Original Article

Visual Outcome after Scleral Fixated Intraocular Lens (SFIOLs) Implantation

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Abstract

Background: To investigate the visual results and problems after scleral fixed intraocular lenses (SFIOLs) implantation. **Material and Methods:** The proposed prospective clinical study was conducted on 30 patients with aphakia who attended the OPD of the ophthalmology department, Government Medical College, Jammu, for one year. **Results:** A group of thirty patients was selected for this study, of which 19 patients (63.3%) were males and 11 (36.7%) were females. The mean patient age was 50±2.3 years. In 15 (50%) patients, surgery was done on the right eye, and in the other 15 (50%) patients, it was done on the left eye. The majority of the patients presented with postsurgical aphakia (73.3%), followed by post-traumatic subluxation of the lens (16.7%). On the first 1st postoperative day, 6.7% of the cases had visual acuity 6/36, 30% had 6/60, and the rest had below 6/60. 6.7% of patients had visual acuity 6/24 at the first week, 30% had visual acuity of 6/36, 46.7% had visual acuity of 6/60, and 16.7% had visual acuity of less than 6/60. At the first postoperative month, 90% of individuals had the best corrected visual acuity between 6/24 and 6/60, and 10% of cases had the highest corrected visual acuity between 6/6 and 6/18. The best corrected visual acuity at the third postoperative month was 6/12 in 16.7% of patients, 6/18 in 26.7%, 6/24 in 30%, 6/36 in 20%, and 6/60 in 6.7% of cases. A few individuals had uveitis and striated keratopathy, which went away in a few weeks. The most frequent surgical complication, seen in 4 patients (13.3%), was astigmatism (>1D). One patient (3.3%) had suture exposure. There were no instances of suture breakdown. Additionally, endopthalmitis and retinal detachment were not reported. The IOP did not significantly increase. **Conclusion:** Current research concludes that implantation of a scleral fixed intraocular lens (SFIOL) is a safe, practical, and successful method for correcting aphakia in patients with insufficient capsular support, lens subluxation or dislocation, iris injury, aniridia, and aberrant angles.

Keywords: Aphakia, Subluxation, Visual acuity.

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Introduction

One common therapy for aphakia is the secondary implantation of scleral fixed intraocular lenses, or SFIOLs. Cataract surgery has become one of the safest and most satisfying surgical procedures in the current age of phacoemulsification and enhanced surgical instruments, with high expectations from the patient. However, every operation has limits, and structural or technological issues sometimes prevent the IOL from being implanted during the initial treatment. The lens should ideally be positioned in the capsular bag (also known as a posterior chamber intraocular lens), which provides firm fixation at the location closest to the eye's nodal point. Nevertheless, there are situations in which this capsular support is insufficient or unavailable. Since it is often unacceptable to treat aphakia with spectacles, scleral fixed IOLs continue to be the most successful method.[1]

Loss of lens capsular support could be caused by trauma or previous ocular surgery: intracapsular cataract extraction, capsular rupture that occurred during phacoemulsification or epinucleus aspiration, excessive vitreous loss, or total lens removal during vitrectomy, which finally leads to aphakia.[2]

Scleral fixated IOLs are considered the procedure of choice in:

1. Traumatic aphakia
2. Surgical aphakia
3. Subluxated lens
4. Marfan's syndrome, homocystinuria, familial ectopia lentis, Aniridia, and Ehlers-Danlos syndrome.
5. Lost zonular support as in hypermature cataract
6. Congenital absence of lens (rubella syndrome and Peter's anomaly).

Various modalities are used for correcting aphakia, which include:

1) Spectacles 2) contact lenses 3) intraocular lens 4) refractive corneal surgeries

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Aphakic spectacles are the safest approach but there are certain disadvantages like:

Image magnification, prismatic and peripheral aberrational effects, jack-in-the-box phenomenon, pin-cushion effect, and impaired distance judgment. Also, lenses are heavy and uncomfortable.[3] Also, contact lens wear is limited by high cost, lens sterilization, and cumbersome, especially in children, old patients with arthritis, and tremors.[4] They cause variety of insults to cornea and conjunctiva including oedema, microcysts, abrasions, superficial punctate keratitis, neovascularization to microbial keratitis and various allergic conjunctivitis.

