

# Visual Outcome and Complications in Retro-Pupillary Iris Claw Intra-Ocular Lens in Patients with Insufficient Capsular/Zonular Support



Imran Ahmad<sup>1</sup>, Nazli Gul<sup>2</sup>, Bilal Khan<sup>3</sup>, Jawad Humayun<sup>4</sup>, Fahad Khan<sup>5</sup>

<sup>1-5</sup>Khyber Teaching Hospital, Peshawar

## ABSTRACT

**Purpose:** To determine the safety and effectiveness of iris claw lenses in cases of deficient capsular support.

**Study Design:** Interventional case series.

**Place and Duration of Study:** Khyber Teaching Hospital, from June 2023 to April 2024.

**Methods:** Aphakic patients with posterior capsule rupture and insufficient support for sulcus fixation intraocular lens (IOL) implantation were included in the study. Exclusion criteria included patients with atrophic iris or deficient iris for holding iris claw IOL, dilated pupils due to poor function of the constrictor pupillae muscle, pre-operative corneal scars, diabetic retinopathy, or posterior segment pathologies. Retro-pupillary placement of iris claw IOL was performed in all cases. Postoperatively, corneal sutures were removed 40 days after surgery, and visual acuity was assessed one week after suture removal. For quantitative variables, mean and standard deviation were calculated, while frequencies were used for qualitative variables. Pre- and post-operative best-corrected visual acuity (BCVA) were compared. A p-value of less than 0.05 was considered statistically significant.

**Results:** A total of 35 iris claw procedures were performed. The mean age of participants was 60.31±6.90 years, with 54.28% male and 45.72% female patients. No complications were documented in 74.28% of patients. Documented complications included: irregular iris (12.24%), High intraocular pressure (2.85%), IOL subluxation (2.85%), Cystoid macular edema (2.85%) and Hyphema (2.85%).

**Conclusion:** The study demonstrates that retro-pupillary placement of the iris claw IOL is a safe and effective procedure for patients with deficient capsular support, with a majority experiencing no postoperative complications.

**Keywords:** Best corrected visual acuity, Iris claw, Intraocular lens, Aphakia.

**How to Cite this Article:** Ahmad I, Gul N, Khan B, Humayun J, Khan F. Visual Outcome and Complications in Retro-Pupillary Iris Claw Intra-Ocular Lens in Patients with Insufficient Capsular/Zonular Support. 2025;41(2):160-165. Doi: 10.36351/pjo.v41i2.1853

---

*Correspondence:* Nazli Gul  
Khyber Teaching Hospital, Peshawar  
Email: drnazli83@gmail.com

---

*Received:* May 03, 2024  
*Revised:* November 20, 2024  
*Accepted:* January 28, 2025

## INTRODUCTION

Cataract surgery with intra-ocular lens (IOL) implantation is a common procedure performed

throughout the world.<sup>1</sup> The most common procedure is phacoemulsification and implantation of IOL within the capsular bag which is the normal anatomical position of the lens.<sup>2</sup> Cataract surgery is associated with many complications including rupture of the posterior capsule or zonular dehiscence with vitreous loss.<sup>3</sup> Aphakia in cataract surgery is never intended but sometime there is not enough capsular support for implanting posterior chamber IOL or placing IOL in sulcus due to complicated cataract surgery and rupture of posterior capsule or zonular dehiscence.<sup>4</sup> In case of

insufficient support for posterior chamber IOL, the options for intraocular lens implantation are limited. In case of insufficient posterior chamber support, the implanted IOL is not stable or subluxated and needs to be removed by replacement with another type of IOL for more stability and centration. The options are placing scleral fixation IOLs, anterior chamber IOLs and Iris claw IOLs.<sup>5</sup>

There are many complications associated with anterior chamber IOLs including bullous keratopathy due corneal endothelium decompensation, glaucoma and uveitis.<sup>6</sup> Scleral fixated IOL is associated with less corneal complications but can have IOL decentration, vitreous abnormalities and astigmatism.<sup>7</sup> Scleral fixation is difficult to be performed, needs more expertise and associated with a lot of ocular manipulation.<sup>8</sup>

