

# Rhegmatogenous retinal detachment in paediatric patients after pars plana vitrectomy and sutured scleral-fixated intraocular lenses

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## Abstract

**Purpose** To report the incidence rate, management, and surgical outcomes of rhegmatogenous retinal detachment (RRD) in children who underwent pars plana vitrectomy (PPV) with sutured scleral-fixated intraocular lens implantation (SSFIOL).

**Patients and methods** Of the 279 eyes of 230 children who underwent PPV with SSFIOL at a tertiary eye care centre, 16 eyes of 15 children developed RRD. Retrospective analysis of the surgical details of RRD, the structural and functional outcomes was done.

**Results** Of the 279 eyes of 230 children who underwent PPV with SSFIOL, RRD was seen in 5.7% of the eyes. Average age was 10.7 years (range 4–15 years). Indication for SSFIOL implantation was congenital subluxation of lens (8 eyes) and traumatic aphakia or lens subluxation (4 eyes each). PPV was done in 15 of the 16 eyes, and 1 patient underwent scleral buckling. Retina was attached at the last follow-up visit in 87.5% of the eyes with median number of surgeries being 1. BCVA at the time of retinal detachment, multiple surgeries, and PVR at presentation were associated with poor visual outcome.

**Conclusion** Surgery for SSFIOL in our series of paediatric eyes was complicated by vision-threatening RRD in 5.7% of cases. Surgical outcome in eyes with RRD without PVR was better (100%) than that in those, where PVR had already set in (75%). Need for regular follow-up and self-monitoring of vision should be emphasized and discussed with the parents before surgical intervention.

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## Introduction

Rehabilitation of aphakia in children presents a unique challenge. Removal of the crystalline lens in a child may be needed in congenital subluxations, simple or associated with hereditary disorders, and in traumatic subluxations, with or without cataract.

Spectacles are a non-invasive means to correct aphakia,<sup>1–3</sup> but they are associated with aniseikonia and peripheral optical aberrations. Contact lenses are the current standard of care to treat aphakia in children with no capsular support. However, their use imposes a maintenance cost on the parents, necessitates regular follow-up, and imposes hygiene requirements, which in a predominantly agrarian society often causes loss of compliance making the child vulnerable to amblyopia.<sup>4</sup>

Surgical correction of aphakia without adequate capsular support can be done using anterior chamber intraocular lens (ACIOL), iris-fixated IOLs, or a scleral-fixated intraocular lens (SFIOL).<sup>5</sup> ACIOLs are not preferred for children due to their propensity for corneal endothelial damage.<sup>6–9</sup> Iris-fixated IOLs may be associated with endothelial cell loss, macular oedema, glaucoma, and spontaneous IOL dislocation.<sup>10–13</sup> Trans-scleral fixation of the capsular bag with IOL has also been described in paediatric age group.<sup>14</sup> Trans-scleral sutured scleral-fixated lenses (SSFIOL), in eyes with inadequate capsular support, first described by Malbran *et al.*<sup>15</sup> and then by several authors,<sup>16–20</sup> have also been associated with complications, like knot erosion, IOL dislocation following broken fixation sutures, and rhegmatogenous retinal detachment (RRD). RRD is an important vision-threatening complication and its

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management in these eyes can be challenging due to various factors; paediatric age group; increased risk of proliferative vitreoretinopathy (PVR); need for multiple surgeries; and presence of a sutured IOL. In the present study, we evaluate the rate, management, and surgical outcome of RRD in children who had undergone sutured SSFIOL implantation.

