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Original Research Article

Clinical outcome in patients with 4- point scleral fixated intraocular lens: Our experience

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ABSTRACT

Background: Visual rehabilitation following cataract surgery with compromised capsular bag includes various options like anterior chamber (ACIOL), fixation to the iris (Iris claw IOL), or fixation to the sclera (SFIOL), as a primary or secondary procedure. We studied the clinical outcome in patients who underwent 4- point fixation of SFIOLs.

Materials and Methods: Retrospective data analysis of fourteen patients who underwent sclera fixated intraocular lens implantation from 2016 to 2018 at our institute under standard operative conditions was done.

Results: The postoperative vision by three months ranged from LogMAR 1.0 – 0.2, out of fourteen patients, BCVA in 60 % of the patients ranged from LogMAR 0.3-0.2 which was maintained at six months follow up with minimal complications.

Conclusion: 4- point fixation of scleral fixated IOL is a good option with favourable outcome, in aphakics who are not ideal candidates for iris claw lens.

1. Introduction

Visual rehabilitation following cataract surgery includes primary implantation of 'in the bag' intraocular lens (IOL). Despite the safety and efficacy of cataract surgery, intraoperative complications can hamper the ability to place an intraocular lens (IOL) in the capsular bag. Medical management of aphakia used to be commonplace but these techniques have their disadvantages including thick bulky lenses, poor cosmesis, and aniseikonia. Surgical management of aphakia overcomes these disadvantages and offers patients the possibility of a spectacle and contact lens-free lifestyle.[1] In patients with inadequate capsular support which precludes 'in the bag' placement, various options are available which include placement of IOL in the anterior chamber (ACIOL), fixation to the iris (Iris claw IOL), or fixation to the sclera (SFIOL), as a primary or secondary procedure.

Given the myriad choice of IOLs in the management of aphakia, with many comparative studies showing similar visual outcomes, the choice of IOL depends upon the operating surgeon. Other factors include IOL availability, adequacy of capsular support, coexistent nucleus or cortex drop, white to white diameter, and primary (i.e., at the time of cataract surgery) vs. secondary surgery (after previous surgery).[2]

SFIOL is preferred over iris claw IOL when normal iris pattern is lost as in cases of sphincterotomy, aniridia, dilated pupils post-surgery, iris atrophy. Advantages of SFIOL over ACIOL includes less corneal endothelial damage and secondary pupil block glaucoma.[3–5]

Whenever in the bag PCIOL cannot be implanted, SFIOLs provide a better ocular safety profile than ACIOLs

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or iris fixated IOLs as SF IOL is implanted in the sulcus region which is closer to the natural anatomic position of the crystalline lens and is safer for the corneal endothelium and iris.[6]

SFIOLs are the most widely used option globally for IOL implantation in the absence of capsular support, especially in young patients with a history of trauma or those with diabetes, guttate cornea, narrow anterior chamber, or post-penetrating keratoplasty.[7,8] SFIOLs are also more often considered in patients whose life expectancy is more than 10 years.[9]

Various techniques of fixation of SFIOL to the sclera are described in literature.[10] Each technique has its own advantages and disadvantages with varied clinical outcomes. We studied the clinical outcome in patients who underwent 4 point fixation of SFIOLs.

2. Aims and Objectives

To assess the visual outcome and complication profile following 4- point fixation of SFIOL implantation

3. Materials and Methods

A hospital based retrospective observational study was done wherein case records of all the patients who underwent surgery for SFIOL implantation during the period from May 2016 to June 2018 was analyzed. Medical records were retrieved using Hospital information system. All patients who underwent SFIOL as a primary or as a secondary procedure and who completed six months follow up were included in the study. Patients who had coexistent glaucoma, macular pathology, corneal degenerations were excluded from the study. All patients had undergone preoperative evaluation including: BCVA, IOP by Goldmann applanation tonometer, lacrimal sac syringing, slit lamp evaluation, slit lamp biomicroscopy. The etiological factors for aphakia were noted. Post-operative BCVA, IOP, slit lamp examination, slit lamp biomicroscopy were noted on post op day 1, day 7, day 30, 3 months and 6 months.