The most effective treatment for aphakia is intraocular lens implantation. As a result, it is now the most often used modality. Aphakic patients undergo secondary IOL implantation. Commonly used IOLs are:

1. Scleral-fixated posterior chamber intraocular lenses. (SFIOL)
2. Peripheral iris-fixated posterior chamber intraocular lenses. (IFIOL)
3. Anterior chamber intraocular lenses. (ACIOL).

ACIOLs are relatively easy to use both in primary and secondary implantation. However, they are infrequently used now due to the high risk of corneal decompensation, pseudophakic bullous keratopathy, iris atrophy, pupil ectopia, secondary glaucoma, severe uveitis, hyphaema, and UGH syndrome.[5]

IFIOLs were introduced by.[6] They provide several benefits, including increased stability, decreased lens tilt, and reduced glare. They are fixed to the iris's front or posterior surface in the anterior chamber.

Numerous problems are linked, including corneal oedema, the creation of posterior synechiae, excessive iris damage, sphincter damage, endothelial decompensation, uveitis, and pseudophacodonesis. Implanting a scleral fixed posterior chamber intraocular lens (SFIOL) is a successful treatment for aphakia, particularly in patients with glaucoma, corneal illness, iris tissue destruction, aberrant angles, or no capsular support.

IOL placement in P/C lowers several issues with ACIOL and IFIOL implantation. Additionally, placing the lens just in front of the vitreous face, closer to the eye's rotational centre, may lessen centrifugal forces on the lens and stabilise the contents of the eye, lowering the risk of complications like retinal detachment, iris, and cystoid macular oedema (CME).[7] Parry was the first to develop suture-fixed IOLs in the 1950s. Malbran et al. were the first to report the implantation of SFIOLs in aphakic eyes after ICCE.[8]

Aim and Objectives

This study has been taken to study

1. The visual outcome after scleral fixated intraocular lens (SFIOLs) implantation.
2. Complications after scleral fixated intraocular lens (SFIOLs) implantation.

Materials and Methods

The proposed prospective clinical study was conducted on patients with aphakia attending the Outpatient Department of Ophthalmology, Government Medical College, Jammu, for one year.

The ethics committee approved the aforementioned research. Every patient recruited for the trial gave informed permission.

Inclusion criteria

1. Complicated cataract surgery with posterior capsular dehiscence.
2. Post-Intracapsular cataract extraction aphakia.
3. Traumatic or congenital subluxation/dislocation of crystalline cataractous lens.
4. Patients of either sex.

Exclusion criteria

1. Patients with coexisting glaucoma, uveitis, corneal opacity, and corneal dystrophy.
2. Patients with posterior segment pathology

The study was carried out as follows: Relevant medical history and a thorough history of vision impairment were documented. According to the included proforma, patients had a thorough general physical and a rigorous ocular examination. Preoperative topical and oral antibiotic drops were given one day before surgery.

Mydriasis was achieved using topical 0.8% tropicamide and 5% Phenylephrine, and 4% xylocaine was instilled topically.

All patients were operated on using a peribulbar block.

The eye planned for surgery was cleaned and draped.

Surgical technique

After placing a wire speculum, a conjunctival peritomy was done from 11 to 1 o'clock and at 3 and 9 o'clock positions. Two partial-thickness scleral flaps measuring 3 mm long at 3 and 9 o'clock positions were dissected [Figure 1]. A 6 mm Sclerocorneal tunnel was made superiorly at the 12 O'clock, and the anterior chamber (AC) was entered through a 3.2 mm keratome. Anterior vitrectomy was performed. [Figure 2]

The straight needle of 10-0 polypropylene suture [Figure 3] was placed through the 9 o'clock sclera bed, and a 26-gauge needle was inserted through the 3 o'clock scleral bed. The straight needle and the 26 G needle were advanced towards each other, and the former was docked into the lumen of the 26 G needle, which was retrieved from the temporal scleral Bed [Figure 4].

