

ORIGINAL ARTICLE

**SUTURELESS SCLERAL FIXATION OF INTRAOCULAR LENS
IN APHAKIA: CHARACTERISTICS AND VISUAL OUTCOMES****Fatkhati Saida Rahma¹, Firman S. W.², Angela Nurini A², Tri Wahyu W², Supanji², M. Bayu Sasongko²**¹Ophthalmology Resident Faculty of Medicine, Public Health, and Nursing, Gadjah Mada University²Department of Ophthalmology, Faculty of Medicine, Public Health, and Nursing, Gadjah Mada University
Email: fatkhatissaidarahma@gmail.com**ABSTRACT**

Introduction & Objective: Sutureless scleral fixation surgery is one of the secondary intraocular lens (IOL) implantation procedures for aphakic patients with absent or deficient capsular bag support that has gained more attention these days. This study aimed to describe the characteristics, indications for and visual outcomes of the patient who had undergone scleral fixation of intraocular lens at Sardjito Hospital.

Methods: A retrospective cross-sectional study of 43 eyes that undergone sutureless scleral fixation intraocular lens at Sardjito Hospital, Yogyakarta. The data were collected from electronic medical records of the patient from October 2020 to December 2022. The data was analysed descriptively by presenting number and percentage for categorical variables and mean \pm standard deviation (SD) for numerical variables. Outcome include pre- and postoperative uncorrected visual acuity (UCVA).

Results: There were 43 eyes obtained from 40 patients who underwent scleral-fixation intraocular lens in this study, consisting of 35 males (79,55%) and 9 females (20,45%). The mean age of the subjects was 50.04 ± 19.2 years. Lens subluxation was the most of indication for surgery (32,56%), followed by intraocular lens luxation (20,93%), dropped nucleus (16,28%), lens luxation (16,28%), intraocular lens decentration (9,30%), and endophthalmitis (4,65%). Before surgery, most of the patients had visual acuity of less than 3/60 (81,4%) and after surgery, 32,56% had $\geq 6/18$, 34,88% had $< 6/18-6/60$ and 18,60% had $< 6/60-3/60$.

Conclusion: The characteristics of patient who underwent scleral fixation intraocular lens in Sardjito Hospital was predominantly male and diagnosed with lens subluxation. There were enhancement in visual outcomes.

Keyword: scleral fixation, aphakia, intraocular lens, indication, visual outcome

INTRODUCTION

Aphakia is a condition in which the eye's crystalline lens has been surgically removed, injured perforatorily, is congenitally abnormal, or has been dislocated. It results in anisometropia, severe hyperopia, and accommodation loss.¹ Aphakia can be treated surgically or conservatively (with glasses or contact lenses).³ It is becoming more and more common to repair aphakia without capsular support, partly as a result of the present rise in intraocular lens (IOL) dislocation cases. The anterior chamber implant (with angled or iris-claw support on the anterior surface of the iris), fixation to the posterior surface of the iris (with iris-claw or suture), or fixation to the sclera (with or without suture) are all options for this challenging surgical problem. Each technique has its benefits, drawbacks, and issues.⁴ Angle-fixed anterior chamber

IOLs are no longer recommended because of the increased risk of hyphema, secondary glaucoma, and corneal endothelium decompensation. Instead, scleral-fixated or iris-fixated IOLs are used.⁵

Implanting a scleral-fixated intraocular lens (SFIOL) is unquestionably a crucial procedure when there is no zonular or capsular support. The method has undergone multiple successful revisions over the past 20 years, piquing the keen interest of ophthalmic surgeons. The haptics are either fixed to the sclera using sutures or are merely tucked into scleral pockets to maintain the stability and centration of the intraocular lens (IOL). In the past ten years, a progressive shift toward sutureless fixation has gained widespread acceptance.⁶ Sutureless scleral fixation surgery is one of the secondary intraocular lens (IOL) implantation procedures for aphakic patients with absent or deficient capsular bag support that is being increasingly performed these days.

Epidemiological data regarding the sutureless scleral fixation intraocular lens surgery is still limited. Therefore, there is need for more sources of information on the profiles of patients who had underwent sutureless scleral fixation intraocular lens in order to better understand patients characteristics. This study aimed to describe the characteristics, indications for and visual outcomes of the patient who had undergone scleral fixation of intaocular lens at Sardjito Hospital.

METHODS

This study used a retrospective descriptive design. The study included 43 eyes of 40 patients who underwent sutureless scleral fixation of IOL during October 2020 to December 2022 at , Sardjito Hospital. All patients were selected from Vitreo-Retina department. The data were obtained from medical records, including age at presentation, sex, diagnose indication, visual acuity before surgery and uncorrected visual acuity one months after operative procedure.