## Materials and methods

This is a retrospective observational consecutive case series of children ( $\leq 18$  years) who, having previously undergone pars plana vitrectomy (PPV) with SSFIOL, subsequently developed a RRD. Only children with a minimum of 6-week follow-up were included. SSFIOL implantation was performed in 279 eyes of 230 children, at a tertiary eye care centre, over a period of 14 years and RRD developed in 16 eyes of 15 of these children in the postoperative period. SFIOL implantation, in all these children, was done only after an unsuccessful trial of glasses and non-compliance or difficulty in wearing contact lenses. Records of these 15 children were scrutinized and surgical details and anatomical and functional outcomes were analysed. Snellen visual acuity measurements were converted to logMAR for statistical purposes.<sup>21,22</sup> All the patients underwent four-point fixation of SSFIOL with PPV. All eyes that developed RRD underwent retinal detachment (RD) repair by experienced vitreoretinal surgeons. This study was done in adherence to the Declaration of Helsinki with the approval of the Ethics committee and the Institutional Review Board of the hospital. Informed consent for the surgical procedure was obtained from parents or guardians of patients included in the study.

## Surgical technique

**PPV and SSFIOL** A 270° conjunctival peritomy was done. A three-port PPV was completed with meticulous peripheral vitreous dissection especially in the horizontal meridians where the SFIOL (Hanita, PMMA posterior chamber IOL) was to be anchored. The optic diameter of the IOL was 6.5 mm and the overall diameter was 13 mm. Fixation of SSFIOL was done by the four-point *ab externo* fixation technique as described by Rao *et al.*<sup>23</sup> Two limbus-based rectangular scleral flaps of up to 50% scleral thickness were fashioned at 3- and 9-o'clock meridians. A double-armed 10-0 polypropylene (Prolene) suture with 16 mm long straight needles (STC6 needle; Ethicon, Aurangabad, India) was cut in the middle. This straight needle was passed at the limbal end of the scleral flaps at 3 o'clock, directed towards the corneoscleral tunnel, engaged into the open end of a 27 G needle in a rail road technique, and brought out to pass through the eyelet of

SSFIOL in below up direction. The 27 G needle was then introduced through the lower end of the scleral bed, beneath the flap, 0.5 mm posterior to the limbus and directed towards the superior tunnel to engage the returning 10-0 prolene carrying needle. A similar procedure was repeated at 9 o'clock but with the needle passed in an above below direction through the other eyelet so as to neutralize the torque. SSFIOL was then inserted into the anterior chamber through a corneoscleral tunnel while gently pulling at suture ends at both 3 and 9 o'clock. The suture ends were tied in a knot in a 3-2-1 manner and the knots were rotated into the eyeball. The scleral flaps and the superior corneoscleral tunnel were sutured with 10-0 nylon (STC6 needle; Ethicon). A fundus examination was performed with indentation to look for any retinal breaks, which were treated appropriately when detected. The sclerotomies were closed and the conjunctiva sutured with 7-0 polyglactin suture (Vicryl, Ethicon).

**RD surgery** A decision regarding the type of surgery for RRD (scleral buckling (SB) *vs* PPV) was taken depending upon the presence of PVR, and number and position of retinal breaks. A 240-encircling band was placed in all the patients undergoing vitrectomy for RD. A complete vitrectomy with posterior vitreous detachment induction and base excision was done. The IOL was removed if found to be unstable. A fluid air exchange or liquid perfluorocarbon (LPFC) was used to settle the retina with or without a drainage retinotomy. Frequent coating of the undersurface of the SSFIOL with viscoelastic was essential to improve visualization during fluid air exchange in cases where the SFIOL was preserved. Care was taken during vitrectomy and base excision not to disturb the sutures anchoring the IOL. In cases needing SFIOL removal, cauterization of the 10-0 Prolene suture anchoring the IOL on both sides was sufficient to release the IOL, which was then removed via a scleral tunnel. In cases where traction was unrelieved even after adequate membrane peeling, a relaxing retinectomy (RR) was performed. Air was exchanged with 14% C3F8 gas or silicone oil depending on the position of the breaks (silicone oil was preferred for inferior breaks) and pre-existing PVR changes. Amblyopia therapy was also instituted as and when required. Follow-up of patients ranged from a minimum of 6 weeks to a maximum of 12 years.