The technique of sclera fixation of IOL followed was as under. 3* 3 mm partial thickness sclera flaps were made at 3'0 and 9'0 clock position starting 1 mm from the limbus. First straight needle of double arm of 10-0 prolene (Aurolene, nonabsorbable surgical suture 0.2 metric, 20cm) was passed from 9'0clock scleral bed and externalised from 3'0clock bed using bent 26G needle and hand shake technique. The other needle of double arm was passed through the eye and exteriorised in the same manner, i.e from 9'0clock to 3'0clock. The two intraocular suture threads were externalised from 12'0clock main sclero-corneal tunnel (pre-existing or fresh), using McPhearson forceps. Care was taken to maintain adequate length of threads on either side of the scleral pockets. The two threads were cut in the middle using Vanna's scissors. Two cut ends of the suture were passed through the eyelet to secure the haptics of rigid PMMA sclera fixated IOL (Appasamy ocular devices pvt. Ltd. India/Gantec Corporation, USA). Multiple throws were taken on either side before finalising the knots. Then the IOL was gently implanted in situ with careful manoeuvring of the IOL and the sutures. Position of IOL was finalised after titrating for the tilt. Scleral flaps were closed with 8-0 vicryl (polyglactin). Main sclerocorneal tunnel was closed with 10-0 Ethilon (polyamide)

Table 1: Causes for aphakia

Cause	Number
Surgical aphakia	7
Trauma related	4
Marfans syndrome (subluxated lens)	1
Posterior subluxated PCIOL	1

4. Results

In our study the most common indication for SFIOL implantation was surgical aphakia (50%) followed by traumatic subluxation (28%), Marfan's syndrome, posterior subluxated PCIOL, pseudophakic bullous keratopathy with ACIOL.

The preoperative vision ranged from perception of light to LogMAR 1.0, the immediate post operative vision ranged from HMCF to LogMAR 0.5. The postoperative vision by three months ranged from LogMAR 1.0 – 0.2, out of fourteen patients, BCVA in 60% of the patients ranged from LogMAR 0.3-0.2 which was maintained at six months follow up.

In our study three patients showed mild decentration of IOL, however patient was asymptomatic requiring no further intervention and one patient had high IOP which was managed medically.

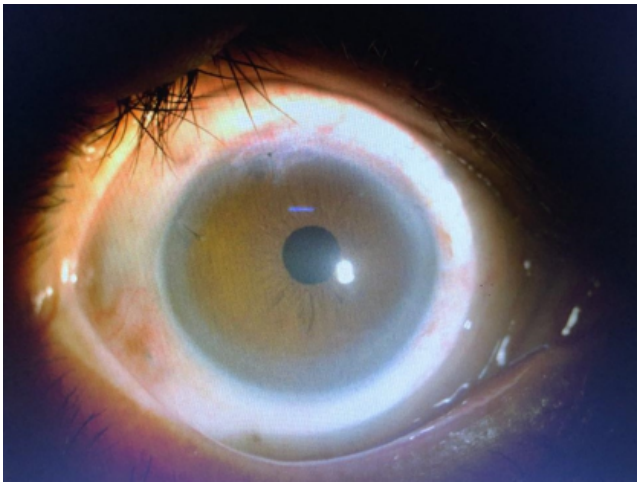

Figure 1: Post op picture showing good centration

Table 2: Pre-op and post op visual acuity

Preop UCVA (LogMAR)	Number (n)	Preop BCVA (LogMAR)	Number (n)	Post op BCVA (6 months) LogMAR	Number (n)
PL +(< 1.0)	3	<1.0	3	<1.0	4
HMCF (< 1.0)	3	1.0-0.8	5	1.0-0.8	4
1/60(< 1.0)	6	0.7-0.5	3	0.7-0.5	4
6/60(< 1.0)	2	0.3-0.2	3	0.3-0.2	2