The patients were in 13-80 year age group. There were 30 eyes who performed sutureless scleral fixation in aphakic conditions with a history of lens subluxation, lens luxation, dropped nucleus, intraocular lens decentration, intraocular lens luxation, and endophthalmitis. Besides that there were 13 other eyes with lens subluxation, intraocular lens decentration, and intraocular lens luxation.

Uncorrected visual acuity was measured with a decimal visual acuity chart. The data was analysed descriptively by presenting number and percentage for categorical variables and mean \pm standard deviation (SD) for numerical variables. This study used secondary data in the form

of medical records. The exclusion criteria were medical records with incomplete data and aphakia patients whose diagnosis history was unknown.

RESULTS

The characteristics of 43 patients who underwent sutureless scleral fixation of IOL included in this study shown in Table 1. The patients had a mean age of 50.04 ± 19.2 years old. Minimum age of the patient's included was 13 years while the maximum age was 80 years. In our study most of the patients were males. Out of 43, there were 35 (79,55%) males patients and 9 (20,45%) female patients. There were different indications for sutureless scleral fixation of IOL. Lens subluxation was the most of indication for surgery (32,56%), followed by intraocular lens luxation (20,93%), dropped nucleus (16,28%), lens luxation (16,28%), intraocular lens decentration (9,30%), and endophthalmitis (4,65%).

Table 1: Patient's Characteristics

Characteristics	
Age (years)	
Mean	50.04 ± 19.2
Gender	
Male	35 (79.55%)
Female	9 (20.45%)

Table 2: Indications of Surgery

Indications	
Lens Subluxation	14 (32,56%)
Intraocular Lens Luxation	9 (20,93%)
Dropped Nucleus	7 (16,28%)
Lens Luxation	7 (16,28%)
Intraocular Lens Decentration	4 (9,30%)
Endophthalmitis	2 (4,65%)

Most of the eyes 14/43 (32,56%) had visual acuities of UCVA 6/18 or better. Comparison of visual acuities before and after surgery is shown in Table 3.

Table 3: Visual Acuity Before and After Surgery

Visual Acuity	Before Surgery	After Surgery
≥ 6/18	0 (0%)	14 (32,56%)
<6/18 - 6/60	5 (11,63%)	15 (34,88%)
<6/60 - 3/60	3 (6,98%)	8 (18,60%)
<3/60 - 1/60	20 (46,51%)	2 (4,65%)
<1/60 - LP	15 (34,88%)	2 (4,65%)
NLP	0 (0%)	0 (0%)

Note: LP, light perception; NLP, no light perception.

DISCUSSION

In cases with aphakia, optical correction is a crucial part of visual rehabilitation. Each method of IOL attachment has benefits and drawbacks. The surgeon's skill will determine whether to utilize IOLs that are iris- or scleral-fixed. At various follow-up times, the visual outcome in both forms of IOL fixation is comparable, although long-term prospective studies are needed to validate this. There are inherent problems with each of these approaches. Iris erosion, pigment dispersion, corectopia, hyphema, IOL subluxation, cystoid macular edema, chronic uveitis, and secondary glaucoma are all linked to iris-fixated IOLs, either anteriorly or posteriorly. Scleral-fixated IOLs, whether they are sutured or not, are also linked to the following issues: vitreous hemorrhage, haptic exposure, retinal detachment, scleral thinning, and IOL tilting and/or dislocation.³

In circumstances where there is no or insufficient support for the capsular bag, stitching the IOL haptics to the scleral wall has provided us with a good alternative for the past 20 years. The hazards associated with this method are nonetheless distinct. The questionable structural integrity and long-term stability of the suture materials utilized in such surgeries are among the most significant worries. Moreover, complicated operative technical skills, which may rely on the abilities of the individual surgeon, are needed for scleral suturing. Similar difficulties arise when iris fixed lenses are used when there is adequate capsule support; they are not the best option when the iris diaphragm is not intact. They may cause secondary intraocular inflammation and iris chafing, followed by cystoid macular edema (CME). Sutureless intrascleral posterior chamber haptic IOL fixation has recently been proposed as an alternative to IOL implantation in bags in complex instances. The lens haptics are imprisoned permanently inside the scleral tunnels using the sutureless approach. The control of a closed-eye system surgery and the post-operation axial stability of the IOL are combined by this haptic fixation approach into previously created scleral tunnels.⁷

