Visual Acuity and Complications After Secondary Retropupillary Iris-Claw Intraocular Lens Implantation at Undaan Eye Hospital Surabaya in 2019 - 2020

Rosvina Diah Nurulita Sutrisno[1], Dini Dharmawidiarini[2], Sahata Poltak Hamonangan Napitupulu[2], Farida Moenir[2]

Email : rosvinadiah@gmail.com
[1]Faculty of Medicine, Universitas Airlangga, Surabaya, Indonesia
[2]Cataract and Refractive Surgery Division, Undaan Eye Hospital, Surabaya, Indonesia

Abstract

Introduction : Intraocular lens implantation is a treatment of choice in cases of aphakia. Aphakia conditions with minimal or no capsular support can use the anterior chamber LIO technique, iris, sulcus, and scleral fixation. The retropupillary iris fixation technique is an alternative technique that is often chosen by operators in aphakia caused by minimal complications and good visual outcomes. **Purpose:** to describe visual acuity and complication after secondary iris claw retropupillary intraocular lens implantation in patients with aphakia. **Method:** this research was a descriptive study by taken data from medical records at Undaan Eye Hospital Surabaya on January 2019 to Desember 2020. We observed the outcome visual acuity and complication from first day until 3 months after surgery. The population in this study was all aphakia patients who had secondary retropupillary iris-claw IOLs implantation surgery that fulfilled the inclusion criterias. **Results:** This study found that from 19 subjects, dominated by male (57,90%). The age group consisted of 49-76 years old, mean 59,05 years old. The most common cause of aphakia was lens subluxation (78.94%) as a result of previous cataract surgery. The complication found was a surgical induced astigmatism (52.63%).

Keywords: aphakia; retropupillary iris-claw;visual acuity;complications

Introduction

Intraocular lens implantation is a treatment of choice in cases of aphakia. The choice of surgical technique, implantation site, and the type of intraocular lens selected depends on the operator's preferences by considering each case's profile, such as the integrity of the remaining capsule, the type of IOL, and the previous eye comorbidities. In the absence of a lens capsule, surgery to correct the aphakia eye can be performed using several techniques, such as anterior chamber IOL, posterior chamber IOL transscleral suturing, sulcus fixation, or iris fixation. Anterior chamber IOL is often associated with complications such as corneal endothelial cell loss leading to bullous pseudophakic

keratopathy (PBK), secondary glaucoma, peripheral anterior synechiae formation, cystoid macular oedema, chronic inflammation, and hyphema. PC IOLs with sutured iris or scleral fixation also have disadvantages, such as complex suture technique, longer surgical time, hypotonia, the possibility of intraoperative bleeding, and damage to the ciliary body. The main disadvantage is that iris-claw IOL implantation requires a 5.5 mm incision, increasing the risk of surgically induced astigmatism. It can minimize this by using a scleral tunnel incision. Complications of the LIO Iris Claw implantation technique that are often reported include LIO dislocation or dislocation, cystoid macular oedema, and pupillary distortion(1). Retropupillary fixation subsequently developed because of its more physiologic location, away from the corneal endothelium, and easier to implant than prepupillary procedures(2).

Materials and Methods :

This research was a descriptive study using medical records as data. Samples were taken using purposive sampling. The samples were all aphakia patients who had secondary iris-claw reptropupillary IOLs implantation surgery that fulfilled the inclusion criteria. Operators who carry out IOL implantation are limited to ophthalmologists from the cataract and refractive surgery division of Undaan Eye Hospital Surabaya. Patients who come for control from day 1 to day 30 until the day when suture are removed. Patients with a personal history of central corneal, retinal, and optic nerve abnormalities and patients who did not come to the outcome control schedule until the sutures were removed were excluded from this study. Visual acuity was checked preoperatively, and follow-up was performed on postoperative day 1. Then continued when the postoperative control was evaluated for visual acuity and complications on the seventh day until three months postoperative.

Results:

From January 2019 to December 2020, from a total of 234 patients who underwent secondary intraocular lens implantation surgery at the Undaan Eye Hospital in Surabaya, 19 patients fulfilled the inclusion criteria. Patients were fully controlled from seventh day to 3 months postoperative. The distribution of aphakia patients with retropupillary iris-claw IOL according to age, sex, history of astigmatism and cause of aphakia can be seen in table 1.

Table 1. Patient Demographic and Clinical Characteristics

Characteristic (n = 19)	n	(%)
Age (mean ± SD)	59,05 ± 7,95	
Sex		
Male	11	57,90%
Female	8	42,10%
History of Astigmatism		
Yes	9	47,36%
No	10	52,63%

Cause of Aphakia		
Cataract Surgery Complications:		
Lens Subluxation	15	78,94%
Posterior Capsule Rupture	2	10,52%
IOL Dislocation	1	5,26%
Nucleus Drop	1	5,26%

The age range is 49-76 years from the age distribution, and the average age is 59.05 years. It is dominated by male sex, as much as 57.90%. And the most common cause of aphakia is lens subluxation.

