisher's exact test was used, depending on the context. To perform t-tests, the relevant formulae for test statistics, which either exactly follow or closely approximate a t-distribution under the null hypothesis, were applied, with specific degrees of freedom indicated for each test. P-values were determined from Student's t-distribution tables. A p-value $\leq$0.05 was considered statistically significant, leading to the rejection of the null hypothesis in favour of the alternative hypothesis.

RESULT AND DISCUSSIONS

Group I In WTR, 8 (8.5%) patients had Pre-operative astigmatism $\leq$1 and 19 (20.2%) patients had Pre-operative astigmatism $\geq$1. In ATR, 11 (11.7%) patients had Pre-operative astigmatism $\leq$1 and 34 (36.2%) patients had Pre-operative astigmatism $\geq$1.

Table 1: Association Between Preoperative Evaluation of Astigmatism in Group I and Group II

Pre-operative astigmatism	Group I (n=94) WTR	ATR	OBL	Total	P-value	Group II (n=96) WTR	ATR	OBL	Total	P-value
0	0	0	0	22 (23.4%)	0.6288	0	0	0	20(20.8%)	0.6017
<1	8 (8.5%)	11 (11.7%)	0	19 (20.2%)		5 (5.2%)	11 (11.5%)	0	16 (16.7%)	
>1	19 (20.2%)	34 (36.2%)	0	53 (56.4%)		23 (24%)	37 (38.5%)		60 (62.5%)	
Total	27 (28.7%)	45 (47.9%)	0	94 (100.0%)		28 (29.2%)	48 (50.0%)	0	96 (100%)	

Table2: Distribution of Mean Pre op Astigmatism and SIA: Group

Pre op Astigmatism and SIA	Group I (n=94) Mean +SD (D)	Group II (n=96) Mean +SD	P-value
Pre op	0.32(±1.43)	0.46(±1.45)	0.52
2nd day	1.45(±0.85)	0.95(±0.75)	0.0001
7 Days	1.24(±0.74)	0.96(±0.76)	0.01
1 month	1.23(±0.68)	1.01(±0.83)	0.04
2 month	1.21(±0.56)	0.94(±0.70)	0.005
3 month	1.21(±0.56)	0.94(±0.70)	0.005