A loop of this suture was hooked out, cut, and divided into two and securely tied to the superior & inferior haptics of the Lens. The lens was placed, and sutures were sutured and buried under the scleral flaps. Scleral flaps were reposited, and the conjunctiva was closed with 10-0 Vicryl. [Figure 5]

Follow up

All patients were followed up on 1st post op day, 1st week, 1st month, and on 3rd month for visual acuity, refraction, and complete eye examination using slit lamp and direct Ophthalmoscopy.

Results

The mean age of patients was 50±2.3 years. The majority of patients who underwent surgery were in the 51 to 60 age group (36.6%).

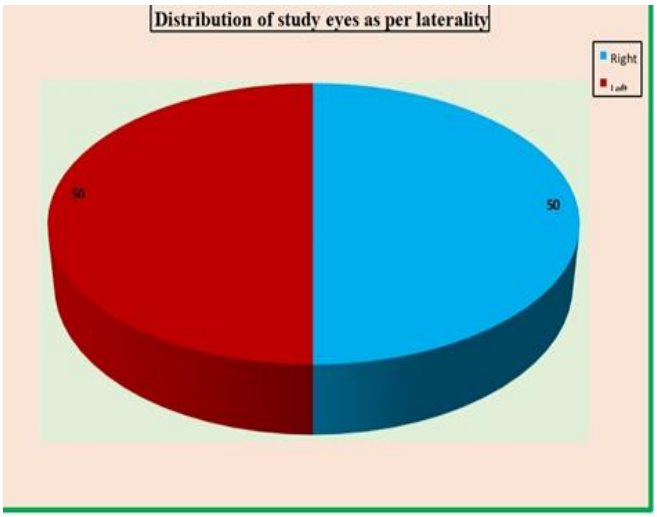
Table 1: Age distribution of study patients

Age (years)	Frequency	Percentage
41–50	8	26.7%
51–60	11	36.7%
61–70	7	23.3%
71–80	4	13.3%
Total	30	100.0%

Table 2: Gender distribution of patients

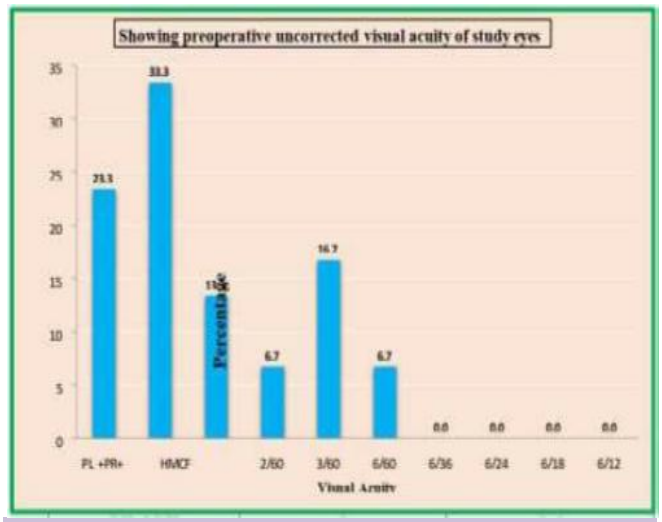
Gender	Frequency	Percentage
Male	19	63.3%
Female	11	36.7%
Total	30	100.0%

Of 30 patients, 19 (63.33%) were males and 11 (36.7%) were females.



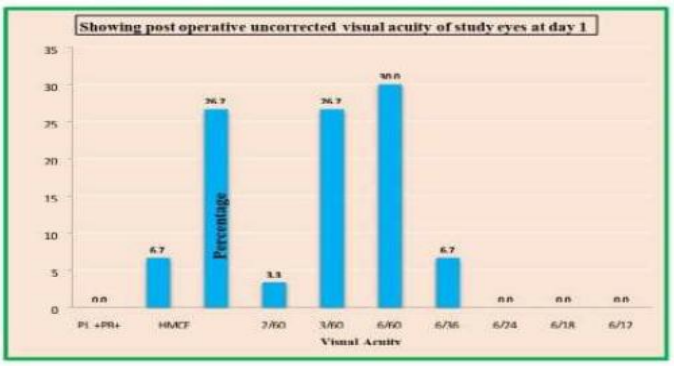
Distribution of patients according to affected eye