## Statistical methods

SPSS Version 14.0 (SPSS Inc., Chicago, IL, USA) was used to perform the statistical analysis. Fisher's exact test with two-tailed *P*-values was used for categorical data, and paired and unpaired *t*-tests were used for continuous

data. Simple linear regression analysis was used to determine the relationship between the BCVA at the last follow-up and the BCVA after SSFIOL, the BCVA before RD surgery, the number of surgeries for retinal reattachment, PVR changes, and the cause for SSFIOL surgery (traumatic or congenital).

## Results

Over a period of 14 years, 279 eyes of 230 children underwent SSFIOL implantation for various indications, including congenital and traumatic subluxations, aphakia following surgery for traumatic cataract, congenital cataract, and following vitreoretinal procedures. The average age of these children was 10.8 years with average follow-up of 39.7 months; 30.1% had a follow-up of more than 60 months. In this cohort, RRD developed in the postoperative period in 16 (5.7%) eyes. Details on demographic variables, surgical parameters, and anatomic and functional outcome of these 16 eyes are given in Table 1. The age of these patients ranged from 4 to 15 years with median age of 11 years and mean age of 10.7 years. The mean follow-up period of these patients was 56.9 months with a median of 51 months.

In all, 13 of the 15 patients (86.6%) were male. Indications for undergoing SSFIOL surgery in these 15 patients included congenital subluxation in 8 eyes (50%), aphakia following wound repair and lens aspiration after penetrating injury in 4 eyes (25%), and subluxated lens with/without cataract following trauma in the remaining 4 eyes (25%). The corresponding percentages for the whole cohort were congenital subluxations in 38.7%, traumatic subluxation/cataract in 33.3%, aphakia secondary to trauma in 14.3%, aphakia following vitrectomy in 3.9%, aphakia following surgery for congenital cataract in 3.9%, and subluxations or dislocations of PCIOLs in 5.9%. The distribution of cases of trauma and congenital subluxations in the group which developed RRD was not significantly different from the distribution in the entire cohort (congenital subluxations in RRD group *vs* whole cohort ( $P = 0.3686$ ); traumatic subluxation/cataract in RRD group *vs* whole cohort ( $P = 0.7342$ )).

There were 5 (31.3%) eyes with ectopia lentis and 3 (18.8%) eyes with Marfan's syndrome in this series of 16 eyes. The percentages for the whole cohort of 279 eyes were simple ectopia lentis in 46 (16.5%) eyes, Marfan's syndrome in 47 (16.8%) eyes, homocystinuria in 4 (1.4%) eyes, and microspherophakia in 2 (0.7%) eyes. There was no significant difference in the distribution of eyes with Marfan's syndrome between the two groups ( $P = 0.8435$ ).

The interval between SSFIOL surgery and the occurrence of RRD varied from as early as 6 days to a

maximum of 7 years after surgery with a median of 7 months and a mean of 14.5 months (Table 1). Presentation within the first 3 postoperative years was seen in 15 of the 16 eyes (93.7%) with 10 of the 16 (62.5%) eyes presenting in the first year of follow-up and 5 out of 16 eyes (31.3%) presenting at the sixth postoperative week. History of blunt trauma post-SSFIOL surgery leading to RD was elicited only in 2 (12.5%) of the 16 eyes. Intraoperatively, breaks were identified in the superior quadrant in 9 (56.2%) eyes, inferior quadrant in 6 (37.5%) eyes, and 1 (6.25%) eye had a break at 4 o'clock position. A giant retinal tear (GRT) was seen in 3 (18.8%) eyes. PVR changes were found in 50% of the eyes (8 out of 16 eyes) at the time of diagnosis of RD (Table 1). Follow-up ranged from a minimum of 3 months to a maximum of 154 months (12 years and 10 months). The mean follow-up duration was 56.9 months.

