

# Comparison of posterior optic capture of intraocular lens without vitrectomy vs endocapsular implantation with anterior vitrectomy in congenital cataract surgery: A randomized prospective study

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**Purpose:** To compare surgical outcome of two procedures in pediatric cataract surgery. **Methods:** Prospective randomised interventional study. Consecutive patients with bilateral congenital cataract who were operated during January 2016 to October 2016 at a tertiary care referral institute were included. One eye of all patients underwent Intraocular lens (IOL) implantation with optic capture through a primary posterior continuous curvilinear capsulorhexis (PPC) without vitrectomy while in the other eye endocapsular IOL implantation was performed along with PPC and anterior vitrectomy. Intraoperative challenges and postoperative complications were noted. **Results:** 15/18 children who fulfilled the inclusion criteria were included for follow up analysis. Mean age at the time of surgery was  $21 \pm 14.7$  months. At a mean follow up of  $25.69 \pm 1.06$  months; all eyes in both groups maintained a clinically centred IOL with clear visual axis. One patient with endocapsular IOL implantation developed anterior capsular phimosis. The rate of fibrinous complications (IOL deposits and synechiae) were more in the eyes with IOL in the bag (6 eyes) vs eyes where posterior optic capture was done (1 eye);  $P = 0.039$ . **Conclusion:** Posterior optic capture is a safer alternative to conventional pediatric cataract surgery in terms of inflammatory sequelae and lens epithelial cell proliferation. However the two methods work equally well in preventing visual axis obscuration over a long follow-up.

**Key words:** Complications, intraocular lens implantation, optic capture, pediatric cataract

The most important consideration in pediatric cataract surgery is keeping the visual axis clear. Surgeons have been routinely performing anterior vitrectomy with primary capsulotomy to decrease rate of visual axis opacification (VAO) in children with congenital cataract. Even in the hands of the most experienced surgeons, with the best available intraocular lenses (IOL) and instrumentation, posterior capsular opacification is inevitable in some children.<sup>[1-3]</sup> The search for a better surgical technique and improvisations in intraocular lens designs is ongoing.

The anterior vitreous face acts as a barrier between the anterior segment and the posterior segment. In a growing child we are not aware till yet if disturbing it would have any consequences later in life. However, anterior vitrectomy in a child does put the child at risk of developing cystoid macular edema the incidence of which is quite low, retinal detachment, vitreous incarceration and enlargement of posterior capsulotomy.<sup>[4]</sup> There is still evolving literature on what is the best technique to prevent VAO in children and minimise inflammation. Bag in the lens has been shown to be very effective in reducing VAO in children.<sup>[5]</sup> However, there is still not robust evidence whether using a standard non-customised 3 piece hydrophobic acrylic IOL would help if the optic was prolapsed behind the posterior capsulotomy thus working in a similar way to achieve closure of the capsules. There is still debate whether optic capture increases or decreases posterior synechia. In view of paucity of any

randomised prospective studies on such comparisons using the two eyes of one patient we planned to evaluate the two techniques in the same patient by including only bilateral cataracts and following them prospectively for two years.

## Methods

It was a prospective randomised interventional study. Consecutive patients aged less than 5 years undergoing cataract surgery from January 2016 to October 2016 at a tertiary care referral institute were included. Informed consent was taken from the parent/guardian of the child. The study conferred to the declaration of the tenets of Helsinki and was approved by the Institute ethical committee. Inclusion criteria were patients diagnosed with bilateral congenital cataract planned for phacoaspiration with primary IOL implantation. Eyes with traumatic cataract, microphthalmia, microcornea, and secondary IOLs along with other ocular abnormalities were excluded. The first eye was randomised to have either optic capture or in-the-bag IOL implantation and the second eye was automatically allocated to the other group.

