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Visual Outcomes And Complication Rates In Aphakic Patients Undergoing Iris-Claw Intraocular Lens Implantation: A Tertiary Care Study

[1]Dr. Ashutosh T Girbide, [2]Dr Narayan S Arvikar, [3]Dr Anjali A Mayekar, [4]Dr. Shifa S Mirza

[1]Junior Resident, [2]Professor, [3] Junior Resident, [4]Junior Resident

Department of Ophtalmology

Dr. Ulhas Patil Medical College and Hospital

Jalgaon 425009 INDIA

Abstract

Purpose: This study aimed to assess visual outcomes and the safety profile of iris-claw intraocular lens (IOL) implantation in aphakic patients lacking capsular support, with an emphasis on improvements in visual acuity and postoperative complications.

Methods: A prospective interventional study was conducted involving 104 aphakic patients aged 40-80 years who underwent iris-claw IOL implantation at a tertiary care center. Preoperative and postoperative uncorrected visual acuity (UCVA), best-corrected visual acuity (BCVA), and intraocular pressure (IOP) were recorded. Postoperative complications were noted, and patient satisfaction was evaluated at the 28-day follow-up.

Results: Postoperative UCVA improved significantly, with 38.5% of patients achieving 6/6–6/12 vision by day 28. BCVA also improved, with 57.7% of patients reaching 6/6–6/12. The mean IOP decreased from 15.2 mmHg preoperatively to 12.6 mmHg postoperatively. Minor complications, such as increased IOP and cystoid macular edema (CME), occurred in 6.7% and 4.8% of patients, respectively. No major vision-threatening complications were observed, and 91.3% of patients had favorable safety outcomes.

Conclusion: Iris-claw IOL implantation demonstrated significant improvements in visual outcomes and a low rate of complications, making it a viable option for managing aphakia in patients without capsular support.

1.INTRODUCTION

Aphakia, the absence of the eye's natural lens, often results from complications during cataract surgery or trauma, leading to significant visual impairment if not properly managed. Globally, cataracts remain a leading cause of reversible blindness, with aphakia being a major consequence in patients where posterior capsular support is compromised. In such cases, primary intraocular lens (IOL) implantation during cataract surgery may not be feasible, necessitating secondary interventions to restore vision.

The advent of iris-claw IOLs has provided a reliable solution for aphakic patients, offering the benefits of stable fixation without requiring capsular support. Unlike scleral-fixated or anterior chamber IOLs, iris-claw lenses are attached to the mid-peripheral iris, ensuring minimal impact on the corneal endothelium and reducing the risk of postoperative complications such as pupil distortion or angle closure.[1,2]
Although numerous studies have explored the efficacy of various secondary IOL implantation techniques, the safety and visual outcomes of iris-claw IOLs, particularly when fixated retropupillarily, warrant further investigation.[3] This study aims to evaluate the visual outcomes, intraocular pressure changes, and complication rates following iris-claw IOL implantation in aphakic patients at a tertiary care center.

2.METHODS

2.1.Study Design and Setting

This prospective, hospital-based interventional study was conducted at the Department of Ophthalmology, Dr. Ulhas Patil Medical College and Hospital, Jalgaon, over a 20-month period from November 2022 to June 2024. Ethical approval was obtained from the institutional ethics committee, and all participants provided written informed consent before enrollment.

2.2.Study Population

The study involved 104 aphakic patients aged 40 to 80 years, presenting with monocular or binocular aphakia due to complicated cataract surgeries or posterior capsular rupture, where primary posterior chamber IOL implantation was not feasible. Patients were excluded if they had preexisting conditions such as glaucoma, significant iris pathology, diabetic retinopathy, or corneal scarring. Those with no light perception or defective light projection were also excluded.