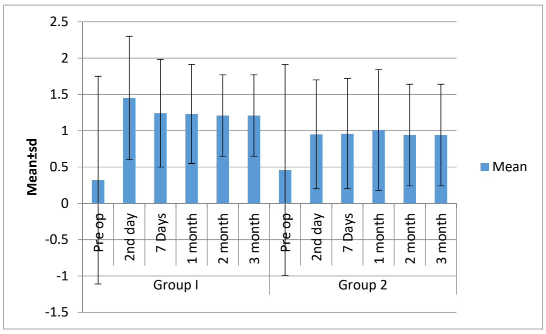

Fig. 1: Distribution of Mean Pre op Astigmatism and SIA: Group

Association of Pre-operative astigmatism with Group was not statistically significant (p=0.6288). Group II In WTR, 5 (5.2%) patients had Pre-operative astigmatism <1 and 23 (24.0%) patients had Pre-operative astigmatism >1. In ATR, 11 (11.5%) patients had Pre-operative astigmatism <1 and 37 (38.5%) patients had Pre-operative astigmatism >1. Association of Pre-operative astigmatism with Group was not statistically significant (p=0.6017). In Group I, the mean Pre op (mean±s.d.) of patients was 0.32±1.43. In Group II, the mean Pre op (mean±s.d.) of patients was 0.46±1.45. Distribution of mean Pre op with Group was not statistically significant (p=0.52). In Group I, the mean 2nd day (mean±s.d.) of patients was 1.45±0.85. In Group II, the mean 2nd day (mean±s.d.) of patients was 0.95±0.75. Distribution of mean 2nd day with Group was statistically significant (p=0.0001). In Group I, the mean 7 Days (mean±s.d.) of patients was 1.24±0.74. In Group II, the mean 7 Days (mean±s.d.) of patients was 0.96±0.76. Distribution of mean 7 Days with Group was statistically significant (p=0.01). In Group I, the mean 1 month (mean±s.d.) of patients was 1.23±0.68. In Group II, the mean 1 month (mean±s.d.) of patients was 1.01±0.83. Distribution of mean 1 month with Group was statistically significant (p=0.04). In Group I, the mean 2 month (mean±s.d.) of patients was 1.21±0.56. In Group II, the mean 2 month (mean±s.d.) of patients was 0.94±0.70. Distribution of mean 2 month with Group was statistically significant (p=0.005). In Group I, the mean 3 month (mean±s.d.) of patients was 1.21±0.56. In Group II, the mean 3 month (mean±s.d.) of patients was 0.94±0.70. Distribution of mean 3 month with Group was statistically significant (p=0.005). Cataract is the most common and curable cause of bilateral blindness in senile age group, both in India as well as on a global scale. Modern cataract surgeries with intraocular lens (IOL) have become one of the safest, most successful, simple, consistent and one of the most frequently performed surgeries. In the evolution of cataract surgery, manual small incision cataract surgery (MSICS) was a later addition much after phacoemulsification became a popular technique. It is neither a hitech procedure, nor is it practiced in Western countries. For that matter, MSICS remains a foreign technique to a large section of the ophthalmic fraternity in the modern world. MSICS was developed mainly as a cost effective alternative to phacoemulsification cataract surgery. MSICS is a safe, simple, consistent, stable and cost effective way of cataract removal. Post-operative astigmatism has remained the only obstacle to the achievement of good uncorrected visual acuity after cataract surgery. Control of postoperative astigmatism is the key to meeting the expectation of good postoperative vision without spectacles. With the advent of suture less small incision cataract surgery, the amount of surgically induced astigmatism (SIA) has significantly reduced and also postoperative refraction stabilizes early. Several factors exist in creation of the wound for the cataract, such as location (corneal versus scleral), direction (superior, temporal or oblique), width, depth and shape. The evolution and refinement of small incision cataract surgery have almost diminished controversies regarding the width and shape of incisions. The depth of the incision has been reported to have little influence on the amount of induced astigmatism. On the other hand, location and the direction of the wound can still have a significant impact on surgical outcome. Cataract surgery can be performed through corneal or scleral incision, which can be placed in either superior or temporal position. Surveys have revealed that most surgeons prefer to make incisions on the sclera because of high vascularity, stability and rapid healing. This study is undertaken to evaluate the effect of site of incision and IOL placement on astigmatism in small incision cataract surgery. In this study, 200 eyes of 200 patients were enrolled who underwent manual small incision cataract surgery in the year 2023-2024. The patients were randomly divided into two groups, group I and group II. However, 10 patients, 6 patients from group I and 4 patients from group II were excluded from the study as they did not turn up for regular follow up. Thus the final analysis were undertaken on 190 eyes of 190 patients admitted from outpatient departments from sept 2023 to May 2024 in Venkateshwara institute of Medical Science, Amroha (UP). Informed consent was taken from every patient. The patients were randomized to one of the following two groups: 94 eyes of 94 patients underwent manual small incision cataract surgery under peribulbar block through a 6.0-6.5 mm superior scleral incision, followed by implantation of a rigid posterior chamber 6X12.5 mm PMMA intraocular lens. 96 eyes of 96 patients underwent manual small incision cataract surgery under peribulbar block through a 6.0-6.5 mm temporal scleral incision, followed by implantation of a rigid posterior chamber 6X12.5 mm PMMA intraocular lens. AGE: In Group I the patients' age varied from 42-82 and in Group II the variation was from 43-81 years. The mean (+Standard deviation) age for Group I and Group II was 66 (+9.68) years and 63.96 (+10.07) years respectively. The 95% Confidence