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Examination included the age at surgery, laterality, sex of the child, significant systemic history, type of cataract, axial length preoperatively, type and power of intraocular lens, intraoperative and postoperative complications with any visual axis opacification or need for resurgery and postoperative retinoscopy/refraction. IOL power was calculated based on axial length values by A-scan and keratometry performed by handheld keratometer whenever the child cooperated. SRK-T formula was used to calculate IOL power in all patients. The target postoperative refraction was based on the patient's age as follows: +4.0 diopters (D) in infants younger than 6 months, +3.0 D in infants aged 6 months to 1 year, +2.0 D in children aged 1 to 2 years, +1 D in the age group 2 to 3 years and emmetropic thereafter. Objective streak retinoscopy was first done after surgery at an interval of one week when no inflammation was documented and then repeated at six weeks by a single optometrist. Intraocular pressure was measured with Perkins handheld applanation tonometer. B scan ultrasonography was performed in eyes where a dense cataract precluded the view of the fundus.

### Surgical technique

All surgeries were performed by the same surgeon under general anaesthesia using standard technique. Two limbal side port tunnels were made at 3 o'clock and 9 o'clock using 15-degree paracentesis knife. Trypan blue was injected to aid visualization of the anterior capsule in all cases. After forming the anterior chamber with sodium hyaluronate, posterior limbal incision was made with 2.8 mm keratome knife and continuous anterior capsulorhexis of approximately 5.0 mm diameter was performed with utrata forceps. Aspiration of the lens was accomplished using an automated handpiece. In one eye, IOL was captured posteriorly through primary posterior continuous curvilinear capsulorhexis (PPC) with the help of a Y-hook (without vitrectomy). The IOL was implanted in the bag and thereafter the optic was pushed down inferiorly and then superiorly or sideways through the PPC thus creating an ellipsoidal opening. The other eye underwent in the bag IOL implantation with PPC and preservative free triamcinolone assisted anterior vitrectomy. The same hydrophobic acrylic IOL was implanted in all cases. (Hoya-PS AF-1 Series; Model PC-60AD, insert; Hoya, Japan). The optic is 6 mm with angulated PMMA haptics making it suitable for in the bag implantation as well as for optic capture. Primary posterior capsulotomy of about 3.5-4 mm and anterior vitrectomy was performed by the anterior route through the same limbal side ports. All ports were sutured with 10-0 vicryl. Intraoperative complications were noted. For descriptive purposes we labelled the eyes undergoing posterior optic capture of the IOL as Group 1 and eyes with endocapsular IOL implantation as group 2. Eyes where we could not capture the IOL posteriorly; or where there was an unplanned vitrectomy or the IOL had to be placed in the sulcus – that eye as well as the contralateral eye were excluded from the follow-up analysis, but were included in the initial grouping of intraoperative surgical difficulties.

Patients in both groups were treated with the same postoperative regimen consisting of topical betamethasone, moxifloxacin/tobramycin and homatropine. They were followed up at weekly and then monthly intervals as a routine case of pediatric cataract and evaluated by an independent experienced clinician.

At follow-up visits, patients were examined either under anaesthesia or, if possible, a slit lamp evaluation was done. The posterior optic capture was confirmed by observing the 'spindle' of the posterior capsule on subsequent examinations under anaesthesia. Eyes where the IOL had shifted from its original site of implantation were included in analysis of follow up events. Visual axis opacification was defined as significant if there was lens epithelial cell regrowth extending into the pupillary space and interfering with vision/inability to perform undilated retinoscopy in that eye. A record of all post-operative findings as well as complications till the last follow-up at two years post-operative was noted and compared.

### Statistical analysis

Statistical analyses were performed using SPSS program. A sample size of at least 13 in each group was calculated based on a previous study<sup>[6]</sup> to have a power of 80%. *P* value of <0.05 was considered statistically significant. Descriptive analysis was done on all patients and a record of both the eyes was kept. The baseline parameters and rates of complications were studied in both groups. Chi square test was used to compare these rates in the two age groups for categorical data and t-test for continuous data.