Iris claw IOL has recently gained popularity due to easy procedure, less time consuming and associated with fewer complications in comparison to scleral fixation IOL or anterior chamber IOLs.<sup>9</sup> It can be placed in the anterior chamber in front of the iris or in the retro-pupillary area. These IOLs were designed to be placed and stuck with iris in the anterior chamber but recently its trend is changing and is used as retro-pupillary IOL in the posterior chamber.<sup>10</sup> Its efficacy is like other IOLs placed through different techniques in the absence of posterior chamber IOL support.<sup>11</sup> Iris claw IOLs are made up of Polymethyl methacrylate material (PMMA) with a total IOL length of 8.5 mm including the haptics and is anchored in the posterior iris away from cornea and is not associated with corneal complications.<sup>12</sup>

The aim of the study is to determine the visual outcomes and complications associated with implantation of retro-pupillary iris claw IOLs in a tertiary care center of Pakistan.

## METHODS

The study was conducted in the Department of Ophthalmology of Khyber Teaching Hospital. The study was an interventional case series, and the patients were enrolled in the study by non-probability consecutive sampling. Aphakic patients secondary to posterior capsule rupture with insufficient support for sulcus fixation IOL were included. Those with subluxated or dislocated IOL due to deficient support were also included. Retro pupillary iris claw IOL fixation was conducted as primary procedure in cases

of cataract with poor zonular support. Patients with atrophic iris or deficient iris for holding iris claw IOL, dilated pupil due to weak constrictor pupillae muscle, pre-operative corneal scar, diabetic retinopathy, or posterior segment pathologies were excluded from the study. Approval of the study was taken from the Institutional Research and Ethical Board (IREB) through Notification **No.308/DME/KMC**. The informed consent was taken. Baseline line ocular examination was performed and investigations for surgical intervention were done. The Artisan model PMMA iris claw IOL was used in the study with two claws on either side as shown in figure 1. Biometry was performed using SRK-T formula keeping A-constant of 116.8 using IOL master. In an aphakic patient, anterior vitrectomy was completed through limbal incision followed by making 2 small incisions at 3 and 9 O'clock positions with 15-degree keratome. PMMA Iris claw IOL was inserted through the limbus and one claw was placed posterior to iris followed by pressing the iris at 3 or 9 o'clock incision followed by pressing the other claw for iris to be captured. At the end viscoelastic was washed out from anterior chamber and limbal wound sutured. Moxifloxacin antibiotics 0.1 ml were injected into the anterior chamber. On the 2nd post-operative day, the patients were prescribed topical steroid and antibiotics drops combination for one month in tapering doses. Corneal sutures were removed after 40 days, and visual acuity was checked one week after suture removal. Patients were examined for cells in the anterior chamber, intraocular pressure, iris irregularities, centration of intraocular lens or dislocation, corneal transparency, and any posterior segment pathologies. If posterior segment or macular pathologies were suspected, optical coherence tomography of the macula using Spectralis Heidelberg OCT was suggested for cystoid macular edema or epiretinal membrane. All findings were recorded in a proforma.

Data was analyzed using SPSS software version 26. Variables included best corrected visual acuity of the patients, surgical complications including corneal opacity, IOL centration/subluxation or dislocation, intraocular pressure, anterior segment, or posterior segment inflammation. Mean and standard deviation were calculated for quantitative analysis and frequencies for qualitative variables. P value of less than 0.05 was considered statistically significant.

## RESULTS

A total of 35 Iris claw IOL procedures were conducted in the last one year. The means age of the patients was  $60.31 \pm 6.90$  years. Out of 35 patients, 19 (54.28%) were male and 16 (45.72%) were females and as shown in Table 1. The most common indication for retro-pupillary iris claw IOL was posterior capsular rupture with insufficient support for posterior chamber sulcus fixation IOL (42.9%) as shown in Table 2. Complications associated with the procedure are depicted in Graph 1. No complication of the procedure was documented in 74.28% of the patients with retro pupillary iris claw IOL. There were 77.14% patients with visual acuity of 6/18 or better and 85.71% of the total patients with visual acuity of 6/24 or better as