Both the eyes were equally affected (50%-right eyes, 50% left eyes)

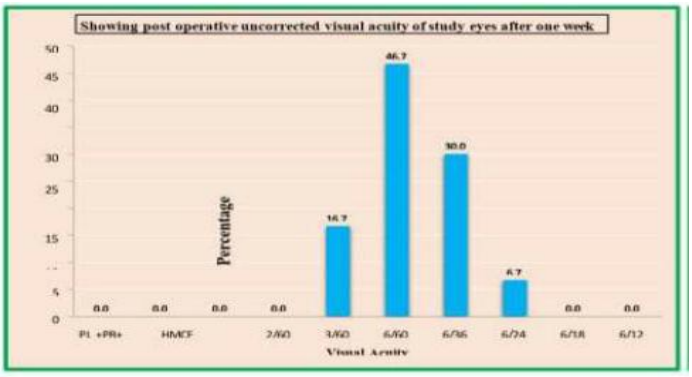


Preoperative uncorrected visual acuity

On presentation 2 patients (6.7%) had visual acuity of 6/60 and 28 patients (93.3%) had visual acuity below 1/60

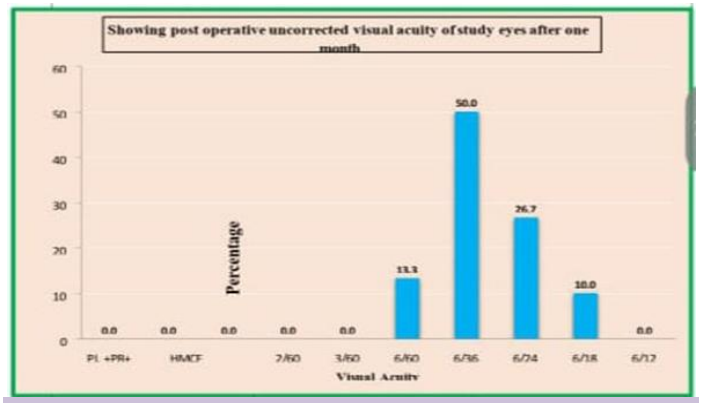


Postoperative uncorrected visual acuity day 1



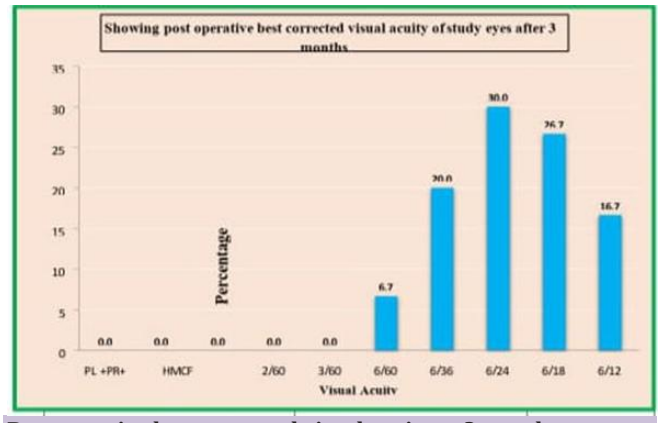
Postoperative uncorrected visual acuity at 1 week

At 1stweek 6.7% cases had visual acuity of 6/24, 30% cases had visual acuity of 6/36,46.7% patients had visual acuity of 6/60 and 16.7 below 6/60



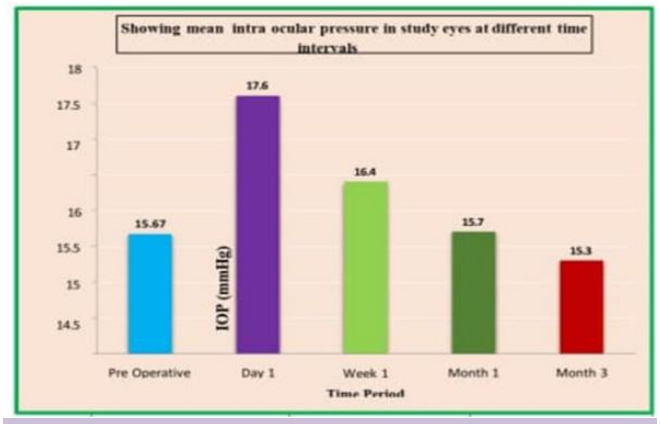
Postoperative best corrected visual acuity at 1 month.

