COMPARISON OF POSTERIOR IRIS CLAW AND SULCUS SUPPORTED INTRAOCULAR LENSES IN TERMS OF VISUAL OUTCOME AND COMPLICATIONS IN A TERTIARY HOSPITAL

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ABSTRACT

BACKGROUND
There are several alternatives for the surgical treatment of Aphakia (scleral fixation, intrascleral fixation, angle supported anterior chamber, ciliary sulcus supported, iris fixation intraocular lenses). Each technique has its own merits and demerits. Hence surgical correction of aphakia still remains challenging and controversial. The purpose of this study was to compare outcomes and complications of posterior fixated iris claw and sulcus supported lens from a tertiary care hospital. We wanted to compare visual outcome and complications of posterior iris claw intraocular lenses and sulcus placed intraocular lenses.

METHODS
This is a prospective interventional hospital-based study. A minimum of 60 patients fulfilling the inclusion criteria coming to our tertiary care hospital were selected for follow up study from January 2014 to December 2015.

RESULTS
70.3% iris claw lenses and 76.6% of sulcus supported lenses had final BCVA 6/18-6/6. 26.5% iris claw lenses and 21.6% sulcus supported lenses had final BCVA in 6/60-6/24 group. Only 3.2% iris claw lenses and 1.8% were in less than 6/60 group. Mean logMAR visual acuity at the end of 6 weeks was comparable in both the groups. There were no significant differences between two groups in mean intraocular pressure at 1 week and at the end of 6 weeks. There was no significant difference between the two groups in operative complications.

CONCLUSIONS
Posterior fixed IOL was comparable to sulcus supported IOL in terms of BCVA at 6 weeks, intraocular pressure and operative complications.

KEYWORDS
Posterior Intraocular Lens, Sulcus Supported Lenses

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BACKGROUND
Cataract surgery has undergone profound changes in the last few decades. With the development of newer surgical techniques and excellent visual outcome after Posterior chamber intraocular lenses implantation, problem of aphakia correction are less commonly encountered. Most preferred technique is definitely in the bag IOL but it may not be possible in cases of weak or no capsular support.¹ When the capsular support is absent or in adequate the other options for intraocular lens implantation are Anterior chamber Intraocular lens (ACIOL), Iris fixated claw lens (anterior or posterior to iris), Scleral fixated intraocular lenses(SFIOL), or sulcus supported lenses when there is adequate sulcus support.

Anterior chamber IOLs though has been used since olden ages, can lead to corneal touch leading to endothelial cell loss, hyphema, raised intraocular pressure due to pupillary block and iritis. This has been observed in many other studies too.² Whereas for SFIOLs more surgical skills are required, more prolonged and as there is more manipulation so more chances of intra and postoperative complications are there.³ In the early 1960s, Collar implanted the first iris-fixated lens after an intra-capsular cataract extraction, but in 1971, Worst came in with the Iris Claw lens, and its modification evolved in the Artisan lens.⁴
Andreas Mohr in 2002 developed the technique of posterior fixation of iris claw lens, since it is placed behind the iris it has a good anatomical outcome as well as low manipulation and hence lower rate of complications as compared to SFIOL. And also, its less time consuming. Still it has few disadvantages like iris atrophy, irregular pupil and dislocation of IOL. SFIOL also has superior optical rehabilitation compared to ACIOL but it has its own disadvantages like decentration of IOL, vitreous in anterior chamber, suture or haptic extrusion and is more time consuming. In cases of intraoperative posterior capsular rents, Sulcus supported IOLs are good and safer alternative. As the ciliary sulcus is anatomically closer to the natural position of lens there are less complications in terms of corneal touch. Contraindications are large zonular dialysis and deficient anterior capsular rim. Now a days we have multiple options available for the correction of aphakia. Its upto the surgeon and also the status of the capsular bag which is a deciding factor to choose the type of surgery. In this article we have done a comparative study between posterior fixated iris claw lenses and sulcus supported lenses in the management of aphakia in tertiary centre.

This is a comparative study of posterior iris claw IOLs and Sulcus placed IOLs in management of complicated cataract surgery in terms of best corrected visual acuity (BCVA) and complications in tertiary care hospital.

METHODS
This was a comparative, observational study on the outcomes of posterior iris claw lenses implantation versus ciliary sulcus implantation of the posterior chamber intraocular lens for the correction of surgical aphakia conducted at a tertiary care eye facility between January 2014 to December 2016, by a single surgeon.