Interval (CI) difference was from-1.79-3.87. There was no significant age difference among the age distribution of the two groups (p=0.46,). In Group I the patients' age varied from 42-82 and in Group II the variation was from 43-81 years. The mean (+Standard deviation) age for Group I and Group II was 66 (+9.68) years and 63.96 (+10.07) years respectively. The 95% Confidence Interval (CI) difference was from-1.79 to 3.87. There was no significant age difference among the age distribution of the two groups (p=0.46,). Maximum number of subjects in Group I were between 61-70 years of age (36.2%) and maximum number of subjects in Group II were between 61-70 years of age (41.7%). This corresponds well to the age of onset of cataract in hot and sunny climate of India where cataract appears roughly a decade earlier than in the west. Out of 94 patients, 42 patients (44.7%) of Group I were male and 52 (55.3%) were female. In Group II, males comprised 52 (54.2%) and female compromised 44 (45.8%) of 96 patients. The p value for gender distribution between the two groups was computed to be 0.19, which was statistically insignificant. In group I right eye was operated on 53 patients (56.4%) and left eye was operated on 41 patients (43.6%). In Group II right eye was operated on 47 patients (48.9%) and left eye was operated on 49 patients (51.1%). The p value for the laterality of eye in the two groups was computed to be 0.31 which was statistically insignificant. Thus, both the Groups under study were comparable with regard to age, gender and the laterality of the eye involved. The nucleus of the lens was graded according to its colour into four grades. Out of 94 patients in Group I, 4 (4.3%) had grade 2 NS, 43 (45.7%) had grade 3 NS and 47 (50%) had grade 4 NS. In Group II, 1 (1%) had grade 2 NS, 57 (59.4%) had grade 3 NS and 38 (39.6%) had grade 4 NS. The majority of patients in Group I (50%) had grade 4 NS and Group II (59.4%) had grade 3 NS. The comparison between the nucleus hardness of the two groups computed to a p value of 0.365 and thus the difference between them was statistically insignificant. In our Indian society most of the patients present late with higher grades of cataract, the reason for which could be lack of education and awareness, poverty and unavailability of resources for surgery. Our study evaluated surgically induced astigmatism between Group I (superior scleral) and Group II (temporal sclera) in MSICS. In our study 42 out of 190 patients (22.1%) were astigmatically neutral. In Group I 27 patients (28.7%) had with-the-rule (WTR) astigmatism whereas 45 (47.9%) had against-the-rule (ATR) astigmatism whereas in Group II 28 patients (29.2%) had WTR astigmatism whereas 48 (50%) had ATR astigmatism. The mean astigmatism in Group I was 0.32+1. 43 D, whereas in Group II, it was 0.46+1.45D (pvalue 0.52). In our study, patients were discharged on 2nd postoperative day. In Group I, the mean surgically induced astigmatism was 1.45+0.85D, whereas in Group II, it was 0.95+0.75D (p value 0.0001). In Group I 78 (82.9%) cases had with-the-rule (WTR) astigmatism whereas 16 (17%) cases had against-the-rule (ATR) astigmatism. In Group II, 66 (68.8%) cases had WTR astigmatism, whereas 24(25%) cases had ATR astigmatism. 6 (6.25%) cases were astigmatically neutral in Group II. In this study, on the second post-operative day there was a significant difference in the amount of astigmatism between both the groups with higher astigmatism in superior incision group. The difference of surgically induced astigmatism was statistically significant on all follow up visits that is seventh post op day, at one, two and three post op months respectively. Although SIA reduced in amplitude with time and got stabilized after two months but significant difference between the groups persisted. At the end of 2 month (3rd follow up), the mean surgically induced astigmatism was 1.21+0.56D in Group I, whereas in Group II, it was 0.94+0.70D (p-value 0.005). We also found in our study that while both groups were comparable in terms of type of astigmatism preoperatively, there is a gradual shift in type of astigmatism postoperatively. Superior incision group induced a gradual conversion towards against the rule type of astigmatism whereas temporal incision induced with the rule type of astigmatism. In Group I, 45 cases which had WTR astigmatism preoperatively converted to ATR astigmatism (90 cases) at 2 months, whereas only 4 cases had WTR astigmatism postoperatively at 2 months. No case was astigmatically neutral at the end of 2 months (p value <0.0001) which is statistically significant. In Group II majority of cases had WTR astigmatism postoperatively at 2 months and only 3 cases had ATR astigmatism, no case was astigmatically neutral at 2 months (p value <0.0001) which is statistically significant. When the incision is located superiorly, both gravity and eyelid blink tend to create a drag on the incision. These factors are neutralized well with temporally placed incision because the incision is parallel to the vector of forces. Various studies have been done which show results similar to our study. Our study also demonstrates less SIA with temporal scleral incision and the recommendation of above mentioned study to avoid superotemporal and temporal incision in WTR astigmatism corroborates our finding that superior incision causes ATR and temporal incision causes WTR astigmatism. In that study