**Table 1:** Demographic data.

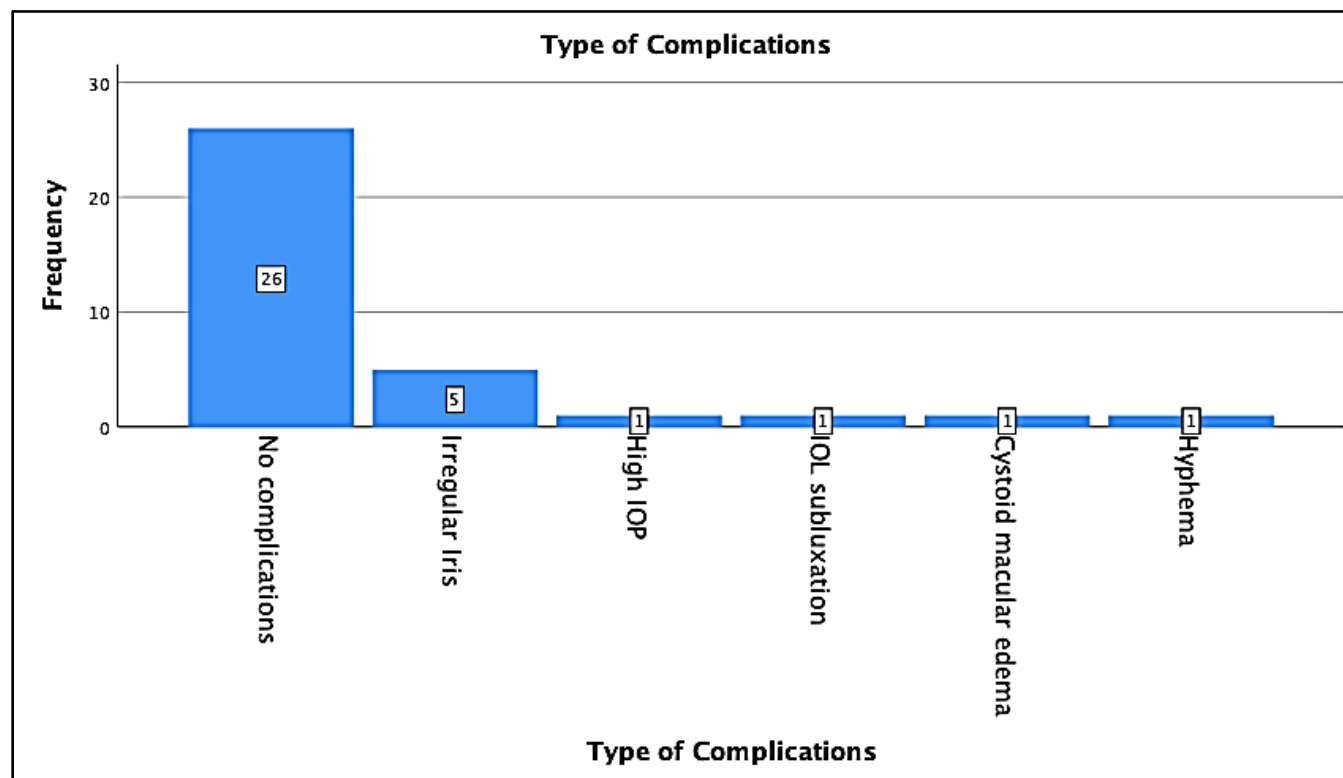
Gender	N	Percentage	Mean Age + SD	Median
Male	19	54.28%	$60.79 \pm 7.39$	58
Female	16	45.72%	$59.75 \pm 6.46$	60.5
<b>Total</b>	<b>35</b>	<b>100%</b>	$60.31 \pm 6.90$	<b>60</b>

**Table 2:** Indications for Iris claw IOL.

	Frequency	Percentage
Posterior capsular rupture with aphakia	15	42.9%
Subluxated IOL	5	14.3%
IOL drop	3	8.6%
Traumatic cataract with phacodonesis	5	14.3%
Nucleus drop	7	20%
<b>Total</b>	<b>35</b>	<b>100%</b>

