INTRODUCTION

Cataract surgery underwent numerous advances in interventions since it was described. In ancient couching was performed that was transferred to intracapsular surgical technique for cataract and after that latest phacoemulsification¹. Primary aim of all types of cataract surgeries is visual rehabilitation with earlier mobilization, but surgical induced astigmatism (SIA) is main obstacle and challenge for ophthalmic surgeons². With passage of time and along different inventions many surgeons strived hard to overcome this hurdle through adopting different surgical approaches³. Number of factors like type of surgery, incision type, type of lens and technique of intraocular lens insertion are involved in results of cataract surgery because of their own associated complications and safety measures⁴. Clear corneal incision has benefits of reduced pain and swelling, increased safety and reduced incidence of surgical induced astigmatism, it can also reduced surgical time and fast recovery⁵. Surgically induced astigmatism depends upon size, location, surgeon’s position, wound architecture and comfort ability of procedure⁶.

Size of incision is also associated with stable and rapid optical recovery and reduced incidence of surgically induced astigmatism⁷. Number of studies was conducted on comparison of different types of incisions like superonasal, superior, temporal and supertemporal and incidence of astigmatism⁸⁹. During phacoemulsification at the time of cataract surgery incision at the steepest corneal axis provides small correction of astigmatism. Toric IOLs and peripheral corneal relaxing incision were also effective and safe incision types when preexisting astigmatism is more than 1 diopter¹⁰.

Methodology

This randomized quasi trial was conducted at ophthalmology department of Ghazi medical college Dera Ghazi Khan from December 2021 to November 2022 in one year period. Study was started after ethical approval from hospital ethical committee. Non probability consecutive sampling technique was used. Written informed consent was obtained from patients after detail description of study and ensuring about confidentiality of their data. Sample size was calculated by using openepi.com online software with 95% confidence interval, 80% study power
and mean astigmatism in temporal group 0.48D and in temporal group it was 0.99D in superior clear corneal incision.

All surgeries were performed by a single team of ophthalmic surgeons. Patients with astigmatism above 0.5D, sensitive to study drugs and who are not willing to give consent were excluded from the study. All patients were divided into two groups by lottery method. Patients admitted from outpatients department of hospital day before surgeries. Preoperative assessment of all patients includes measurement of visual aquity, intraocular pressure, fundoscopy, slit lamp examination.

Javel Schiortz Keratometer was used for measurement of IOP. Surgery was performed under peribulbar injection of local anesthesia (Bupicaine 0.5% and Lignocaine 2%). In all patients a clear corneal injection was used. In temporal incision approach position of surgeon sitting was 3 o’clock in left eye and 9 o’ clock in right eye. Similarly in superior approach at 12 o’clock position was used to make main port and 3 o’clock position used for side port in left sided eye. Patients were advised a combination of topical antibiotics and steroids and follow up at 2 and 8 week. At every follow keratometery and auto refraction was done along with subjective refraction at 8 weeks follow up. SPSS version 24 was used for data analysis. Mean and SD was calculated for numerical data and frequency percentages for categorical data. Test of significance were applied and p values ≤0.05 was taken as significant.

Results

Overall, 250 patients were included in our study. The Group I included 125 patients had 130 eyes. The Group II included 125 patients had 132 eyes. The average age of Group I and Group II was 56.45±3.92 years and 57.97±3.61 years, respectively. (p=0.275). The sex distribution of both the group was almost equal, (p=0.893). Whereas, the mean astigmatism of Group I was less than Group II, as 0.51±0.22 and 0.85±0.29, respectively, (p<0.001). (Table. I).

The induced astigmatism distribution at different levels for one or two eyes, for Group I and Group II were shown in table II, the differences were statistically significant, (p<0.001). (Table. II).

Table-I: Demographic and clinical characteristics among the groups

<table>
<thead>
<tr>
<th>Variable</th>
<th>Group</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Temporal clear corneal incision</td>
<td></td>
</tr>
<tr>
<td>Average Age (years)</td>
<td>56.45±3.92</td>
<td>57.97±3.61</td>
</tr>
<tr>
<td>Sex</td>
<td>Male</td>
<td>83 (66.4)</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>42 (33.6)</td>
</tr>
<tr>
<td>Astigmatism</td>
<td>0.51±0.22</td>
<td>0.85±0.29</td>
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</tbody>
</table>

Discussion

Primary goal of modern cataract surgery with phacoemulsification is to reduced corneal astigmatism after surgical procedure. Exact evaluation of corneal curvature is requiring as a result of surgery because this may induce different proportions of corneal astigmatism. Giansanti et al12 conducted a study on 146 patients and compare temporal and superior clear corneal incision, SIA was found lower in temporal corneal incision approach as compared to superior approach. Incision size was 2.75mm in this study.

In our study demographics of patients were almost same. Another study was conducted by Marek et al13 and compared SIA incidence in 2.8mm temporal and superior incisions. On temporal group mean SIA was 0.63±0.28 D and in superior group it was 1.00±0.54 D, results in both groups were statistically significant p<0.05. Kohnen T et al14 also give favor to temporal 3.5mm incision approach when compared with other surgical approaches when final results evaluated after six month duration.

In our study mean astigmatism was observed in 0.51±0.22 in temporal incision approach and 0.85±0.29 in superior group. Another study by Moon SC et al15 reported in his study that 3.2 mm incision through temporal technique can hardly cause astigmatism as compared to superior approach and nor induced any change in preoperative astigmatism. In other Barequet et al16 compared temporal corneal incision with nasal and concluded that induced astigmatism is 0.74 D in temporal incision and 1.65 D in nasal incision technique.

Similarly Borasio et al17 compared clear corneal temporal incision with clear corneal on axis incision and after 2 months follow up of phacoemulsification astigmatism was noted 0.34 D in temporal group and in on axis group it was 0.63 D. Wei et al18 conducted a study and performed phacoemulsification using 3mm temporal incision and 3mm nasal clear corneal incision and concluded that temporal incision induces less SIA although 6mm foldable IOL was used.

In latest ophthalmic advances cataract surgery and intraocular lens implantation were considered and
appreciated as refractive surgery targeting emmetropia postoperatively. Like our observation previous literature also reported that clear corneal temporal incision can cause less incidence of astigmatism. Pakravan et al. also compared temporal and nasal clear corneal incisions in cataract surgery with phacoemulsification technique. In post operative follow up 20% and 35% astigmatism was observed in both groups respectively.

**Conclusion**

Clear corneal incision 3.2 mm and temporal approach induces less surgical astigmatism, even it can be used in against the rule astigmatism cases where horizontal meridian is steeper.

**References**