## Structural outcome

SB was done in 1 case, which presented with an inferior slowly progressing RRD with subretinal gliotic bands and a peripheral dialysis. This patient had well-attached retina at last follow-up with a final vision of 0.5 logMAR. A PPV was necessary to reattach the retina in 15 of 16 cases (93.7%). A relaxing retinectomy (RR) was necessary in 6 out of 8 (75%) eyes with PVR. The number of surgeries required for retinal attachment varied from 1 to a maximum of 3 with an average of 1.31 surgeries per eye and a median of 1. The retina remained attached till the final follow-up after a single RD surgery in 11 eyes (68.7%) while a repeat surgery was required in 5 eyes (31.3%). Overall retina was successfully reattached in 14 out of 16 (87.5%) of the eyes. In 2 (12.5%) eyes, recurrent RD was seen despite repeated surgeries due to severe PVR. Anatomical success with a single surgery and overall anatomical success rate were better in eyes without PVR as against eyes with PVR though the difference was not statistically significant (Table 2).

Gas was used as a primary tamponade in 4 (40%) eyes without PVR. One of these 4 (25%) eyes developed a recurrent RD and had a successful outcome after a second surgery with silicone oil tamponade. In all, silicone oil was used as primary endotamponade in 11 (68.8%) eyes. In all eyes that had oil, an inferior peripheral iridectomy (PI) was made, as in 'aphakic eyes', to avoid oil coming in contact with the cornea. Silicone oil was *in situ* in 3 of the 12 eyes (25%) at the last follow-up visit; 2 of these had persistent RD and 1, attached retina with hypotony. Postoperative complications following RRD surgery are enumerated in Table 1.

SSFIOL was not removed during surgery in 14 out of 16 (87.5%) eyes. Of the 2 eyes in which the IOL was removed, an intraoperative breakage at the optic haptic

**Table 1** Pertinent data of the 16 eyes of 15 paediatric patients who developed RD after SSFIOL surgery

| SR. No. | Age at SSFIOL (years) | Cause | BCVA after PPV +SSFIOL | Duration b/w SSFIOL and RD (months) | BCVA on development of RRD | Final BCVA after RD surgery | PVR grading | Location in clock hours | Oil/gas IOL removal | Recurrent RD | No. of Surgeries to attach retina | Follow-up (months) | Retina attached at final visit | Postoperative complications |
|---------|-----------------------|-------|------------------------|-------------------------------------|----------------------------|-----------------------------|-------------|-------------------------|---------------------|--------------|-----------------------------------|--------------------|--------------------------------|-----------------------------|
| 1       | 11                    | C     | 0.6                    | 9                                   | 0.6                        | 0.8                         | 0           | 12                      | O                   | No           | 1                                 | 25                 | Yes                            | Glaucoma                    |
| 2       | 11                    | C     | 0.6                    | 14                                  | 0.5                        | 0.4                         | 0           | 12                      | G                   | No           | 1                                 | 27                 | Yes                            | Glaucoma                    |
| 3       | 7                     | C     | 0.3                    | 13                                  | 1                          | 0.5                         | C1          | 5-7                     | SB                  | No           | 1                                 | 64                 | Yes                            | Nil                         |
| 4       | 7                     | T     | 0.5                    | 29                                  | 2.7                        | 1.7                         | 0           | 6-9                     | O                   | Yes          | 2                                 | 154                | Yes                            | Nil                         |
| 5       | 8                     | T     | 1.3                    | 2                                   | 1.5                        | 1.7                         | B           | 6                       | O                   | No           | 1                                 | 127                | Yes                            | BSK                         |
| 6       | 14                    | T     | 2.3                    | 1.5                                 | 1.5                        | 2.4                         | D1          | 5                       | O                   | Yes          | 2                                 | 7                  | Yes                            | Hypotony                    |
| 7       | 13                    | C     | 0.6                    | 1.5                                 | 1.7                        | 1                           | C2          | 5                       | O                   | Yes          | 2                                 | 12                 | Yes                            | Nil                         |
| 8       | 8                     | C     | 0.5                    | 24                                  | 2.7                        | 2.4                         | D1          | 4                       | O                   | No           | 1                                 | 120                | Yes                            | Nil                         |
| 9       | 17                    | C     | 0.2                    | 36                                  | 0                          | 0.2                         | 0           | 12                      | G                   | No           | 1                                 | 73                 | Yes                            | ERM                         |
| 10      | 11                    | C     | 0.2                    | 6                                   | 2.4                        | 0.2                         | 0           | 12                      | G, O                | No           | 1                                 | 46                 | Yes                            | ERM                         |
| 11      | 4                     | T     | 0.5                    | 0.2                                 | 0.3                        | 0.2                         | 0           | 12                      | O                   | No           | 1                                 | 45                 | Yes                            | ERM                         |
| 12      | 7                     | C     | 0.5                    | 84                                  | 1.7                        | 2.4                         | D1          | 6                       | O                   | No           | 1                                 | 80                 | Yes                            | ERM                         |
| 13      | 15                    | T     | 0.2                    | 8                                   | 2.7                        | 3                           | C3          | 11-2                    | O                   | Yes          | 3                                 | 65                 | No                             | Hypotony/BSK                |
| 14      | 15                    | T     | 2.3                    | 1.5                                 | 1.7                        | 3                           | C2          | 11, 1                   | O                   | Yes          | 1                                 | 56                 | No                             | Hypotony/OA                 |
| 15      | 15                    | T     | 0.2                    | 1.5                                 | 0.2                        | 0.1                         | 0           | 11                      | G                   | No           | 1                                 | 6                  | Yes                            | Nil                         |
| 16      | 8                     | T     | 2.7                    | 1.5                                 | 2.7                        | 1.5                         | 0           | 10-2                    | O                   | No           | 1                                 | 3                  | yes                            | Nil                         |