mean surgical induced astigmatism (SIA) was found to be significantly lower in the temporal group compared to superior group (p<0.001). The superior incision produced 2.1D of ATR while temporal group induced 0.7 WTR astigmatism. They concluded that high SIA induced by superior incision may prove useful when aimed at reducing high levels of preoperative corneal WTR astigmatism (around 2D) while temporal incision is recommended in patients with low levels of preoperative WTR astigmatism. Although in this study SIA caused by superior incision was more than found in our study and amplitude of SIA in temporal group was >in our study but they point out the same conclusion that temporal incision is better than superior incision. The difference is because of the fact that they used superior incision in patients of WTR astigmatism and temporal incision in patients of ATR astigmatism. The mean SIA in superior incision group was found to be 1.572±0.651, in superotemporal group, it was 0.532±0.317 and in temporal group, it was 0.435±0.338 (F score 186.44, p-value<0.001) which was highly significant. They concluded that a temporal and a supero-temporal approach provides a better quality of vision due to a significantly less SIA than the superior approach is similar to our study. SIA in superior incision group was more than our study while SIA in temporal group is less. The difference could be attributed to several factors like surgeon’s ease and experience with a particular site of incision, shape of incision, amount and type of preoperative astigmatism in patients of both studies, patients factor affecting wound healing. Renu M Magdum[7] studied the amount and type of surgically induced astigmatism in superior and temporal scleral incision in Manual Small Incision Cataract Surgery (MSICS). They found that after 3 months of surgery, out of 50 patients in superior scleral incision group 74% patients had ATR astigmatism and 16% patients had WTR astigmatism whereas in temporal scleral incision group 56% of the patients had WTR astigmatism and 36% had ATR astigmatism. The mean surgically induced astigmatism (SIA) in temporal incision group was significantly less than the superior incision group after 3 months postoperatively (t=2.33, p<0.05). They concluded that temporal approach MSICS produces less postoperative astigmatism and has manifold advantages over superior incision MSICS with excellent visual outcome. This study also support the conclusion derived from our study. In our study both the amplitude and type of astigmatism stabilised after 2 month as patients followed at third month had same values as that of at the end of second month. This finding is in tune with the results of other similar studies and literature most of which shows that amount and type of astigmatism stabilizes after 45 days as wound healing has taken by then. In our study 55 (58.5%) patients of Group I, had BCVA in the range of 6/60 to 6/24. In Group II also majority of the cases that is 77 (80.2%) were in the range of 6/60-6/24. This finding points to the fact that cataract is a significant cause of blindness in India and patients has poor access to ophthalmological services and facilities of surgery. Also as most of the patients are from rural background and belongs to lower socioeconomic strata, modern state of the art facilities like phacoemusification are out of reach to them both because of monetary issues and lack of phaco compatible surgery centres in India. In this context MSICS becomes important as it has a lower cost of surgery, is technically easier to perform at rural centres and provides best corrected visual acuity comparable to phacoemusification. At 2 months post-operatively there was no significant difference in BCVA in both the groups (p value 0.11) (Table 16). In group I, 60 patients (63.9%) had a BCVA of 6/6 and 21 patients (22.3%) had 6/9 BCVA. Only 13 patients (13.8%) had 6/12 BCVA. In group II 74 patients (77.1%) had a BCVA of 6/6 and 15 patients (15.6%) had 6/9 BCVA. Only 20 patients (10.5%) had 6/12 BCVA. In both groups no patient had 6/18 or higher BCVA. The above findings show that MSICS is good and safe surgery and provides a good final surgical outcome in terms of vision. Manual small incision cataract surgery (MSICS) has emerged as a popular technique in the last decade and it has been possible to deliver quality surgery to the masses in developing countries. Manual small incision extracapsular techniques (SICS), the first choice alternative to phacoemulsification-retains most of the advantages of “phaco” giving visual results equivalent to phacoemulsification at lower cost. However, the larger incision used induces greater astigmatism than phacoemulsification[8]. On postoperative day 1, the groups had comparable uncorrected visual acuity (UCVA) (p=0.185) and the SICS group had less corneal edema (p=0.0039). At six months, 89% of the SICS patients had UCVA of 20/60 or better and 98% had a best-corrected visual acuity (BCVA) of 20/60 or better vs 85% of patients with UCVA of 20/60 or better and 98% of patients with BCVA of 20/60 or better at six months in the phaco group (p=.30). Surgical time for SICS was much shorter than that for 0 phacoemulsification (p<.0001). Hence both phacoemulsification and SICS achieved excellent visual outcomes with low complication rates. SICS is significantly faster, less expensive and less technology dependent than phaco emulsification. SICS