### Results

We performed surgery in 18 patients for posterior optic capture in one eye and bag implantation of the IOL in the other eye. In group 1, IOL could be successfully captured in 15 children. In two children, IOL had to be captured behind the anterior capsule in the eye where posterior optic capture was attempted because of large pre-existing posterior capsular defect and a friable posterior capsule which got torn when the IOL was being positioned in the bag first. The haptic got entangled in the margin of the large posterior capsular opening and so the IOL couldn't even have been placed in the bag. In the second case the IOL when placed in the bag for an attempted capture started to sink before a capture could be performed. In group 2, one patient in which the IOL was placed in the sulcus because of extended anterior capsulorhexis. Hence a total of 15 children were included for final analysis on follow-up.

The mean age at the time of surgery was  $21 \pm 14.7$  months (median 12 months; range (8 months to 4 years). The mean follow-up was  $25.69 \pm 1.06$  months (median 24 months; range 24 to 26 months). The preoperative parameters of all the patients are listed in Table 1. The two eyes were matched in terms of biometry [Table 2]. The axial length was measured by the A scan in all patients and the keratometry by handheld keratometer.

Anterior capsulorhexis, lens aspiration and primary posterior capsulotomy with implantation of the intraocular lens was performed in all eyes by the same surgeon (JS). The surgical steps were primarily same for both eyes till PPC was attempted. One eye of all the patients underwent Intraocular lens (IOL) implantation with optic capture through a primary posterior continuous curvilinear capsulorhexis (PPC) without vitrectomy and the other eye underwent endocapsular IOL implantation with PPC and anterior vitrectomy. The surgeon experienced some intraoperative difficulties [Table 3]; which were not significantly different between the two groups.

Table 4 further enumerates the adverse events occurring postoperatively in all patients. No cases of clinically significant

macular edema, retinal detachment or endophthalmitis were observed. None of the patients required surgery for control of IOP. All eyes in both groups maintained a clinically centred IOL with clear visual axis. However two eyes in group 1 and one eye in group 2 had displacement of the IOL from where it had been implanted. One patient in group 2 developed anterior capsular opacification which was not visually significant. The rate of fibrinous complications like IOL deposits and synechiae were more in the eyes with IOL in the bag (6 eyes) vs eyes where posterior optic capture was done (1 eye);  $P = 0.039$  and these were seen mainly in infants [Table 5]. There was no lens epithelial cell proliferation shortly after surgery, however the process started at 6 months and gradually increased over a period of two years in 8 cases where in the bag IOL implantation was performed but did not cause visual axis obscuration at last follow up. This was not observed in any case in group 1 [Fig. 1].

Mean postoperative IOP at two years was  $13.05 \pm 2.18$  mm Hg in group 1 and  $13.4 \text{ mm} \pm 2.76$  Hg in the group 2 ( $P = 0.82$ ). The refractive error could not be determined preoperatively for any of the cataractous eyes. The mean spherical equivalent at 6 weeks after surgery was  $0.46 \pm 1.14$  D in group 1 and was not significantly different from group 2. ( $0.48 \pm 0.96$ ) ( $P = 0.89$ ).

**Table 1: Baseline characteristics of the patients**

	<i>n</i>
Total patients	18
Children less $\leq 1$ year	7
Patients with systemic associations/infections*	2
patients with strabismus	2
Eyes with PHPV <sup>^</sup>	0
Eyes with total white cataract	19
Eyes with zonular cataract	17