Characteristics consideration shows that patients who underwent sutureless scleral

fixation of IOL is predominantly seen in older people seen in this study with a mean age of 50 years. Previous studies have also found that the incidence of aphakia is higher in older age⁹. A Study in Turkey and Miami on the demographics of patients who underwent iol exchange were predominantly male.^{8,13} This result is consistent with our study, which had more males (79.55%) than females (20.45%). But this contrasts with the study by Munir et al that many patients who undergone sutureless scleral fixation of IOL is predominantly are female.¹⁵

Lens subluxation (32,56%), intraocular lens luxation (20,93%), dropped nucleus (16,28%), lens luxation (16,28%), intraocular lens decentration (9,30%), and endophthalmitis (4,65%) is several indication for surgery. This study is consistent with that of Patel et al. (2023), who found that IOL dislocation (n=285, 46.6%), IOL subluxation (n=52, 8.5%), UGH (n=35, 5.7%), refractive error (n=24, 3.9%), broken haptic (n=22, 3.6%), and corneal edema (n=18, 3.0%) were the most frequent precipitating reasons for exchange. This finding was similar to the current study that reported dislocation, followed by subluxation, as the most frequent indication for IOL exchange. While practice patterns have changed over time, explanations may include the inadequate support of the intraocular lens by the capsular bag or ciliary sulcus due to the operation or prior pathology, poor IOL fixation, or zonular rupture. Another common reason for IOL exchanges in the current study included subjective visual complaints following initial lens placement.⁸

In contrast to eyeglasses or contact lenses, intraocular lens (IOL) implantation to treat aphakia offers good visual rehabilitation. Anterior chamber lenses, iris fixated lenses, and scleral fixated intra ocular lenses may be options when there is insufficient capsular support. The risk of various complications, including corneal endothelial damage, harm to the anterior chamber angle structure, pupillary block glaucoma, hyphema, uveitis, iris chafing, dislocation, and pseudo phacodonesis, is lower when IOLs are implanted in the posterior chamber as opposed to the anterior or iris fixed lenses. The risk of problems like iritis, cystoid macular edema (CME), and retinal detachment may be reduced by positioning the lens anterior to the vitreous face, closer to the rotational center of the eye. This may lessen the centrifugal forces on the lens and stabilize the ocular contents. The enhanced optical qualities of the lens in this position are another benefit of placing the lens closer to the nodal point and center of the eye. There are two surgical methods: Ab-externo (from the outside in) and Ab-interno (from the inside out). The more difficult and blind Ab-interno approach involves passing the needle through the sclera from the inside of the eye to the outside. The Ab-externo procedure entails passing a needle through the sclera from the exterior to the interior of the eye. Scleral fixation of the IOL in the ciliary sulcus can be more precisely accomplished using the Ab-externo

technique. The surgeon's perspective is never blocked using this technique. The iris plane is where all manipulation takes place. Thus, the surgeon can lower the chance of vitreous bleeding. by avoiding the potential suture placement errors that are intrinsic to the Ab-interno procedure, retinal detachment, and lens malposition.⁹

This study also found that most of the eyes 14/43 (32,56%) had visual acuities of UCVA 6/18 or better, but there is 2 patient who still had visual acuities of UCVA <1/60 – LP after surgery. The findings of this study are consistent with those of Sidiropoulos et al.'s research from 2022, which found that overall visual acuity had improved statistically and that all cases had acceptable refractive outcomes.¹⁰ This study is also in accordance with the research of Reddy et al. (2016) which shows the most of the Eyes 21/30 (70%) had visual acuities of BCVA 6/12 or better.⁹ Transient ocular hypertension (4%-12.4%), IOL dislocation (0-12%), hyphema (4.0-9.7%), vitreous hemorrhage (0-12.2%), serous choroidal detachment (1.3-2.7%), IOL capture within uveal tissue (0-8.6%), cystoid macular edema (0-6.9%), retinal detachment (0-2%), and anterior uveitis (1.1-5.4%) and transient hypotony (9.5%) are complications that may occur from this operating procedure.¹⁰ Due to their lack of suture-related problems, technical simplicity, and superior functional results, sutureless scleral fixation procedures have garnered particular attention.¹¹ In summary, IOL exchange was generally successful when used, with acceptable visual and refractive results.

CONCLUSION

Sutureless scleral fixation surgery is one of the secondary intraocular lens (IOL) implantation procedures for aphakic patients that has gained more attention these days. The characteristics of patient who underwent scleral fixation intraocular lens in Sardjito Hospital was predominantly male and diagnosed with lens subluxation. The patients had a mean age of 50.04 ± 19.2 years old. There were enhancement in visual outcomes.

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