At 1st postoperative month 10% cases had best corrected visual acuity within range of 6/6 - 6/18 and 90% cases had best corrected visual acuity within range of 6/24 - 6/60



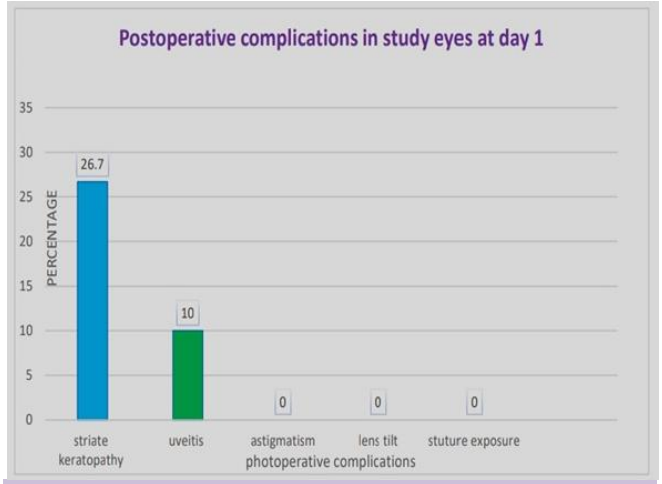
Postoperative best corrected visual acuity at 3 months.

At 3rd postoperative month final best corrected visual acuity was 6/12 in 16.7% cases, 6/18 in 26.7% cases, 6/24 in 30% cases, 6/36 in 20% cases and 6/60 in 6.7% cases



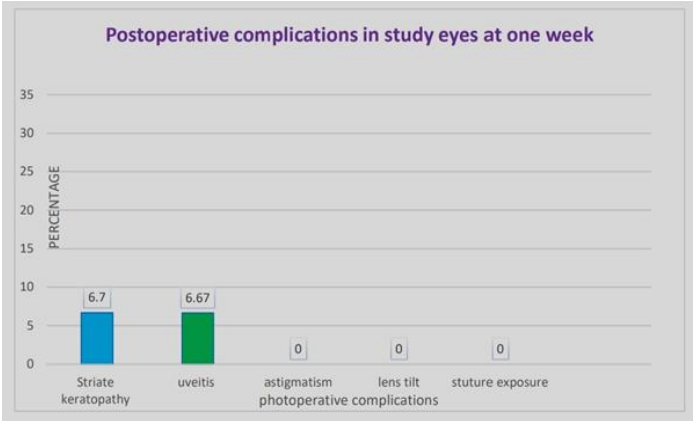
Comparison of intraocular pressure between the different time intervals.

There was no significant rise in IOP



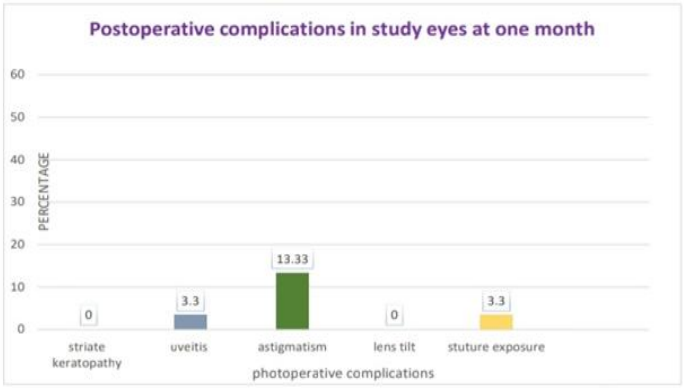
Postoperative day 1 complications.

At 1st postoperative day striate keratopathy was most common postoperative complication seen in 8 (26.6%) patients, followed by uveitis in 3 (10%) patients.



