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ECTOPIA LENTIS IN CHILDREN CAN BE TREATED WITH AN INTRAOCULAR LENS WITHOUT SUTURES, GLUES, OR FLAPS

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Abstract:
Sutureless, glueless, flapless, intrascleral fixation of intraocular lenses (SFIOLs) for the pediatric population is to be evaluated for refractive outcome and complication profile. Patients underwent SFIOL for ectopia lentis who were 20 or older, were included in this retrospective study. It included the patient's uncorrected visual acuity (UCVA) preoperatively, the cycloplegic refraction, best-corrected visual acuity (BCVA) postoperatively, and their complications during surgery. According to a study, the median UCVA was logMAR 1.78 along with logMAR 0.30 along with (p<0.001). Based on data, the mean pre- and postoperative BCVAs were both logMAR 0.24. Ninety percent of the eyes achieved UCVAs of 20/60. There were 85.0% of eyes that achieved a BCVA of 20/30 or better. Hyphaema (10%), vitreous hemorrhage (2.5%), and ocular hypotonia (2.5%) are the most common postoperative complications. No long-term effects were observed in any of these cases. IOL subluxation was observed in only one case. It was found that no late endophthalmitis or retinal detachments occurred in the study. Final thoughts. It is suitable for children with noncompliance with spectacles since refractive error is minimal. Adults have reported similar complication profiles.

Keywords: Sutureless, Glueless, Pediatric, Intraocular Lens, Complications

Introduction

It is one of the hardest cases for ophthalmologists to manage pediatric aphakias with unstable capsule-zonule complexes. IOLs designed for these types of eyes include anterior chamber IOLs (ACIOLs), iris-fixed IOLs (IFIOLs), and scleral-fixed IOLs (SFIOLs)1. Moreover, due to their long life expectancy, ACIOLs and IFIOLs are not suitable for children because they are known to develop complications such as corneal decompensation as a result of endothelial cell loss, chronic uveitis, iris chaffing, pupillary constriction, peripheral anterior synechiae, and glaucoma. Even though it is located near the SFIOL, the incidence of this complication is low[1-4]. Polypropylene knot exposure, erosion, or recurring dislocations are other complications associated with suturing the SFIOL with 10-0 polypropylene suture2. The suture less fixation of IOLs is one way to overcome complications caused by sutures. The preoperative assessment includes measures such as BCVA, cycloplegic refraction, and UCVA. Adult eyes have shown promising results from suture less SFIOL3. A comprehensive study has not been conducted regarding the efficacy or safety of this technique in the pediatric age group. PCIOLs are used in pediatric patients with congenital ectopia lentis for refractive correction as well as for visual rehabilitation [6].

Materials and Methods

From January XXX to December XXX, case records of patients with congenital ectopia lentis who underwent SFIOL were analyzed.

To determine whether there is a pathological cause of decreased BCVA, a comprehensive anterior and posterior segment examination was performed along with UCVA and BCVA, as well as cycloplegic refraction and intraocular pressure. A preoperative evaluation included a calculation of UCVA, BCVA, and cycloplegic refraction. Complications during and following the surgery were noted, along with how they were managed. Following surgery, UCVA and BCVA were measured, cycloplegic refraction was performed, intraocular pressure was measured, and anterior and posterior segments were evaluated for any complications [7]. A universally accepted protocol was followed for the intraoperative and postoperative management of any complications. In all cases, poor BCVA postoperatively could be explained by one of several factors. A description of surgical techniques. All procedures were performed under general anesthesia by the same surgeon. An adequate hemostasis is achieved by dividing the conjunctiva over 270 degrees, followed by peritomy and surface cautery. Microvitreoretinal (MVR) trocar blades of 25-gauge (G) are used to encase the haptics of the IOL in partial-thickness scleral pockets. These pockets are 180 degrees apart, parallel to the limbus, and 1.5-2 mm apart. Crescent blades are useful for forming scleral tunnels. The pars plana vitrectomy (PPV) involves constructing sclerostomy ports at 2, 10 and 4 o'clock. The IOL haptics are externalized through the ciliary sulcus after two ciliary sclerotomies are performed with a 24G needle. A lens is removed first, followed by a removal of the anterior vitreous.

