Surgical outcomes and complications of sutured scleral fixated intraocular lenses in pediatric eyes

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ABSTRACT ●

Objective: To study the outcome and complications of sutured scleral fixated intraocular lenses (SSFIOL) in children.
Design: Retrospective study.
Subjects: A total of 279 eyes of 230 children who underwent SSFIOL at ≤18 years of age in a tertiary eye care centre in India.
Methods: Treatment-naive children having traumatic cataract or subluxated lens underwent a single-sitting lensectomy and pars plana vitrectomy (PPV), along with SSFIOL insertion. Children with aphakia underwent PPV with SSFIOL, and vitrectomized eyes underwent only SSFIOL implantation. Fixation of SSFIOL was done by the 4-point ab externo fixation technique using 10-0 prolene suture.
Main outcome measures: Preoperative and postoperative visual acuity, as well as intraoperative and postoperative complications.
Results: The mean age at which SSFIOL was performed was 10.8 ± 4.22 years. The most common indication of SSFIOL in our study was traumatic subluxation of lens (47.63%; n = 133 patients), followed by congenital subluxation in 38.7% (n = 108). Best-corrected visual acuity was maintained or improved from the preoperative visual acuity in 93.19% of eyes. The complications included choroidal detachment in 2.86% (n = 8), dispersed vitreous hemorrhage in 2.86% (n = 8), endophthalmitis in 0.72% (n = 2), raised intraocular pressure in 12.54% (n = 35), diplopia in 0.72% (n = 2), retinal detachment in 5.73% (n = 16), and dislocation of the SSFIOL in 4.6% (n = 13). The mean follow-up after SSFIOL implantation was 39.68 months.
Conclusions: SSFIOLs are effective in correcting aphakia in children; long-term follow-up of these children is, however, necessary.

Transscleral sulcus fixation of the posterior chamber intraocular lens (IOL) was first described by Girard in 1981[1] and later modified by Malbran et al.[2] in aphakic eyes after intracapsular cataract extraction in 1986. It is very important to treat early in unilateral aphakia in children because they are at high risk of developing amblyopia. However, treatment options for aphakia in the absence of capsular support are limited. Spectacles in unilateral aphakia may result in diplopia and loss of binocularity due to aniseikonia. Contact lens is currently the most accepted method to correct aphakia in children. Lenses are noninvasive and provide acceptable quality of refraction. However, their use entails constant vigilance to ensure compliance and avoid contact lens related complications.[3] The cost of quality care and maintenance is often beyond the means of many households and, in a predominantly agrarian society, carries an added risk of infection.

Sutured scleral fixated intraocular lens (SSFIOL) is theoretically a better option because the IOL sits in the original anatomical position behind the iris plane. SSFIOL scores over anterior chamber IOL (ACIOL) with regard to associated complications such as corneal endothelial damage, chronic anterior chamber inflammation, and cystoid macular edema.[4,5] Moreover, ACIOL and iris-fixated IOL may not be possible in cases of trauma where healthy iris tissue support may be inadequate. The SSFIOL implantation technique, despite its distinct advantages, is also associated with complications such as retinal detachment (RD), vitreous hemorrhage, choroidal hemorrhage, endophthalmitis, suture erosion, and SSFIOL dislocation.[6,7] Although studies have shown the efficacy and complications of SSFIOL in an adult population,[8] similar studies in large populations are limited in younger age groups. Our study analyses the outcome of SSFIOL in a large group of patients, with a wide range of indications, age ≤18 years at SSFIOL implantation.

Patients and Methods

A retrospective observational study of pediatric patients age ≤18 years who underwent SSFIOL with pars plana vitrectomy (PPV) from 2000 to 2014 at a tertiary eye care centre in India was undertaken, and children with a minimum of 6 weeks of follow-up were included. A trial of glasses or contact lens was given for aphakic children before SSFIOL implantation was considered. The study revealed 279 eyes of 230 patients who underwent SSFIOL implantation. The study was performed after approval was obtained from the institutional review board and ethics committee. All study procedures conformed to the tenets

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of the Declaration of Helsinki for research involving human subjects. Informed consent for the surgical procedure was obtained from all parents or guardians of patients included in the study.

All patients had detailed evaluations preoperatively and postoperatively. Parameters recorded at baseline, 6 weeks postsurgery, 1 year, and at final follow-up included demographic variables, best-corrected visual acuity (BCVA; measured on a Snellen chart and converted to logMAR units for analysis), refractive error including spherical equivalent, slit-lamp examination, intraocular pressure (IOP) measurement by Goldmann applanation tonometry, fundus examination by indirect ophthalmoscopy, and postoperative complications.