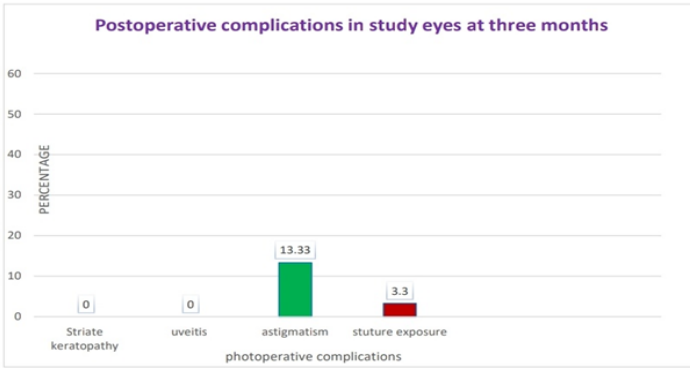
Postoperative week 1 complications

At 1st postoperative week uveitis was present in 2 (6.7%) patients and striate keratopathy was seen in only in 2 (6.7%)



Postoperative month 1 complications

At 1st postoperative month astigmatism(> 1 D) was most common postoperative complication seen in4(13.33%) patients. Persistent uveitis was seen in 1(3.3%) patient and also suture exposure was seen in 1 (3.3%) patient.



Postoperative month 1 complications

At 3rd postoperative month astigmatism(> 1 D) was seen in 4(13.33%) patients and suture exposure in 1 (3.3%) patient.