Abbreviations: BCVA, best corrected visual acuity; BSK, band-shaped keratopathy; C, congenital subluxation; ERM, epiretinal membrane; G, C3F8 gas; IOL, intraocular lens; O, silicone oil; OA, optic atrophy; PVR, proliferative vitreoretinopathy; RD, retinal detachment; SB, scleral buckle; SSFIOL, sutured scleral-fixated intraocular lens; T, trauma.

Contains pertinent data of the 16 eyes of 15 paediatric patients who developed RD after SSFIOL surgery.

**Table 2** Structural and functional success rates in eyes with and without PVR changes

| Success rate           | All eyes with RRD (n = 16) | Without PVR at presentation (n = 8) | With PVR at presentation (n = 8) | P-value |
|------------------------|----------------------------|-------------------------------------|----------------------------------|---------|
| Single surgery         | 11 of 16 (68.7%)           | 7 of 8 (87.5%)                      | 4 of 8 (50%)                     | 0.2821  |
| Multiple surgeries     | 5 of 16 (31.2%)            | 1 of 8 (12.5%)                      | 2 of 8 (25%)                     |         |
| Overall success        | 14 of 16 (87.5%)           | 8 of 8 (100%)                       | 6 of 8 (75%)                     | 0.4667  |
| Final BCVA $\geq$ 6/18 | 6 of 16 (37.5%)            | 5 of 8 (62.5%)                      | 1 of 8 (12.5%)                   | 0.1189  |
| Loss of >2 lines       | 5 of 16 (31.25%)           | 1 of 8 (12.5%)                      | 4 of 8 (50%)                     | 0.2821  |

Abbreviation: PVR, proliferative vitreo retinopathy.

Anatomical and functional success rates after surgery for rhegmatogenous retinal detachment (RRD) and comparison of results in eyes with and without PVR changes at presentation.

junction prompted the removal of IOL in one eye. The other eye had a recurrent RD with advanced PVR and the IOL was removed during the second surgery along with a 360° RR. This patient had attached retina (BCVA 2.4 logMAR) at last follow-up but had persistent hypotony because of which silicone oil could not be removed. No excessive fibrosis was seen around the SSFIOL or the sutures in any of the eyes during subsequent surgery.