\*Both patients had positive history of TORCH group of infections,

<sup>^</sup>PHPV=Persistent Hyperplastic Primary Vitreous

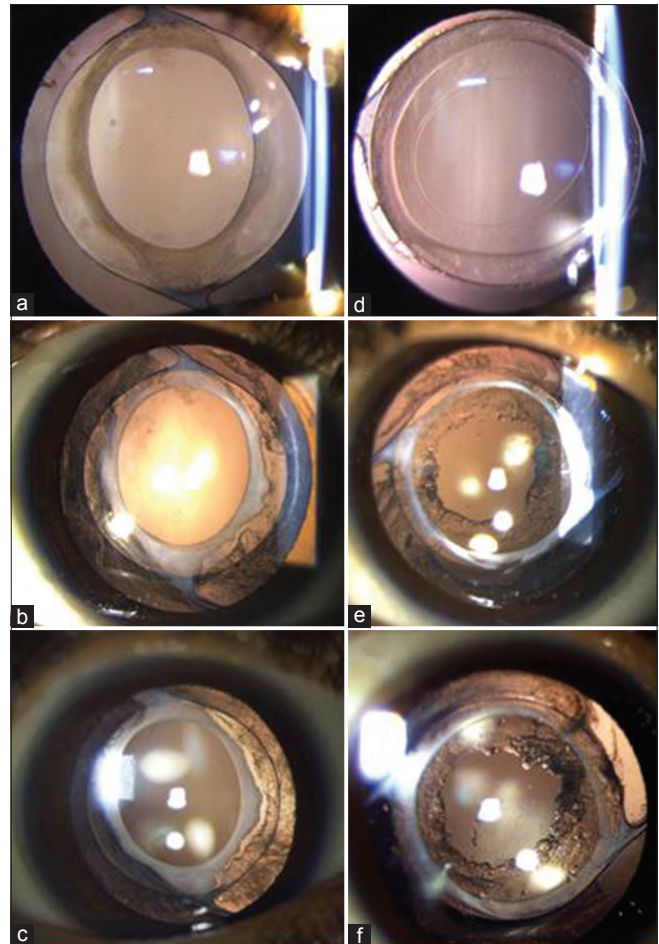
**Table 2: Biometric profile for both groups**

	Group 1	Group 1	<i>P</i>
Mean axial length (mm)	$20.74 \pm 1.4$	$20.69 \pm 1.7$	0.911
Mean keratometry (D)	$43.5 \pm 1.74$	$44.1 \pm 2.48$	0.49
Mean IOL power implanted	$27.35 \pm 3.4$	$27.58 \pm 3.2$	0.86

**Table 3: Details of intraoperative findings/complications**

Intraoperative complications	Group 1	Group 2	<i>P</i>
Non-dilating pupil	1	1	1.0
Size of anterior capsulorhexis (mean in mm)	$5.323 \pm 1.2$	$5.41 \pm 1.1$	0.8
Escaped anterior capsulorhexis	1*	1	1.0
Size of posterior capsulorhexis (mean in mm)	$3.83 \pm 2.2$	$3.91 \pm 2.1$	0.89
Large posterior capsulorhexis <sup>^</sup>	1	1	1.0
Pre-existing posterior capsular defect (IOL implanted where intended)	1	0	0.956
Pre-existing posterior capsular defect (IOL could not be implanted where intended)	2	1	0.956
Iris prolapse	0	1	0.9

\*Despite the large capsulorhexis, the IOL could still be captured successfully, <sup>^</sup>Larger than usual but still well centred and optimal.



**Figure 1: (a-c):** Post-operative photograph of a patient with optic capture at 3 months follow up, 1 year and 2 years. Note the fused capsules in 1a. At 1 year and 2 years in Figure 1b and 1c there is fibrosis around the capsular margins thus sealing the bag 360 degrees along with the trapped lens fibres. There is a sparkling clear visual axis with good centration of the IOL and no signs of any previous inflammation. (d-f): Post-operative photograph of the other eye of the same child. In Figure 1d, at 3 months post op, IOL can be seen well-centred in the bag with an overlapping anterior capsule and an appropriately sized posterior capsular opening. On further follow up at 1 year and 2 years although the visual axis is clear there is florid proliferation of lens epithelial cells which at 2 years are seen scraping on to the vitreous as well.