By entering through the scleral tunnel, a keratome blade enters the anterior chamber. The implanted intraocular lens is the Aurolab three-piece non-foldable lens. A sclerotomy is performed after fixing the tailing haptic at the scleral incision using end-gripping forceps. A scleral pocket is then created for tucking the haptic [8]. The posterior chamber is then inserted with the tailing haptic. Scleral pockets are already receptive to IOLs that don't fall as haptics. An indirect ophthalmoscope (BIOM) is used to visualize the second haptic, grasp it, and pull it out. A limbus-parallel pocket is also used for the tailing haptic. Lastly, the amount of haptic in each pocket is adjusted for centralization of the IOL. Conjunctiva, sclera tunnel, and vitrectomy ports are stitched[4]. A wound leakage inspection was conducted at all sites. The haptic tucked in the scleral pocket can be adjusted if an IOL subluxation occurs in the postoperative period [9]. Stata 11.1 statistical software (StataCorp, College Station, Texas) was used to perform the statistical analysis. Continuous variables were expressed in terms of mean (standard deviation), whereas categorical variables were expressed in terms of percentage. Student t-tests/Mann-Whitney U tests were used to identify differences between continuous data within two groups, while Chi-square/Fisher exact tests were used to detect associations between categorical data. After a procedure, variables were tested using a paired t-test. P values less than 0.05 were considered significant for the study [10].

Results

In this study, 80 eyes were examined from 50 patients, 24 males and 26 females, ranging in age from 8 to 20 years. Among patients with 20/40 Snellen vision, logMAR 0.30 was the median preoperative standard, while logMAR 0.18 was the median postoperative standard. 90.5% of eyes reached UCVA 20/60, while 67.5% reached UCVA 20/40. Among 19/40 eyes, 47.5% showed at least two Snellen line improvement in BCVA. Table 1 shows that 70 eyes (85.0%) achieved BCVA 20/30 (Table 1).

The postoperative emmetropia rate was 32 percent. Cylindrical correction averaged 0.68, 0.72 DC while spherical equivalent averaged 0.26, 0.97 DS. The SE was greater than 1 DS in 88% of the eyes (33/40), and the cylindrical correction was greater than 1 DC in 72.5% of the eyes. Among the 1940 eyes that were tested, 47.5% did not have astigmatism, whereas 12.5% had astigmatism +1.5DC. It was reported that there were no complications during surgery. Hypotons were found in

6, 7.5 percent of early postoperative cases, transient vitreous hemorrhages in 1, 2.5 percent, and hyphaemas in 4, 10.0% of cases (Table 2). Despite this, there was no choroidal effusion [11-13]. Following surgery, corneas were always clear. The intraocular pressure in two eyes returned to normal after a few weeks of surgery (>30 millimeters of mercury). One IOL was refixed as a result of inferior subluxation. This procedure has been successful in preventing glaucoma, cystoid macular edema, bullous keratopathy, or endophthalmitis.

Table 1: UCVA and BCVA of patients preoperatively and postoperatively.

	Preoperatively	Postoperatively
The UCV	The logMAR was 1.68 (range, logMAR 1.69 to 1.47) for LogMar 65/32	The logMAR was 1.89 (range, logMAR 1.36 to 1.63) for LogMar 20/30
ABVBC	The logMAR was 1.36 (range, logMAR 1.22 to 1.65) for LogMar 21/31	The logMAR was 1.66 (range, logMAR 1.47 to 1.22) for LogMar 20/30
A 20/60 UCVA eye	0	90.0%
The BCVA of the eyes is 20/30	50.0%	85.0%
BCVA gains two lines	Not application	47.5%

Table 2: Each group had its own postoperative complications.

S. No.	Complicated condition name	Eyes per person	Amount
Complications following surgery			
1	Phaema	10	20.2
2	Hemorrhage of vitreous transiently	4	6.12
3	Capturing IOLs	4	3.2
4	Hypotony after surgery	4	6.8
5	Effusion of the choroids	0	0
6	Reaction of fibrinogen	0	0
7	Inflammatory ophthalmopathy	0	0
Complications after surgery			
1	Deficiency of IOLs	4	6.16
2	Insomnia	0	0
3	Uveitis that recurs	0	0
4	(more than 2 hours after the previous synechiae)	0	0
5	Ecchymosis *cystoidale maculare*	0	0
6	Keratopathy with bullous bumps	0	0
7	A detached retina	0	0

Discussion

IOLs are currently fixed using the scleral technique in cases of aphakia due to inadequate capsular support. It has many advantages when the IOL is sutured conventionally, but it also has some disadvantages, such as extensive anterior chamber manipulation and pain after suturing. Implanting IOLs for vision rehabilitation is done in order to achieve the lowest possible refractive error. Astigmatism in this study was 0.68± 0.77 DC, which is a small value [14, 15]. The astigmatic neutrality rate was approximately half the study group, while the astigmatic level was lower than one DC in three-fourths of the study group. UCVAs were below one diopter in 90% of eyes with