Treatment-naive patients having traumatic cataract or subluxated lens underwent a single-sitting lensectomy and PPV, along with SSFIOL insertion. Patients with aphakia after cataract surgery without capsular support underwent PPV with SSFIOL, and only SSFIOL implantation was done in those with previously vitrectomized eyes. IOL power was calculated using the SRK-II formula. Keratometry and axial length measurements were done preoperatively, except in uncooperative or very young children, for whom the measurement was taken intraoperatively. In cases where the corneal surface was too irregular for keratometry, corneal topography was performed, and the Sim K value was determined. In the postoperative period, unilateral cases were treated for amblyopia by patching after the surgery as required. Postoperative complications were managed appropriately.

Surgical Technique

Experienced vitreoretinal surgeons performed all surgeries. Three-port PPV was completed with meticulous peripheral vitreous dissection, especially in the horizontal meridians where the SSFIOL (PMMA posterior chamber IOL with 2 eyelets, Hanita lenses) was to be anchored. Fixation of SSFIOL was done using 10-0 prolene suture (Ethicon STC6, PR, USA) and a 2-knot 4-point ab externo fixation technique, as described by Rao et al.,[9] in all eyes (Fig. 1). A corneal marker was used to ensure accurate placement of the scleral flaps. The rail road technique was used for passing the sutures, and the direction of sutures though the eyelets was changed to neutralize the torque exerted. The knots were buried by rotating them into the eyeball. Scleral flaps and corneoscleral section were secured with 10-0 ethilon suture (Ethicon, PR, USA).

Outcome Measures

Preoperative and postoperative visual acuity, refractive outcome, and intraoperative and postoperative complications were the principal outcome measures studied.

Statistical Analysis

SPSS 14.0 software (IBM SPSS Statistics, IBM Corporation, Chicago, IL, USA) was used for statistical analysis. Fisher's exact test with 2-tailed p-values was used for categorical data, and paired and unpaired t tests were used for continuous data. A p-value of 0.05 or less was considered to be statistically significant.

Results

Our study included 279 eyes of 230 patients who underwent SSFIOL implantation at age ≤18 years. Of the patients, 74.3% (n = 171) were male and 25.7% (n = 59) were female. The mean age at which SSFIOL was

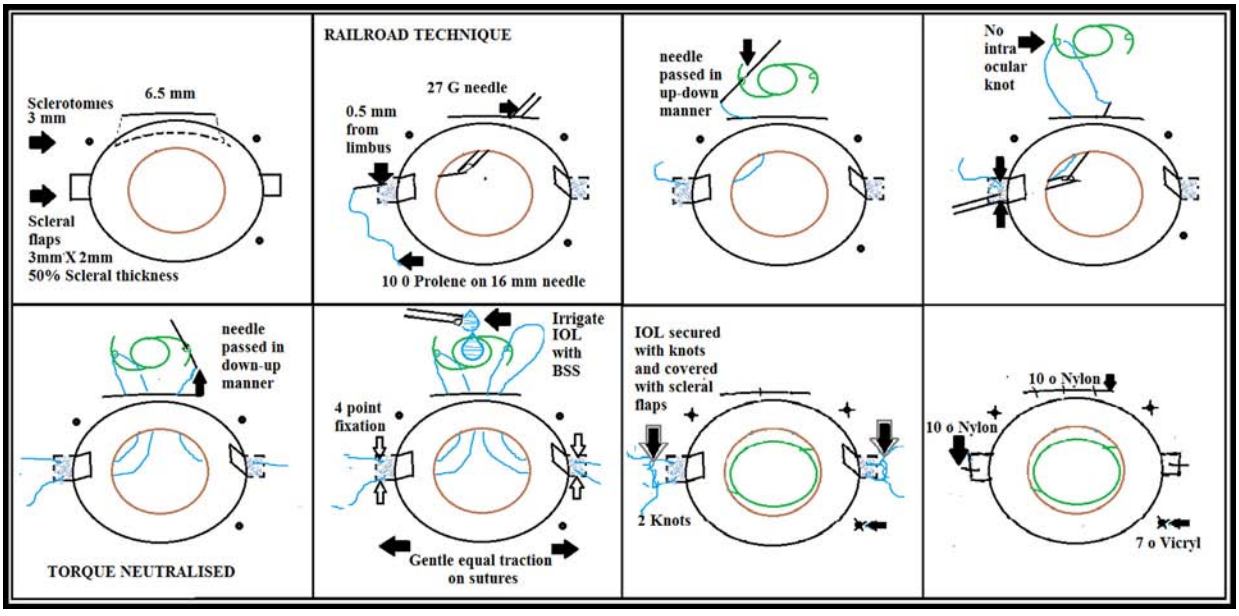

Fig. 1—Illustration of the standardized sutured scleral fixated intraocular lenses (SSFIOL) implantation technique.