**Table 4: A Record of the postoperative adverse events in both groups**

Adverse events	Group 1	Group 2	P
Visual axis opacification	0	0	-
IOL not found at the intended site <sup>^</sup>	2	1	0.54
Anterior capsular phimosis	0	1	0.49
Inflammatory sequelae			
1. Posterior synechiae and Pigments on IOL	1	5	0.039*
2. Anterior synechiae	0	1	
Decentered IOL	0	0	-
Ocular hypertension	0	0	-
Corneal haze	1	0	0.49
Retinal detachment	0	0	-

**Table 5: Details of patients aged less than one year**

	Capture eye	Bag eye	P
Total	7	7	
Mean age	11.4±1.8 months		
Escaped anterior capsulorhexis	0	0	-
Large posterior capsulorhexis	1	0	0.95
Pre-existing posterior capsular defect	0	0	-
Iris prolapse	0	1	0.9
Visual axis opacification	0	0	-
Anterior capsular phimosis		1	0.49
Inflammatory sequelae			
1. Lenticular adhesions and Pigments on IOL	1	4	0.04*
2. Anterior synechiae/side port synechiae	0	1	
Decentered IOL	0	0	-
IOL not found at the intended site	2	1	0.54
Corneal haze	1	0	0.49

## Discussion

We compared the benefits and demerits of posterior optic capture vs in the bag IOL implantation in two eyes of the same patient in this study. We did not find any significant difference in terms of visual axis clarity between eyes having a vitrectomy and those not having one. Posterior optic capture resulted in a well apposed capsules and prevented visual axis opacification comparable to in the bag implantation of IOL. The inflammatory response in the eye with optic capture was less than the fellow eye. To the best of our knowledge, this is the first 'prospective study' of its kind. The biggest merit of our study was that we performed the two procedures in either eye of the same patient which eliminates bias in terms of age, biometry and a lot of patient factors. The same surgeon implanted similar IOL in both eyes.

Anterior vitrectomy brings its own set of complications in growing eye of a child.<sup>[7]</sup> Vitrectomy can increase the chances of cystoid macular edema, which is often underreported in

children due to lack of imaging.<sup>[8]</sup> How much vitrectomy is "adequate" in children is not quantifiable and hence may be subjective. Strands of vitreous in the anterior chamber may predispose to more fibrinous complications. Enlargement of PPC may also occur at the time of vitrectomy making it impossible to implant IOL in the bag.<sup>[9]</sup> Despite these disadvantages, we are routinely performing anterior vitrectomy due to its biggest advantage in preventing posterior capsular opacification in congenital cataract surgery. But even after primary posterior capsulectomy with vitrectomy, many children's visual axes become reoccluded by secondary membranes necessitating repeated surgery and disturbing the vitreous again. The long-term effect of vitrectomy in children is yet to be ascertained.

In the hands of a well-trained surgeon, posterior optic capture needs minimal manipulation and does away with vitrectomy related complications. It was first advocated by Gimbel and colleagues and later propagated by others.<sup>[10-13]</sup> The major benefit achieved with posterior optic capture is optimum centration of IOL and prevention of vitreous herniation. It results in fusion of the capsular bag's anterior and posterior leaflets for almost 360 degrees. Since most of the circumference of the posterior capsule opening is anterior to the lens optic, Elschnig pearls do not get deposited on the vitreous face reducing lens epithelial cell migration and visual axis obscuration.<sup>[14]</sup> Moreover, it can be carried out even if the anterior capsulorhexis is eccentric.<sup>[15]</sup>

We also observed significantly less inflammatory sequelae with this technique. Almost half of the children in our cohort were a year old or younger, the age group with the maximum propensity for inflammatory complications and it is in this subgroup that we observed the maximum inflammatory response in those with endocapsular implantation. Considering our Indian scenario where the patient profile is from low socio economic strata who come from far flung areas it is a reasonable option to consider primary IOL implantation.<sup>[16]</sup> We cannot fully apply the strategy of IATS to our system.<sup>[17]</sup> Using the same IOL in both eyes in our study did away with any such complication arising due to IOL material, IOL design and IOL diameter. Previous studies have reported comparable or increased inflammatory sequelae in the eyes with optic capture.<sup>[14,18]</sup> Uveal inflammation may depend on iris pigmentation which affects inflammatory sequelae, but were again not relevant in our study as it was done in two eyes of the same patient presumably with same iris pigmentation. Keeping all these factors in mind, we hypothesize that anterior vitrectomy may be a contributing factor to these fibrinous complications occurring in group 2. Secondly since the optic is capture behind the capsule, optic capture could potentially reduce chaffing and rubbing on the posterior surface of the iris.