2.3.Preoperative Assessment

All patients underwent a comprehensive ophthalmic evaluation, including the measurement of uncorrected visual acuity (UCVA) and best-corrected visual acuity (BCVA) using a Snellen chart. A slit-lamp biomicroscopy was performed to assess the anterior segment, and intraocular pressure (IOP) was measured using Goldmann applanation tonometry. Keratometry and A-scan biometry were used to calculate the appropriate IOL power based on the SRK-II formula. Dilated fundus examinations were conducted using +90D lenses or indirect ophthalmoscopy to evaluate the posterior segment.

2.4.Surgical Procedure

Iris-claw IOL implantation was performed by a senior surgeon under local anesthesia. A superior scleral incision of approximately 5.4 mm was made, followed by anterior vitrectomy in cases of vitreous prolapse. The iris-claw IOL was inserted into the anterior chamber and secured retropupillarily using iris enclavation with the help of a Sinskey hook. The scleral incision was closed with 10-0 nylon sutures, and a subconjunctival injection of gentamicin and dexamethasone was administered at the end of the procedure.

2.5.Postoperative Evaluation

Postoperative follow-up was conducted on days 1, 7, and 28, during which UCVA, BCVA, IOP, and any complications were recorded. Visual acuity was assessed using a Snellen chart, and IOP was remeasured using Goldmann tonometry. Patients were also monitored for potential complications, including increased IOP, cystoid macular edema, endophthalmitis, and any signs of iris or corneal damage.

3.RESULTS

A total of 104 patients with aphakia were enrolled in this study, with a near-equal gender distribution (52.9% males and 47.1% females). The age of participants ranged from 40 to 80 years, with the majority (27.8%) falling within the 61-70 age group.

3.1.Preoperative Visual Acuity

Preoperatively, the majority of patients presented with significant visual impairment. Specifically, 43.2% had uncorrected visual acuity (UCVA) between 6/36 and 6/60, and 32.7% had UCVA below 6/60. Only 4.8% of patients demonstrated UCVA of 6/6 to 6/12. Similarly, the best-corrected visual acuity (BCVA) was poor, with 38.4% of patients achieving BCVA between 6/36 and 6/60 and 23.07% below 6/60.

3.2.Postoperative Visual Acuity (UCVA and BCVA)

Postoperative visual acuity showed marked improvement at each follow-up:

- **3.2.1.Day 1 Postoperative**: 38.5% of patients achieved UCVA between 6/36 and 6/60, while 27.9% had UCVA below 6/60.
- **3.2.2.Day 7 Postoperative**: 33.7% of patients improved to UCVA between 6/18 and 6/24, while an equal percentage (33.7%) had UCVA between 6/36 and 6/60.
- **3.2.3.Day 28 Postoperative**: By the final follow-up, 43.3% of patients achieved UCVA between 6/18 and 6/24, and 38.5% attained UCVA between 6/6 and 6/12.

Postoperative BCVA improved significantly by day 28, with 57.7% of patients achieving BCVA of 6/6 to 6/12 and 28.8% between 6/18 and 6/24. Only 3.8% had BCVA less than 6/60, indicating considerable improvement from preoperative levels.

3.3.Intraocular Pressure (IOP)

The mean preoperative intraocular pressure was 15.2 mmHg, which decreased to 12.6 mmHg by postoperative day 28 ($p < 0.001$). The percentage of patients with elevated IOP (>20 mmHg) decreased from 18.3% preoperatively to 3.8% postoperatively. By day 28, 81.7% of patients had IOP within the normal range of 10-20 mmHg.

3.4.Postoperative Complications

Most patients (86.5%) experienced no postoperative complications. Minor complications included increased IOP in 6.7% of cases and cystoid macular edema (CME) in 4.8%. Two cases of endophthalmitis (1.9%) were reported, but both were managed effectively without long-term visual impairment.

3.5.Patient Satisfaction

Patient satisfaction was high, with 67.3% reporting they were "very satisfied" with their visual outcomes, and 24.0% being "satisfied." Only a small fraction (3.8%) expressed dissatisfaction, largely due to postoperative complications.