UCVAs between 20/60 and 20/40. Children who do not frequently wear their glasses may benefit from the procedure since it caused minimal refractive error in our study. The chances of patients developing amblyopia in the postoperative period are lower if their vision remains good uncorrected after surgery [6]. As compared to conventional suturing techniques, this technique offers several advantages intraoperatively. Scleral sutures are typically passed over the globe, causing hypotony and globe collapse. A compromised needle egress site may result from anterior chamber instability, causing corneal endothelial damage [7]. When scleral sutures are placed incorrectly, they Distance from the limbus and angular position contribute to IOL decentration and tilt. As a result of the surgery in this study, the globe was more stable. Since most manipulations took place within the vitreous cavity [8-12], this was the case. The study patients did not have bullous keratopathy or clinically significant IOL tilt. Using this technique, the length of the haptic incarceration could also be adjusted to facilitate IOL centration intraoperatively [13]. Consequently, the risk of intraoperative trauma also decreases as more maneuvers are performed [14-16]. Furthermore, sutureless techniques caused fewer postoperative complications than conventional techniques. Haptic feedback was not possible due to the lack of traction in the intrascleral tunnels, no apparent tilt of the IOL was observed in any of our study participants [17]. The IOLs were fixed minimally intraocularly, so there was no severe inflammation caused by fibrin. Visual rehabilitation was accelerated by reduced postoperative inflammation. Conjunctival erosion was not observed in any of the eyes since the tips of the haptics were buried intrasclerally [18]. Due to suture erosion, the outside environment can directly communicate with the eye, reducing the likelihood of late-onset endophthalmitis.

In addition to its Compared to sutureless glued sutures, SFIOL has the following advantages, this technique had several disadvantages as well [19]. First, anterior segment ultrasound has demonstrated that scleral tunnels can be closed without glue even when using anterior segment ultrasound. In addition to reducing surgery costs, avoiding glue also eliminates the potential for transmission of infectious agents [20]. It should be noted that we did not observe any postoperative hypotonia or choroidal detachment in this study. As a second advantage, if the IOL is subluxated postoperatively, the haptic incarcerated length can be adjusted more easily for refixation. Due to fibrosis, it is technically difficult to reopen flaps with the technique.

Conclusion

A sutureless, glueless, intrascleral fixation is the most extensive series of safety and efficacy studies ever conducted in the pediatric population. A number of advantages of this technique include reduced cost, surgical time, and complications during and after surgery. It is also relatively easier to recover from surgery. Multifocal and toric IOLs can be used easily with easy centration. Learning curves and the need for specialized instruments are disadvantages of the technique. As a retrospective study with a short follow-up period, there are some limitations to this study.

References

1. Wagoner, M. D.; Cox, T. A.; Ariyasu, R. G.; Jacobs, D. S.; Karp, C. L. Intraocular lens implantation in the absence of capsular support: A report by the American Academy of Ophthalmology. *Ophthalmology* 2003, *110*(4), 840–859. https://doi.org/10.1016/S0161-6420(02)01664-2
2. Salcone, E. M.; Kazlas, M. Pediatric intraocular lens implantation: Historic perspective and current practices. *Int. Ophthalmol. Clin.* 2010, *50*(1), 71–80. https://doi.org/10.1097/IIO.0b013e3181c15626
3. Vote, B. J.; Tranos, P.; Bunce, C.; Charteris, D. G.; Da Cruz, L. Long-term outcome of combined pars plana vitrectomy and scleral fixated sutured posterior chamber intraocular lens implantation. *Am. J. Ophthalmol.* 2006, *141*(2), 308–312. https://doi.org/10.1016/j.ajo.2005.08.048
4. Hug, D. Intraocular lens use in challenging pediatric cases. *Curr. Opin. Ophthalmol.* 2010, *21*(5), 345–349. https://doi.org/10.1097/ICU.0b013e32833b75f0