**Table 3:** Pre-operative and Post-operative Visual Acuity.

Pre-Operative VA	Post-Operative VA								Total n (%)
	6/6	6/9	6/12	6/18	6/24	6/36	6/60	CF	
6/60	0	1	4	0	0	0	0	1	6 (17.14)
5/60	1	2	6	2	0	0	0	0	11 (31.43)
4/60	0	4	0	3	0	0	0	0	7 (20)
3/60	1	1	0	0	1	1	0	0	4 (11.43)
2/60	0	0	1	0	2	0	1	0	4 (11.43)
1/60	0	0	0	0	1	1	0	1	3 (8.57)
<b>Total</b>	<b>2</b>	<b>8</b>	<b>11</b>	<b>5</b>	<b>4</b>	<b>2</b>	<b>1</b>	<b>2</b>	<b>35 (100)</b>



**Graph 1:** Type and number of complications of Posterior Iris claw procedure.

shown in Table 3. There was clinically significant difference between pre-operative and post-operative visual acuity with p-value of 0.04.

## DISCUSSION

Our study demonstrated that the iris claw intraocular lens (IOL) is an effective and minimally invasive option for cases with insufficient support for posterior chamber or sulcus fixation IOLs. Approximately 74.28% of patients experienced no complications, while the minimal complications observed were not severe and did not impact the final visual acuity of the patients.

Anterior chamber intra ocular lens (AC-IOL) is also an option but is associated with many complications including glaucoma, corneal endothelium decompensation, bullous keratopathy anduveitis.<sup>13</sup> These complications have led to limited use of AC-IOL in the past few years.<sup>14</sup> In comparison to AC-IOL posteriorly placed iris claw IOL has fewer complications due to its implantation in retro-pupillary area. Most common complication associated with iris claw IOL in our study was iris irregularities which accounts for 14.3% out of 22.9% of total complications. Iris irregularities were expected as the IOL must be clipped with posterior iris tissues causing some distortion of iris. Iris irregularities have been reported to range from 10 – 30% in various studies.<sup>15</sup> During the early era of IOL implantation, Worst JG et al, used the technique of Iris clip IOL by suturing the IOL with iris tissues.<sup>16</sup> Artisan design iris claw IOLs have the clip which is anchored in the iris tissues easily without the need of suturing.

Our study showed that 77.14% of the patients after retro-pupillary iris claw IOL implantation had visual acuity of 6/18 or better and only 11% had 6/36 or worse in comparison to pre-operative visual acuity of 6/60 or worse in all the patients with a p-value of 0.04. There was visual improvement in 94% of the patients after implantation of iris claw IOL in comparison to pre-operative visual acuity. In a study by Kelkar et al, intravitreal triamcinolone acetonide was administered to reduce postoperative inflammation along with retro-fixation of the iris claw intraocular lens (IOL). Their results demonstrated that visual acuity improved significantly after iris claw IOL implantation, with 71% of patients achieving a visual acuity of 6/12 and 85% achieving 6/18, compared to preoperative levels of counting fingers.<sup>17</sup> The ideal visual acuity cannot be

aimed in these patients as these are complicated procedures with associated different ocular pathologies. We noticed only one IOL haptics dislodging at 2 months of follow up leading to subluxation of IOL and was successfully clipped back with iris without further complications. The incidence of disenclavation has been reported to range from 0 to 8% by Jayamadhury G et al.<sup>18</sup>

Iris claw IOL is an easier, less time-consuming procedure with better anatomical and visual outcomes in comparison to scleral fixation IOLs.<sup>19</sup> In a systematic review and meta-analysis by Liang IC and Chang YH, comparing anterior chamber iris claw IOL and retro-pupillary iris claw IOL, it was documented that retro-pupillary iris claw IOL is associated with a lower risk of intraocular pressure (IOP) elevation and a reduced incidence of cystoid macular edema.<sup>15</sup>

Cystoid macular edema is a complication associated with iris claw IOLs. Choi EY et al, documented the incidence of cystoid macular edema to be 3.9% in their study.<sup>20</sup> In our sample we found that one patient got post-operative cystoid macular edema who had a history of complicated cataract surgery and was left aphakic. Topical NSAIDs drops were started but did not respond to topical treatment. After one month of Iris claw IOL implantation sub-tenon triamcinolone acetonide was given which improved cystoid macular edema.