Raina *et al.* in his prospective study showed optic capture without vitrectomy as a promising technique to prevent opacification but the authors did not compare it with the 'gold standard' bag implantation of IOL with vitrectomy.<sup>[6]</sup> The studies which necessitate the use of anterior vitrectomy with capture either use a PMMA IOL with haptics in sulcus or have reported results in different set of patients retrospectively with a short follow up.<sup>[4,14,15,19]</sup> A recent study has shown results with the three piece acrylic IOL. However, they included only one eye of a patient.<sup>[18]</sup>

It has been hypothesized that there might be a low incidence of glaucoma after IOL optic capture due to the backward movement of the optic part of IOL.<sup>[20]</sup> A study with longer follow up with a large infant cohort is needed in this regard. A part of the success of the procedure can also be attributed to the IOL design and the make of the optic-haptic junction.<sup>[20,21]</sup> The overall length of the Hoya IOL is 12.5 mm, which is less than other acrylic single-piece IOLs. The design of the Hoya IOL could be an additional factor in low incidence of complications.<sup>[21]</sup> We understand and agree that posterior optic capture is a technically challenging procedure. Care should be taken in cases where we plan posterior optic capture, the PPC should be made 1-1.5 mm smaller than the IOL optic. It can be larger than routine but not large enough to cause spontaneous release of the optic. It might have a learning curve for inexperienced surgeons and trypan blue staining of the posterior capsule may be done by beginners to achieve an optimum capture.<sup>[22]</sup> For surgeons who opt for making a PPC after IOL implantation, posterior optic capture can be a viable option.

A meta-analysis of all published literature on posterior optic capture without vitrectomy in children describes the technique to be a helpful surgical method in preventing PCO and geometric decentration with robust efficacy and safety.<sup>[23]</sup>

## Conclusion

It is safe to conclude from the long follow-up of our patients that posterior optic capture is a promising technique of IOL implantation and can be effectively used even in young children without having to perform vitrectomy and without using a customised intraocular lens. In conclusion, posterior optic capture is a reasonable alternative to endocapsular implantation of IOL with significantly fewer inflammatory sequelae and at the same time preserving the vitreous in a growing eye.

## Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form, the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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## Conflicts of interest

There are no conflicts of interest.