may be the more appropriate surgical procedure for the treatment of advanced cataracts in the developing world. In our study also patients had excellent visual outcomes. In our study results are better in terms of BCVA than their study. But sample size of their study was quite large as compared to our study and may be more representative of actual population. Small sample size is a demerit of our study. Also in our study we have excluded all the patients with retinal pathologies while in their study exclusion criteria was not very strict due to which other factors might have played a role in final visual outcome. One such factor is site of IOL placement. Fixation of the intraocular lens in the capsular bag has been accepted as the preferred method for lens implantation. However during cataract surgery capsular complications such as zonular dialysis, posterior capsule rupture with vitreous loss or unsuccessful capsulorrhexis may prevent in the bag fixation of the IOL. In complicated cases IOL is usually implanted in the ciliary sulcus. In our study there were total 17 unsuccessful capsulorrhexis-11 in superior (group I) and 6 in temporal (group II) and capsulotomy was done. In all the cases where capsulotomy was done lens was placed in the sulcus and a single suture was placed for section closure. On comparison of both groups there was no statistical difference in terms of capsulotomy (p value 0.18). On evaluation in terms of BCVA in both groups (11 in group I and 6 in group II) there was no statistical difference (p value>0.05). However, placement of IOL in sulcus did have a impact on BCVA when compared with patients where IOL was placed in the capsular bag in both groups. In Group I there was significant difference in BCVA according to siteof IOL placement in capsular bag and sulcus (p value, 0.0001). In Group II there was significant difference in BCVA at 2 months in accordance with site of IOL placement in the capsular bag and in the sulcus (P value<0.0001). So our study shows that placement of IOL in the sulcus does have a significant effect on post-operative BCVA. This result is in tune with results of various other studies like Spokes DM , Suto[9], all which concluded that IOL power needs to be adjusted or substracted if lens is placed in the sulcus as it causes a myopic shift leading to poorer final visual outcome. In our study adjustments were made of 1.0 D in the patients in whom lens was placed in the sulcus. Hence there was a relative less BCVA in patients with sulcus implanted lens. At 2 months mean SIA was 1.26±0.70 D in Group I (n=11), whereas in Group II (n=6) it was 0.37±0.13. The difference was statistically significant (p value 0.008). But it is difficult to say with so few cases that whether the difference was due to the site of IOL placement or site of scleral incision. So further studies need to be carried out to come to a conclusion. One explanation for the above result is that temporal incision is away from the drag effect of upper eyelid during blinking and other distractive forces during movement of eye and hence is better than superior incision as far as SIA is concerned. When comparison was made within the groups at 2 months postoperative follow up it was found in group I that mean SIA was1.26±0.70 D in sulcus IOL placement (n=11) and it was 1.20±0.54 D with IOL in the bag placement (n=83) (p value 0.35). There was no significant difference. While in group II mean SIA was 0.37±0.13 D in sulcus IOL placement (n=6) and it was 0.98±0.71 D with IOL in the bag placement (n=90) (p value 0.05). There was no significant difference. But as there were few cases with sulcus implanted IOL, results could not lead to a conclusion and further studies are required to settle the issue. Sutures in the form of single stitch was placed only in those cases where capsulorrhexis was unsuccessful and IOL is placed in the sulcus At 2 months mean SIA was 1.26±0.70 D in group I (n=11), whereas in Group II (n=6) it was 0.37±0.13. The difference was statistically significant (p value 0.008). But it is difficult to say with so few cases that whether the difference was due to the site of IOL placement, site of scleral incision or suture placement. So further studies need to be carried out to come to a conclusion. When comparison was made within the groups at 2 months postoperative follow up it was found in group I that mean SIA was1.26±0.70 D in sulcus IOL placement with single stitch for section closure (n=11) and it was 1.20±0.54 D with IOL in the bag placement with no stitch (n=83) (p value 0.35). There was no significant difference. While in group II mean SIA was 0.37±0.13 D in sulcus IOL placement with single stitch for section closure (n=6) and it was 0.98±0.71 D with IOL in the bag placement with no stitch (n=90) (p value 0.05). There was no significant difference. But as there were few cases where stitches were placed therefore these results could not lead to a conclusion and further studies are required to settle the issue.

CONCLUSION

We concluded that the site of incision and intraocular lens (IOL) placement significantly influence astigmatism following small incision cataract surgery. Temporal incisions induce less astigmatism compared to superior incisions and accurate IOL placement minimizes refractive errors. Optimizing these factors can enhance visual outcomes and patient satisfaction after surgery.

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