The limitation of study is small sample size which limits the generalizability of the findings to a larger population. The follow up was limited and the study was conducted at a single center which may not reflect the variability in outcomes across different centers or regions. The study did not include a control group, such as patients undergoing alternative treatments (e.g., scleral-fixated IOLs), to directly compare safety and efficacy.

Further studies, particularly randomized controlled trials are warranted to provide clearer and more definitive outcomes regarding the safety, efficacy, and long-term performance of retro-pupillary iris claw IOL implantation.

## CONCLUSION

Iris claw IOL is a safe and effective procedure which is less time consuming and associated with favorable visual outcomes in patients with deficient support for placing posterior chamber in the bag or sulcus fixation IOL.

**Funding:** None.

**Patient's Consent:** Researchers followed the guide lines set forth in the Declaration of Helsinki.

**Conflict of Interest:** Authors declared no conflict of interest.

**Ethical Approval:** The study was approved by the Institutional review board/Ethical review board (308/DME/KMC).

## REFERENCES

1. **McGhee CN, Zhang J, Patel DV.** A perspective of contemporary cataract surgery: the most common surgical procedure in the world. *J R Soc N Z.* 2020;**50(2)**:245-262. Doi: 10.1080/03036758.2020.1714673
2. **Al-Dwairi R, Saleh O, Aleshawi A, Alladkanie Z, Al Deyabat O, Alasheh A, et al.** Anterior Versus Retropupillary Iris-Claw Intraocular Lens: Indications, Visual Outcome and Postoperative Complications. *Ophthalmol Ther.* 2022;**11(2)**:771-784. Doi: 10.1007/s40123-022-00474-2.
3. **Joshi RS, Madan AH, Wadekar PD, Patil N, Tamboli S, Surwade T, et al.** Incidence and risk factors for vitreous loss in residents performing manual small-incision cataract surgery. *Int J Ophthalmol.* 2022;**15(7)**:1071-1076. Doi: 10.18240/ijo.2022.07.05.
4. **Barai PS, Wang J, Biswas SK, Barai NC.** Clinical Study of Intraocular Lens Implantation by Scleral Suture Fixation after Lensectomy and Vitrectomy. *SAS J Surg.* 2022;**5**:408-414. Doi: 10.36347/sasjs.2022.v08i05.016
5. **Dzhaber D, Mustafa OM, Tian J, Cox JT, Daoud YJ.** Outcomes and complications of iris-fixated intraocular lenses in cases with inadequate capsular support and complex ophthalmic history. *Eye (Lond).* 2020;**34(10)**:1875-1882. Doi: 10.1038/s41433-019-0759-6.
6. **Drolsum L, Kristianslund O.** Implantation of retropupillary iris-claw lenses: A review on surgical management and outcomes. *Acta Ophthalmol.* 2021;**99(8)**:826-836. Doi: 10.1111/aos.14824.
7. **Rastogi A, Kumar P, Dhiman S, Mishra M, Anand K, Bhardwaj A.** Evaluation of functional outcome and stability of sutureless scleral tunnel fixated IOLs in children with ectopia lentis. *Int J Ophthalmol.* 2020;**13(1)**:66-70. Doi: 10.18240/ijo.2020.01.10.
8. **Yamane S, Ito A.** Flanged fixation: Yamane technique and its application. *Curr Opin Ophthalmol.* 2021;**32(1)**:19-24. Doi: 10.1097/ICU.0000000000000720.
9. **Navya C, Hatti, Ajay S.** Comparative study of secondary implantation of iris-claw lens and scleral fixated intraocular lens in terms of visual outcomes and complications. *J Clin Ophthalmol Res.* 2020;**8(3)**:100-103. Doi: 10.4103/jcor.jcor\_66\_19