3.6.Safety Outcomes

Overall, 91.3% of patients had a safe postoperative course with no major complications. Minor complications were noted in 6.7%, and only 1.9% experienced serious complications, all of which were successfully managed.

4.DISCUSSION

The correction of aphakia, especially in patients with insufficient capsular support, presents unique challenges for ophthalmic surgeons. Iris-claw intraocular lens (IOL) implantation has emerged as a safe and effective solution for these cases, offering improved visual acuity and minimal risk of postoperative complications. This study aimed to evaluate the efficacy and safety of iris-claw IOLs in a population of aphakic patients at a tertiary care center, and the results demonstrate significant improvements in both uncorrected visual acuity (UCVA) and best-corrected visual acuity (BCVA).

4.1.Visual Outcomes

Postoperative visual outcomes in this study were highly favorable. By day 28, a substantial proportion of patients achieved UCVA between 6/6 and 6/12, indicating a marked improvement from preoperative visual impairment. These results are consistent with existing literature that reports positive outcomes following iris-claw IOL implantation. For instance, studies by Mohamed et al.[4] and Zaleski et al.[5] have also shown significant visual improvement in aphakic patients receiving iris-claw IOLs, with BCVA improving to similar levels.

The improvement in BCVA observed in this study, with 57.7% of patients achieving 6/6 to 6/12 by the 28-day follow-up, further highlights the efficacy of this technique. The fact that the majority of patients experienced significant gains in visual acuity suggests that iris-claw IOLs provide stable and predictable outcomes in the absence of capsular support.

4.2.Intraocular Pressure and Complications

Postoperative control of intraocular pressure (IOP) was another key finding in this study. Preoperatively, a significant number of patients had elevated IOP, but by the final follow-up, IOP had normalized in most cases. This is in line with other studies that have reported stable or reduced IOP following iris-claw IOL implantation. The reduction in IOP from 15.2 mmHg to 12.6 mmHg by day 28 suggests that iris-claw IOLs do not contribute to significant IOP elevation, a complication often associated with other types of secondary IOL implantation, such as anterior chamber IOLs.

Postoperative complications in this study were minimal. The most common minor complications were transient increases in IOP (6.7%) and cystoid macular edema (CME) (4.8%), both of which are known risks in intraocular surgeries. These were effectively managed without long-term visual impact. Notably, the rate of serious complications such as endophthalmitis was low (1.9%), which compares favorably with other published studies on iris-claw IOLs.

4.3.Comparison with Existing Literature

The findings from this study are consistent with previous research on the safety and efficacy of iris-claw IOLs. Studies conducted by Al-Dwairi et al.[3] and Mohamed et al. have also reported significant improvements in visual acuity and low rates of postoperative complications, confirming the reliability of iris-claw IOLs in aphakic patients.

Moreover, the retropupillary fixation technique used in this study has been associated with better long-term outcomes compared to anterior chamber IOLs, as reported by Zaleski et al. Retropupillary fixation offers greater stability and reduces the risk of complications such as corneal endothelial damage and pupil block, which are more common with anterior chamber lenses.

4.4.Clinical Implications

The results of this study reinforce the role of iris-claw IOLs as a safe and effective option for managing aphakia in patients without capsular support. Given the high level of patient satisfaction, significant visual improvements, and low complication rates, iris-claw IOL implantation should be considered a preferred surgical technique in these cases. The ability to restore functional vision in aphakic patients, especially in resource-limited settings, makes this approach invaluable.

5.CONCLUSION

Iris-claw intraocular lens implantation for aphakic patients without capsular support is an effective and safe procedure, providing significant improvements in both uncorrected and best-corrected visual acuity. Postoperative complications are minimal, and patient satisfaction is high, making this technique a preferred option for restoring vision in complex aphakic cases. Further studies with longer follow-up periods may be beneficial to evaluate long-term outcomes and complication rates.

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