Figure 1: Two partial thickness scleral flaps were made

Figure 2: Anterior vitrectomy was performed

Figure 3: 10-0 polypropylene suture

Figure 4: The straight needle and the 26 G needle inside AC

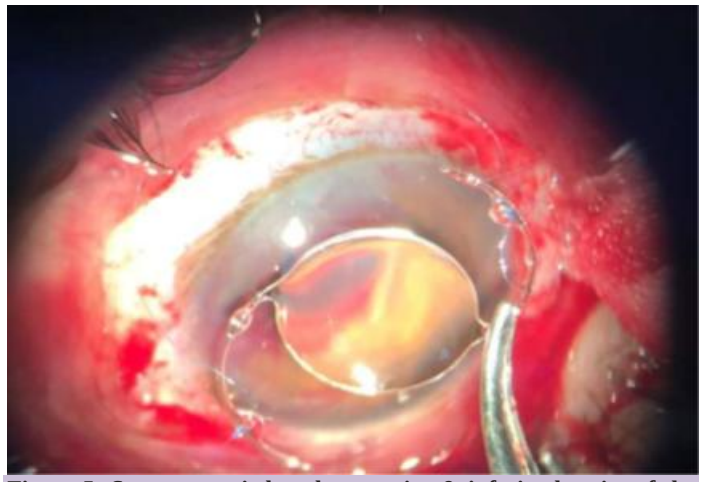


Figure 5: Suture was tied to the superior & inferior haptics of the Lens

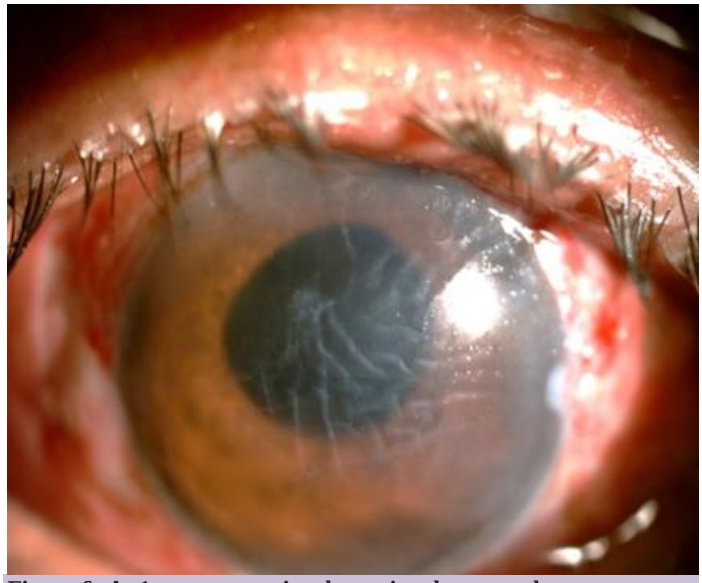


Figure 6: At 1st postoperative day striate keratopathy

Discussion

This study included 30 patients, most presenting with postsurgical aphakia (73.3%). In this study, there is a significant improvement in best corrected visual acuity, which was 6/12 in 16.7% cases, 6/18 in 26.7% cases, 6/24 in 30% cases, 6/36 in 20% cases, and 6/60 in 6.7% cases (p=0.016).Our results are similar to Saxena D and Patel C's (2016) study, in which 40% patients had final postoperative visual acuity between 6/12 and 6/9, 36% patients had visual acuity of 6/18 to 6/60, and 24% patients had visual acuity of <6/60(1). Similar results were seen in Rahman A et al. (2011) study, in which best corrected visual acuity improved in 29 (96.7%) patients while 26 (86.7%) patients showed BCVA 6/12 or better.[9] Similarly Reddy JML (2016) reported that 18 eyes (60%) had visual acuities of 6/12 or better.[7] Also, in the study by Obeng FK et al. (2017), 95.27% of eyes showed improvement in visual acuity.[3] Vote BJ et al. (2006) reported that final mean visual acuity remained at preoperative levels, and results didn't reach significance (p=.211).[10] This is contrary to our study, where improvement in postoperative visual acuity is statistically significant.

According to Kokame GT et al. (2018), 58.5% of patients improved their visual acuity, whereas 24.6% saw a steady improvement and 16.9% saw a decline. All patients in our research improved their preoperative uncorrected visual acuity. In contrast, 26 patients (86.67%) improved their preoperative best corrected visual acuity, and the remaining four patients (13.33%) remained constant.[11]

At 1st postoperative day, striate keratopathy was the most common postoperative complication seen in 8 (26.6%) patients, followed by uveitis in 3 (10%) patients, which resolved later within a few weeks. At 1st postoperative month, astigmatism (> 1 D) was the most common postoperative complication seen in 4(13.33%) patients. Persistent uveitis was seen in 1(3.3%) patient, and suture exposure was seen in 1 (3.3%) patient. No reports of suture breakage were obtained. Also, there were no reports of endophthalmitis and retinal detachment. There was no significant rise in IOP. The most frequent postoperative complication, according to Rahman A et al., (2011), was astigmatism, which was observed in 7 (23.3%) of the patients, followed by uveitis in 5 (16.7%), cystoid macular oedema in 3 (10%), hyphaema in 2 (6.7%), suture erosion in 2 (6.7%), and IOL decentration in 1 (3.3%).[9] Striate keratopathy affected 25% of patients, uveitis 33.33%, and cystoid macular oedema 8.33%, according to Panditrao K and Naik RR (2016).[4] According to Reddy JML (2016), astigmatism (52.8%) and transient uveitis (3%) were the most frequent postoperative complications in their series, which is consistent with the findings of our investigation.[7]

A big corneal incision, tight sutures, or tilt or decentration of the IOL brought on astigmatism. According to Bhutto IA et al. (2013), the most frequent postoperative complication was astigmatism in 30% of patients, followed by uveitis in 10% and exposed sutures in 16.7% of cases.[12] According to Vote BJ et al. (2006), suture breakage was the most frequent complication in their sample, and this number rose with longer follow-up.[10] Our investigation did not find any instances of suture breakdown.

Conclusion

The current research thus concludes that implantation of a scleral fixed intraocular lens (SFIOL) is a safe, practical, and successful method for correcting aphakia in patients with iris injury, aniridia, subluxation or dislocation of the lens, and aberrant angles. Positive postoperative outcomes with few complications were seen. A significant increase in visual acuity was seen. A few weeks after the procedure, minor side effects disappeared, including uveitis and striate keratopathy.

Limitations of the study

A longer follow-up period is necessary to evaluate long-term postoperative problems, such as suture-related issues. Due to the tiny sample size, many of the parameters assessed were not statistically significant.

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Nil.

Conflicts of interest

There are no conflicts of interest.

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