## References

- Plager DA, Lynn MJ, Buckley EG, Wilson ME, Lambert SR; Infant Aphakia Treatment Study Group. Complications in the first 5 years following cataract surgery in infants with and without intraocular lens implantation in the Infant Aphakia Treatment Study. *Am J Ophthalmol* 2014;158:892-8.
- Yangzes S, Kaur S, Gupta PC, Sharma M, Jinagal J, Singh J, Ram J. Intraocular lens implantation in children with unilateral congenital cataract in the first 4 years of life. *Eur J Ophthalmol* 2019;29:304-8.
- Sukhija J, Kaur S, Ram J, Yangzes S, Madan S, Jinagal J. Outcome of various hydrophobic acrylic intraocular lens implantations in children with congenital cataract. *Eur J Ophthalmol* 2017;27:711-5.
- Vasavada AR, Trivedi RH, Singh R. Necessity of vitrectomy when optic capture is performed in children older than 5 years. *J Cataract Refract Surg* 2001;27:1185-93.
- Van Looveren J, Ní Dhubhghaill S, Godts D, Bakker E, De Veuster I, Mathysen DG, *et al.* Pediatric bag-in-the-lens intraocular lens implantation: Long-term follow-up. *J Cataract Refract Surg* 2015;41:1685-92.
- Raina UK, Gupta V, Arora R, Mehta DK. Posterior continuous curvilinear capsulorhexis with and without optic capture of the posterior chamber intraocular lens in the absence of vitrectomy. *J Pediatr Ophthalmol Strabismus* 2002;39:278-87.
- Gimbel HV, Ferensowicz M, Raanan M, DeLuca M. Implantation in children. *J Pediatr Ophthalmol Strabismus* 1993;30:69-79.
- Hoyt CS, Nickel B. Aphakic cystoid macular edema: Occurrence in infants and children after transpupillary lensectomy and anterior vitrectomy. *Arch Ophthalmol* 1982;100:746-9.
- Gimbel HV, DeBroff BM. Management of lens implant and posterior capsule with respect to presentation of secondary cataract. *Operative Tech Cataract Refract Surg* 1998;1:185-90.
- Gimbel HV, DeBroff BM. Posterior capsulorhexis with optic capture: Maintaining a clear visual axis after pediatric cataract surgery. *J Cataract Refract Surg* 1994;20:658-64.
- Gimbel HV. Posterior continuous curvilinear capsulorhexis and optic capture of the intraocular lens to prevent secondary opacification in pediatric cataract surgery. *J Cataract Refract Surg* 1997;23(Suppl 1):652-6.
- Gimbel HV. Posterior capsulorhexis with optic capture in pediatric cataract and intraocular lens surgery. *Ophthalmology* 1996;103:1871-5.
- Argento C, Badoza D, Ugrin C. Optic capture of the AcrySof intraocular lens in pediatric cataract surgery. *J Cataract Refract Surg* 2001;27:1638-42.
- Vasavada AR, Trivedi RH. Role of optic capture in congenital cataract and intraocular lens surgery in children. *J Cataract Refract Surg* 2000;26:824-31.
- Koch DD, Kohnen T. Retrospective comparison of techniques to prevent secondary cataract formation after posterior chamber intraocular lens implantation in infants and children. *J Cataract Refract Surg* 1997;23:657-63.
- Sukhija J, Kaur S, Ram J. Outcome of primary intraocular lens implantation in infants: Complications and rates of additional surgery. *J Cataract Refract Surg* 2016;42:1060-5.
- Sukhija J, Ram J, Kaur S. Complications in the first 5 years following cataract surgery in infants with and without intraocular lens implantation in the infant aphakia treatment study. *Am J Ophthalmol* 2014;158:1360-1.
- Vasavada AR, Vasavada V, Shah SK, Trivedi RH, Vasavada VA, Vasavada SA, Srivastava S, Sudhalkar A. Postoperative outcomes of intraocular lens implantation in the bag versus posterior optic capture in pediatric cataract surgery. *J Cataract Refract Surg* 2017;43:1177-83.
- Cicik ME, Doğan C, Bölükbaşı S, Cinhüseyinoğlu MN, Arslan OŞ. Comparison of two intraocular lens implantation techniques in pediatric cataract surgery in terms of postoperative complications. *Balkan Med J* 2018;35:186-90.
- Xie YB, Ren MY, Wang Q, Wang LH. Intraocular lens optic capture in pediatric cataract surgery. *Int J Ophthalmol* 2018;11:1403-10.
- Sukhija J, Kaur S, Ram J. Outcome of a new acrylic intraocular lens implantation in pediatric cataract. *J Pediatr Ophthalmol Strabismus* 2015;52:371-6.
- Sharma N, Balasubramanya R, Dada VK, Vajpayee RB. Efficacy of trypan blue in posterior capsulorhexis with optic capture in pediatric cataracts [ISRCTN48221688]. *BMC Ophthalmol* 2006;6:12.
- Zhou HW, Zhou F. A Meta-analysis on the clinical efficacy and safety of optic capture in pediatric cataract surgery. *Int J Ophthalmol* 2016;9:590-6.