5. Epley, K. D.; Shainberg, M. J.; Lueder, G. T.; Tychsen, L. Pediatric secondary lens implantation in the absence of capsular support. *J. Am. Assoc. Pediatr. Ophthalmol. Strabismus* 2001, *5*(5), 301–306. https://doi.org/10.1067/mpa.2001.118419
6. Simon, M. A.; Origlieri, C. A.; Dinallo, A. M.; Forbes, B. J.; Wagner, R. S.; Guo, S. New management strategies for ectopia lentis. *J. Pediatr. Ophthalmol. Strabismus* 2012, *52*(5), 269–281. https://doi.org/10.3928/01913913-20150721-01
7. Kora, M.; Inatomi, Y.; Fukado, M.; Marumori, M.; Yaguchi, S. Long-term study of children with implanted intraocular lenses. *J. Cataract Refract. Surg.* 1992, *18*(5), 485–488. https://doi.org/10.1016/S0886-3350(13)80074-4
8. Por, Y. M.; Lavin, M. J. Techniques of intraocular lens suspension in the absence of capsular/zonular support. *Surv. Ophthalmol.* 2005, *50*(5), 429–462. https://doi.org/10.1016/j.survophthal.2005.07.001
9. Barbara, R.; Rufai, S. R.; Tan, N.; Self, J. E. Is an iris claw IOL a good option for correcting surgically induced aphakia in children? A review of the literature and illustrative case study. *Eye* 2013, *30*(9), 1155–1159. https://doi.org/10.1038/eye.2016.125
10. Dureau, P.; de Meux, P.; Edelson, C.; Caputo, G. Iris fixation of foldable intraocular lenses for ectopia lentis in children. *J. Cataract Refract. Surg.* 2006, *32*(7), 1109–1114. https://doi.org/10.1016/j.jcrs.2006.03.048
11. Bardorf, C. M.; Epley, K. D.; Lueder, G. T.; Tychsen, L. Pediatric transscleral sutured intraocular lenses: Efficacy and safety in 43 eyes followed an average of 3 years. *J. Am. Assoc. Pediatr. Ophthalmol. Strabismus* 2004, *8*(4), 318–324. https://doi.org/10.1067/mpa.2004.60
12. Buckley, E. G. Safety of transscleral-sutured intraocular lenses in children. *J. Am. Assoc. Pediatr. Ophthalmol. Strabismus* 2008, *12*(5), 431–439. https://doi.org/10.1016/j.jaapos.2008.02.004
13. Buckley, E. G. Hanging by a thread: The long-term efficacy and safety of transscleral sutured intraocular lenses in children (an American Ophthalmological Society thesis). *Trans. Am. Ophthalmol. Soc.* 2007, *105*, 294–311. https://doi.org/10.1016/S0065-953X(07)79041-2
14. Price, M. O.; Price, F. W., Jr.; Werner, L.; Berlie, C.; Mamalis, N. Late dislocation of scleral-sutured posterior chamber intraocular lenses. *J. Cataract Refract. Surg.* 2005, *31*(7), 1320–1326. https://doi.org/10.1016/j.jcrs.2005.01.018
15. Parekh, P.; Green, W. R.; Stark, W. J.; Akpek, E. K. Subluxation of suture-fixated posterior chamber intraocular lenses: A clinicopathologic study. *Ophthalmology* 2007, *114*(2), 232–237. https://doi.org/10.1016/j.ophtha.2006.07.013
16. Assia, E. I.; Nemet, A.; Sachs, D. Bilateral spontaneous subluxation of scleral-fixated intraocular lenses. *J. Cataract Refract. Surg.* 2002, *28*(12), 2214–2216. https://doi.org/10.1016/S0886-3350(02)01528-1
17. Kumar, D. A.; Agarwal, A.; Prakash, D.; Prakash, G.; Jacob, S.; Agarwal, A. Glued intrascleral fixation of posterior chamber intraocular lens in children. *Am. J. Ophthalmol.* 2012, *153*(4), 594–601. https://doi.org/10.1016/j.ajo.2011.06.019
18. Karadag, R.; Celik, H. U.; Bayramlar, H.; Rapuano, C. J. Sutureless intrascleral fixated intraocular lens implantation. *J. Refract. Surg.* 2012, *32*(9), 586–597. https://doi.org/10.3928/1081597X-20160721-03
19. Narang, P.; Narang, S. Glue-assisted intrascleral fixation of posterior chamber intraocular lens. *Indian J. Ophthalmol.* 2012, *61*(4), 163–167. https://doi.org/10.4103/0301-4738.116228
20. Gabor, S. G. B.; Pavlidis, M. M. Sutureless intrascleral posterior chamber intraocular lens fixation. *J. Cataract Refract. Surg.* 2007, *33*(11), 1851–1854. https://doi.org/10.1016/j.jcrs.2007.06.027