#### Functional outcome

The mean BCVA before SSFIOL in these eyes was  $1.19 \pm 0.77$ , which improved to  $0.86 \pm 0.83$  logMAR after SSFIOL ( $P = 0.350$ ). After development of RD, there was a drop in the BCVA to  $1.49 \pm 0.97$  logMAR ( $P = 0.1239$ ), which improved to  $1.31 \pm 0.95$  logMAR ( $P = 0.7453$ ) at final follow-up. On comparing the BCVA after SSFIOL implantation with the BCVA after RD surgery, 9 of 16 (56.3%) eyes showed a decrease in visual acuity. A visual acuity of hand movement or worse was seen in 5 of 16 (31.3%) eyes at the last follow-up. A final visual acuity of 6/18 or better was seen in 62.5% (5 of 8) of eyes without PVR, while only 12.5% (1 of 8) of eyes with PVR achieved this visual acuity (Table 2). Simple linear regression analysis was used to determine the factors that could influence the final BCVA. Of the various factors analysed, the BCVA at the time of RRD ( $P = 0.007$ ), number of surgeries for RRD ( $P = 0.01$ ), and the presence of PVR at presentation ( $P = 0.005$ ) were found to be statistically significant; the BCVA after SSFIOL surgery ( $P = 0.08$ ) and primary indication for SSFIOL fixation ( $P = 0.16$ ) did not show statistical significance.

#### Discussion

SSFIOL not only provides visual rehabilitation but also prevents amblyopia in children, in whom in-the-bag placement of the IOL is not possible due to inadequate capsular support. This procedure, best done along with PPV can however expose these eyes to the risk of RRD. RRD in the paediatric age group following SSFIOL surgery has never been studied as a separate entity.

The rate of RRD after SSFIOL in paediatric age group in our study was 5.7%. Previous studies also have reported 4–5% rate of RRD in eyes undergoing SSFIOL in the paediatric age group.<sup>18,24</sup> Lee *et al*<sup>25</sup> have reported RRD in 4.9% of 122 adult cases undergoing SSFIOL during a follow-up of up to 42 months.

Various factors could contribute to development of RRD after surgery. Disturbance of the vitreous leading to increased vitreoretinal traction and new retinal break formation has been hypothesized to be the main cause of RD after cataract surgery. RRD has also been reported in 1.2–1.7% of eyes after vitrectomy for conditions such as macular hole and epiretinal membrane.<sup>26</sup> This has been attributed to new break formation during PPV. As a PPV was done in all our eyes, they were exposed to similar risk factors. In addition, in SSFIOL surgery, passage of needle while passing the Prolene sutures has also been postulated to disturb the vitreous base anatomy and predispose to traction and breaks in the surrounding area.<sup>24,27</sup> The retinal breaks in all our cases were seen in both superior and inferior quadrants; no association with the site of entry of needles could be determined.

The mean duration between the SSFIOL implantation and presentation of RRD was 14.54 months with a median interval of 7 months in our study. RD as early as on the sixth postoperative day was seen in one case with a superior GRT. RD in the late postoperative period was seen in a case of Marfan's syndrome who presented 7 years after the surgery with a total RD with PVR at presentation. It was noteworthy to find that almost one-third of the patients (5 of 16 eyes) had RRD within 6 weeks post-SSFIOL surgery. The early occurrence of RD in our study could be due to absence of formed vitreous in these eyes allowing detachment to occur and spread rapidly. The RRD occurring late may be due to new breaks following trauma (as seen in 1 case) or due to an increase in the axial length in the paediatric eyes causing a change in traction forces especially at the vitreous base.

In children, late presentation due to late recognition of symptoms as well as an exaggerated inflammatory response can lead to advanced PVR at presentation making management of these cases difficult.<sup>28,29,30</sup> In our