Table 2. Uncorrected Visual Acuity in Preoperative, First Day until 3 months after surgery

Visual Acuity	Pre operative	UCVA 1st day	UCVA 1st week	UCVA 2nd week	UCVA 1st month	UCVA 3rd month
<3/60	19 (100%)	8 (42,10%)	1 (5,26%)	1 (5,2%)	1 (5,2%)	0
3/60 - <1/10	0	2 (10,52%)	6 (31,57%)	5 (26,31%)	2 (10,52%)	0
>1/10 - <3/10	0	7 (36,84%)	5 (26,31%)	3 (15,78%)	2 (10,52%)	1 (5,26%)
3/10-7/10	0	2 (10,52%)	6 (31,57%)	8 (42,10%)	10 (52,63%)	7 (36,84%)
8/10 - 10/10	0	0	1 (5,26%)	2 (10,52%)	3 (15,78%)	11 (57,89%)
Total n (100%)	19 (100%)	19 (100%)	19 (100%)	19 (100%)	19 (100%)	19 (100%)

The table above found that the visual acuity before surgery was dominated by the visual acuity group < 3/60 and experienced a sharp increase in vision on the 30th postoperative day as much as 52.36% in the visual acuity group 3/10 – 7/10. Then it is improved in the third month, which increased to 57,89% in the visual acuity group 8/10 -10/10.

Table 4. Complications in 3 Months After Surgery

Complication	n (%)
None	47,36%
Surgical Induced Astigmatism (SIA)	52,63 %

52,63% of patients had astigmatism induced by surgical complications in the 19 samples studied after secondary lens insertion.

Table 5. Astigmatism Before and After Suture Removal

	Before	After
Range	-0,5 to -5,0 D	-0,5 to -3,0 D
Mean ± SD	-2,25 D ± 1,28	-1,25 D ± 0,82

The mean astigmatism after sutures removal is reduced from -2,25 D to -1,25 D.

Discussion

Lens implantation was performed at 49-76 years, with an average patient age of 59.05 years. The average result is that old age is associated with a greater incidence of cataracts, so many patients undergo cataract surgery and some experience complications such as aphakia. Based on gender data on aphakia patients obtained from this study, 57.90% were male. These results were also obtained in the 2017 study by Toro et al., men dominated 57%(3). From this study, there was no mention of a relationship between the incidence of aphakia and gender. The most common cause of aphakia in this study was complications from cataract surgery, with a percentage of 89,46%. This is supported by the research results by Patrycia & Knoch in 2016 at Cicendo Eye Hospital, cataracts caused 78.4% of aphakia patients(4).

In three months of follow-up, there was an increase visual acuity from preoperative uncorrected visual acuity <3/60 to 8/10 – 10/10 group, 57,89% of eyes. The highest percentage in the visual acuity group <3/60 in preoperative IOL implantation was also found in a study by Sudjana in 2020 at Cicendo Eye Hospital Bandung, as much as 92.31%(5). The same results were also obtained at Cicendo Eye Hospital, a sharp increase in uncorrected visual acuity in 98.15% (n=53) eyes with retropupil iris-claw intraocular lens inserted were due to a more physiological lens implantation site, close to the visual midpoint of the eye resulting in refraction. which is good, and the procedure does not tend to be too much manipulation(2). Choragiewicz's 2016 study said that theoretically, with minimal complications, good visual acuity would result. Observation on the installation of the iris-claw lens, 63% of the 30 patients observed a sharp correction of vision far more than 0.5. Although there is a complication of iris abnormalities in the form of ovalization that occurs during observation, it does not affect the visual acuity(6).

Retropupillary IOL implantation may be indicated in patients who have an adequate iris. By attaching the lens to the midpheriphery of the iris, complications related to IOL size and anterior chamber angle can be avoided. Iris-claw retropupils may cause complications, such as oval pupils, discoloration of the iris, hyphema, secondary glaucoma, uveitis, and haptic LIO dislocation. However, this depends on the experience and skills of the operator (7).

In this study, 47.36% of patients had a history of astigmatism obtained from complications of previous surgery. At the end of the visual acuity evaluation, there were complications in the form of astigmatism after IOL implantation in 57.80% of patients with a range of -0.5 to -5 D and an average of -2.25 D. After removing the sutures, there was a sharp increase in vision and the mean decrease in astigmatism correction to -1.25 D. Corneal sutures were removed at 8-10 weeks post IOL implantation. Sugiarti et al in their study, found that a sharp decrease in vision could be due to the sutures being too tight and improving after the sutures were removed. In addition, one of the disadvantages of implanting a rigid PMMA lens is that it requires an incision size of about 5-6 mm, which can lead to surgically induced astigmatism (SIA). A 2017 study by Kristianslund, compared surgical astigmatism between two lens implantation techniques. The mean astigmatism was -2.00 0.51 D in the group of patients who underwent LIO replacement. In LIO implantation with a non-foldable lens in both the anterior and posterior chambers of the eye. Implantation requires a large incision and can cause astigmatism, especially in the corneal and limbal incisions(8). In a study by Choragiewicz on the implantation of the intraocular iris-claw lens, astigmatism results ranged from -0.25 to -5.5 D. In 72.8% of patients using the scleral tunnel incision technique, the astigmatism was below -1 D. Although the retropupil iris-claw technique is easy, other disadvantages of this method are that it is more expensive, the width of the incision and the sutures usually cause complications such as astigmatism(6). Iris-claw implantation, either prepupillary or retropupillary can be an effective and safe option with relatively simple placement and better clinical outcomes than scleral fixation or BMD(9).

The limitations of this study were the small sample and the different follow-up times between patients. The number of patients who came to the hospital decreased in 2020 during the COVID-19 pandemic. So further studies with a significant number of a sample are needed to provide more accurate research results.

Conclusion:

During the January-December 2020 period, visual acuity of secondary intraocular lens implantation of retropupillary iris claw had a good visual acuity outcome and minimal complication in aphakia patients with inadequate lens capsule. Retropupillary iris-claw IOL implantation technique is one of the most effective techniques, because of its location according to the physiology of the lens.

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