10. **Calzetti G, Bellucci C, Tedesco SA, Rossi M, Gandolfi S, Mora P.** Tilt and decentration of posterior and anterior iris-claw intraocular lenses: a pilot study using anterior segment optical coherence tomography. *BMC Ophthalmol.* 2022;**22(1)**:233. Doi: 10.1186/s12886-022-02430-x.
11. **Dalby M, Kristianslund O, Drolsum L.** Long-Term Outcomes after Surgery for Late In-The-Bag Intraocular Lens Dislocation: A Randomized Clinical Trial. *Am J Ophthalmol.* 2019;**207**:184-194. Doi: 10.1016/j.ajo.2019.05.030.
12. **Mansoori T, Agraharam SG, Sannapuri S, Manwani S, Balakrishna N.** Surgical Outcomes of Retropupillary-Fixated Iris-Claw Intraocular Lens. *J Curr Ophthalmol.* 2020;**32(2)**:149-153. Doi: 10.4103/JOCO.JOCO\_92\_20.
13. **Patel V, Pakravan P, Lai J, Watane A, Mehra D, Eatz TA, et al.** Intraocular lens exchange: Indications, comparative outcomes by technique and complications. *Clin Ophthalmol* 2023;**17**:941-951. Doi: 10.2147/OPHTH.S399857.
14. **Woo JH, Arundhati A, Chee SP, Tong W, Li L, Ti SE, et al.** Endothelial keratoplasty with anterior chamber intraocular lens versus secondary posterior chamber intraocular lens. *Br J Ophthalmol.* 2022;**106(2)**:203-210. Doi: 10.1136/bjophthalmol-2020-316711.
15. **Liang IC, Chang YH, Hernández Martínez A, Hung CF.** Iris-Claw Intraocular Lens: Anterior Chamber or Retropupillary Implantation? A Systematic Review and Meta-Analysis. *Medicina (Kaunas).* 2021;**57(8)**:785. Doi: 10.3390/medicina57080785.
16. **Worst JG, Massaro RG, Ludwig HH.** The introduction of an artificial lens into the eye using Binkhorst's technique. *Ophthalmologica.* 1972;**164(5)**:387-391. Doi: 10.1159/000306776.
17. **Kelkar A, Shah R, Vasavda V, Kelkar J, Kelkar S.** Primary iris claw IOL retrofixation with intravitreal triamcinolone acetonide in cases of inadequate capsular support. *Int Ophthalmol.* 2018;**38(1)**:111-117. Doi: 10.1007/s10792-017-0467-9.
18. **Jayamadhury G, Potti S, Kumar KV, Kumar RM, Divyansh Mishra KC, Nambula SR.** Retropupillary fixation of iris-claw lens in visual rehabilitation of aphakic eyes. *Indian J Ophthalmol.* 2016;**64(10)**:743-746. Doi: 10.4103/0301-4738.195012.
19. **Vounotrypidis E, Schuster I, Mackert MJ, Kook D, Priglinger S, Wolf A.** Secondary intraocular lens implantation: a large retrospective analysis. *Graefes Arch Clin Exp Ophthalmol.* 2019;**257(1)**:125-134. Doi: 10.1007/s00417-018-4178-3.

20. **Choi EY, Lee CH, Kang HG, Han HY, Byeon SH, Kim SS, et al.** Long-term surgical outcomes of primary retro-pupillary iris claw intraocular lens implantation for the treatment of intraocular lens dislocation. *Sci Rep* 2021;**11(1)**:726. Dio: 10.1038/s41598-020-80292-3.

### **Authors Designation and Contribution**

Imran Ahmad; Assistant Professor: *Concepts, Data acquisition, Manuscript editing, Manuscript review.*

Nazli Gul; Assistant Professor: *Design, Data analysis, Manuscript preparation, Manuscript editing.*

Bilal Khan; Assistant Professor: *Literature search, Data acquisition, Statistical analysis.*

Jawad Humayun; Registrar: *Concepts, Literature search, Statistical analysis.*

Fahad Khan; Registrar: *Literature search, Data analysis, Manuscript preparation, Manuscript review.*