Inclusion Criteria
Group 1: Patients with aphakia due to intraoperative defect in Posterior capsule or subluxation of natural lens or IOL without adequate capsular rim, who had posterior iris claw implantation.

Group 2: Patients with aphakia due to intraoperative defect in Posterior capsule or subluxation of natural lens or IOL with adequate capsular rim, who had posterior chamber intraocular lens implantation in the sulcus. Both types of IOL implantation was done either as a primary surgery or later as secondary surgery. Time and type of IOL was decided by operating surgeon

Exclusion Criteria
Group 1: Rubeosis iridis, aniridia, iris defects precluding adequate iris support for enclavation of iris claw lens, underlying retinal disorders needing future intervention.

Group 2: Absence of adequate posterior capsular support, especially in the inferior quadrant, gross zonular weakness due to pseudo exfoliation, or trauma.

In follow-ups estimation of Snellen’s BCVA, IOP (Applanation tonometry), Keratometry, Biometry, slit lamp examination and dilated retinal evaluation was done.

Surgical Technique
The lens used in this study for iris fixation was (Indian) which is a polymethyl methacrylate (PMMA) IOL with an 8.0 mm length and 5.50 mm optical zone width. Alcon 3-piece IOL of total 13 mm diameter with 6.00 mm biconvex optic with PMMA haptics was used for sulcus placement. So as to achieve emmetroplia IOL power calculation was done using SRK 2 formula except eyes with Axial length >23 mm where SRK-T was used. In planned secondary surgeries, IOL power was obtained after adjusting for the A constants. During primary (unplanned) implantation, the power of IOL was determined by reducing 1.5 D for iris claw, and 0.5 D for Sulcus supported IOL, from that of in the bag IOLs. IOL implantation in all cases were done by a single surgeon with the same technique.

Group 1: (n=25)
According to the site of enclavation, two paracenteses were done diametrically opposite. Proper anterior vitrectomy should be done. Intracameral pilocarpine 1% was used to induce pupillary miosis. Iris claw was inserted using the IOL holding forceps below the iris plane using the surgeon’s dominant hand. Enclaver was used to enclavate the haptic at the side of the nondominant had first, and then similarly enclavate the opposite haptic. After visible tuck is seen in of the iris at the sites of enclavation, the IOL holding forceps was gently withdrawn. Dimple at the site of enclavation are seen. Tunnel was sutured with 10’0 Nylon.

Group 2: (n=35)
Anterior chamber should be cleared off vitreous by proper anterior vitrectomy. Alcon 3-piece IOL was placed over the sulcus only after ensuring adequate capsular support. The section closed with 10-0 nylon sutures. Topical antibiotics, steroids in tapering doses were prescribed in operated eyes. In cases of inflammation Homatropine was given for a while. Antiglaucoma drops were added in IOP hike. All the patients were examined patients on postoperative day- 1, 1 week, and 6 weeks. At every follow up BCVA, IOP, slit lamp examination, Retina evaluation was done.

Statistical Analysis
Paired t-test was used for analysis of pre and postoperative BCVA and intraocular pressure. Mean of absolute prediction errors was calculated in both groups. The A scan power of IOL and implanted IOL difference was calculated and was correlated with Pearson’s coefficient. Test was statistically significant if p<0.05.

RESULTS
The patients were matched in terms of age, sex, laterality. Age group in both the groups ranged from 42-75 years. The majority of patients in both the groups were in the 60-75 years age group. In the study majority were males i.e.
55.33% and 44.77% were females. In group 1 males were more than females and in Group 2 (Sulcus supported) females were more but the difference was insignificant. Aetiology of surgical aphakia in Group 1 was and large posterior capsule rents precluding placement of in the bag PCIOL 12 (48%), zonular dialysis >6 clock h 11(44%), posteriorly displaced primary PCIOLs 2(8%). In Group 2, posterior capsule rents accounted for 21(70%) cases, zonular dialysis>6 clock h 2 (6.66%) cases, and displaced primary PCIOLs 5(16.66%) cases. 42.9% eyes in Group 1 and 58.5% eyes in Group 2 underwent posterior iris claw or Sulcus supported IOL implantation during the primary surgery itself. 57.1% eyes in Group 1 and 41.50% eyes in Group 2 underwent posterior iris claw or Sulcus supported IOL implantation as secondary procedure. Timing of surgery and type of IOL implanted was decided as per the discretion of the surgeon. Preoperative BCVA and postop BCVA at 6 weeks in Group 1 and Group 2 was statistically significant. However, there was no significant difference in BCVA between the groups at 6 Weeks.