Table 3: Complications

IOL decentraion	3
High IOP	1
Suture erosion	0
Late onset uveitis	0
Cystoid macular edema	0
Vitreous haemorrhage	0
Retinal detachment	0

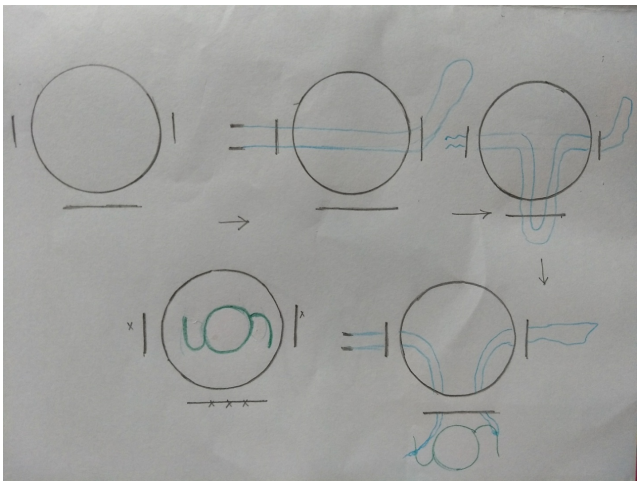

Figure 2: Technique of SFIOL fixation

5. Discussion

Uneventful cataract surgery is routinely followed by 'in the bag' placement of PCIOL. As the IOL is positioned within the lens capsule and well-centered to the pupillary axis, it maximises the visual outcome. However in the absence of adequate posterior capsular support, alternative surgical approach to place an IOL in the eye has to be planned to maximise the visual outcome.[11]

Compromised anterior and posterior capsular support can result from various conditions that can be broadly categorized into ocular trauma, inherent zonular weakness as in Marfan's syndrome, homocystinuria, pseudoexfoliation syndrome, advanced hypermature cataracts, or complicated cataract surgery.[12] Traumatic aphakia is often the result of absorption of the crystalline lens, subluxated, luxated or even expelled from the eye during the trauma. Surgical aphakia is caused by a complication during cataract surgery.

Surgical options for patients with inadequate capsular support include alternative placement in the anterior chamber (ACIOLs), fixation[12] to the iris, or fixation to the sclera (SFIOL). Each approach has its advantages and unique set of disadvantages. Scleral-fixated IOLs are indicated when there is no remnant capsule or iris. Patients with an intact iris would be candidates for ACIOL or Iris Fixated IOL placement. However, even in cases where placement of an ACIOL may be possible, SFIOL may be the preferred option if the patient has a shallow anterior chamber or corneal disease such as Fuch's dystrophy, corneal edema, or post corneal transplantation.[13,14]

Since scleral suturing of IOL was introduced, the technique has undergone modification to improve success rates and reduce the risk of complications. 2-point fixation of SFIOL means passing the sutures through the eyelets on each haptic before fixation to sclera. However, this lens has only two eyelets and thus may be susceptible[15] to lens tilt that can compromise the visual outcome. However lenses with four haptics, each with its own eyelet for suture passage will provide four-point stabilization, theoretically helping to reduce the risk of lens tilt and decentration.[16,17] In our study slight modification of suturing technique has been attempted to achieve 4- point fixation with a PMMA IOL with two eyelets. This technique of Four-point fixation minimizes the risk of lens tilt, and the lens can be centered in the eye easily by adjusting the tension on the two sutures. Caution to be taken to avoid excess stress on sutures as lens can bend or warp.

6. Conclusion

In our study it has been possible to achieve a fairly good visual outcome with minimal complications by slightly modifying the suturing technique so as to obtain 4- point fixation of scleral fixated IOL. A prospective study with a larger sample with longer post-operative follow up is

desirable and long term outcome needs to be studied.

7. Limitation of the Study

Our study is a retrospective of a small sample size and evaluates the outcome at the end of six month period.

8. Source of Funding

None.

9. Conflict of Interest

None.

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