study 8 of the 16 (50%) eyes had PVR at presentation. Eyes without PVR had a significantly better anatomical and visual outcome against eyes with PVR. Anatomical success rate with a single surgery and BCVA of 6/18 or better at last visit were both better in eyes without PVR as against eyes with PVR (Table 2). Associated previous trauma and surgery can further add to tissue reaction causing PVR. Myopia, history of ocular trauma,<sup>31</sup> and Marfan's syndrome<sup>32</sup> are known to be common identifiable risk factors for RD in children. In our study, 8 (50%) of the 16 eyes had a previous history of trauma and 3 (18.8%) eyes had Marfan's syndrome. A study by Cevik *et al*<sup>3</sup> on implantation of iris claw lenses in children with ectopia lentis by a posterior enclavation technique had a RD rate of 10%. RD rate of 5.9% has been reported with iris-fixated PCIOLs.<sup>34</sup> In both the above studies all the cases who developed RRD had Marfan's syndrome. In a study by Sminia *et al*<sup>35</sup> on Artisan IOLs in paediatric traumatic aphakia, over a mean follow-up of 10 years, 1 of the 5 eyes developed RD, 18 months after the intraocular lens implantation.

Management of RRD in these cases may not be different from management of other paediatric RDs. Because it is seen in the setting of previously vitrectomized eyes, with some eyes presenting with GRT (3 eyes) and others with PVR, it necessitates PPV for retinal reattachment in most of the cases. Fivgas and Capone<sup>28</sup> used SB in majority of their cases of paediatric RD and achieved an anatomic reattachment in 72% of cases with a mean of 2.2 surgeries per eye. Another study by Soheilian *et al*<sup>36</sup> reported a successful outcome in nearly 75% of eyes with nearly 63% of eyes undergoing vitrectomy. In our study we achieved a successful reattachment of retina in 14 of 16 (87.5%) eyes, with vitrectomy as the principal surgical technique (87.5%) and with a mean of 1.31 surgeries and a median of 1 surgery.

SSFIOL removal was not necessary in most of our cases. Its presence, however, does impair intraoperative visualization, especially during fluid air exchange due to condensation of tiny droplets on the undersurface of the IOL. This can be overcome by viscoelastic coating of the IOL or use of LPFC to settle the retina instead of fluid air exchange. The two cases that did need SSFIOL removal were technically not very difficult and no fibrosis was seen around the IOL. When silicone oil is used as endotamponade, however, there is a risk of oil filling the anterior chamber resulting in secondary glaucoma. This is because, in contrast to other modes of IOL fixation, in these eyes, there is no posterior capsule; an inferior PI was hence performed to allow for the movement of aqueous.

Our single surgery success rate was 68.7%. This was similar to the single surgery retinal reattachment rate of 50–80% in paediatric age group as seen across various studies.<sup>28,30,37–39</sup> Final reattachment rate in eyes without

PVR at presentation was 100% while in eyes with PVR it was 75%. Although anatomical success was seen in 87.5% cases, recovery of vision to the extent present before development of RD was not seen in all patients. The mean BCVA in logMAR reduced from 0.86 after SSFIOL implantation to 1.32 at the last follow-up after RD surgery, making RRD a vision-threatening complication of SSFIOL implantation. Recurrence of RD and associated increase in the number of surgeries had a negative impact on the final visual outcome.

This study may be limited by a small sample size, but to our knowledge, is the single largest case series on management techniques and outcomes of RD after SSFIOL in paediatric age group. This is a small 'niche' group but gains significance because of its relevance to a large subgroup of aphakic paediatric eyes with inadequate capsular support who need visual rehabilitation.

## Conclusion

To conclude, surgery for SSFIOL in our series of paediatric eyes was complicated by vision-threatening RRD in 5.7% of cases. RRD in these eyes commonly needs a PPV for successful reattachment. Delay in diagnosis and treatment can result in rapid onset of PVR. Surgical outcome in eyes with RRD without PVR was better (100%) than in those where PVR had already set in (75%). Hence, the need for regular follow-up and self-monitoring of vision should be emphasized and discussed with the parents before surgical intervention.

## Summary

### What was known before

- SSFIOL—potential treatment modality to treat aphakia in children without capsular support.
- Associated complications of SSFIOL.

### What this study adds

- Management of retinal detachment after sutured SSFIOL implantation in paediatric patients.
- Outcome of retinal detachment surgery in paediatric patients after SSFIOL implantation.

## Conflict of interest

The authors declare no conflict of interest.

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