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Group 1 (Iris claw)</th>
<th>Group 2 (SSIOL)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean age (years)</td>
<td>79.5</td>
<td>66.5</td>
</tr>
<tr>
<td>Male</td>
<td>17</td>
<td>11</td>
</tr>
<tr>
<td>Female</td>
<td>8</td>
<td>19</td>
</tr>
<tr>
<td>Preoperative BCVA (logMAR)</td>
<td>1.71 ± 0.51</td>
<td>1.54 ± 0.64</td>
</tr>
<tr>
<td>Primary IOL implantation</td>
<td>42.9%</td>
<td>58.5%</td>
</tr>
<tr>
<td>Secondary IOL implantation</td>
<td>57.1%</td>
<td>41.5%</td>
</tr>
</tbody>
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Table 1. Comparison of Demographic Characteristics between the Two Groups (SSIOL- Sulcus Supported)

IOP was measured in both groups 1 week and 6 weeks postoperatively. In Posterior iris claw group mean IOP was 18.2± 2.75 mmHg at 1 week and 14.6 ± 1.45 mmHg at the end of 6 weeks. Whereas in Sulcus placed IOL, the mean IOP was 15.75 ± 2.35 mmHg at 1 week and 15.25± 2.45 mmHg at the end of 6 weeks post-surgery. With respect to change in Intraocular pressure, there was no statistically significant difference between two groups at the end of 1 week and at weeks post-operatively. Following table 2 shows comparison of visual acuity of two groups.

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Group 1 (Iris claw)</th>
<th>Group 2 (SSIOL)</th>
</tr>
</thead>
<tbody>
<tr>
<td>BCVA at 1 week (logMAR)</td>
<td>0.16 ± 0.15</td>
<td>0.15 ± 0.18</td>
</tr>
<tr>
<td>BCVA at 6 weeks (logMAR)</td>
<td>0.12± 0.04</td>
<td>0.11± 0.02</td>
</tr>
<tr>
<td>IOP at 1 week (mmHg)</td>
<td>18.2± 2.75</td>
<td>15.75± 2.35</td>
</tr>
<tr>
<td>IOP at 6 weeks (mmHg)</td>
<td>14.6± 1.45</td>
<td>15.25± 2.45</td>
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</table>

Table 2. Comparison of BCVA & IOP between the Two Groups at 1 & 6 Weeks

The mean BCVA in the iris claw IOL group was 0.12± 0.04 log MAR units and in Sulcus supported IOL group was 0.11±0.02 log MAR units. Though it was not statistically significant but mean BCVA of sulcus supported IOL was slightly better than mean BCVA of posterior iris claw lens.

**DISCUSSION**

In our comparative study between posterior iris claw and sulcus supported IOL group the outcomes were comparable in terms of BCVA at 6 weeks. In this study comparison between primary and secondary implanted IOL showed no much difference in visual outcome and complications. If we perform good anterior vitrectomy intraoperatively, visual outcomes are comparable irrespective of primary or secondary implantation. In terms of post-operative stability of intraocular lenses also, there was no case of posterior dislocation or decentration of IOL. In group 1 patient there was one case of lens tilt following blunt trauma 3 months after surgery. There are several studies which shows there are chances of dislocation of posterior iris claw lenses later. There were few patients who needed topical antiglaucoma medications due to raised IOP but was stopped later. Out of those had raised IOP, two had history of trauma, two had vitreous blob in Anterior chamber and one had residual viscoelastic . There was no significant difference in the IOP between two groups. Out of total 60, 5 patients developed cystoid macular oedema. But it was either due to primary surgical manipulation or worsening of pre-existing Diabetic maculopathy. 5 patients had irregular iris from group 1. As observed in few other studies no cases of pigment erosion, progressive dispersion. None of the patients developed pseudophakic bullous keratopathy or choroidal or retinal detachment. This is suggestive of safety of this procedure. Merits of our study is this is simple study of Posterior claw IOL vs. Sulcus supported IOLs in tertiary care hospital.

**CONCLUSIONS**

The study suggests that both posterior iris claw and sulcus supported lenses are effective in visual improvement with lower rate of complications. The visual outcome of primary and secondary IOL implantation were comparable between both groups.

**REFERENCES**


