Chattagram Maa-O-Shishu Hospital Medical College Journal
Volume 12, Issue 1, January 2013 • DOI: 10.11566/cmosh.2013.1201.25

Original Article

Management of Pediatric Cataract with Acrylic Foldable Intraocular Lens: Our Experience

Riffat Rashid[1]*
Md. Jafrul Hassan[2]
Farzan Afzal[3]
Shovona Alam[3]
Jamal Nizamuddin Ahmed[3]
Deen Mohd. Noorul Huq[4]

[1]Department of Oculoplasty, Ispahani Islamia Eye Institute & Hospital, Dhaka

[2]Department of Cornea, Ispahani Islamia Eye Institute & Hospital, Dhaka

[3]Department of Pediatric Ophthalmology, National Institute of Ophthalmology & Hospital, Dhaka

[4]Director, National Institute of Ophthalmology & Hospital, Dhaka

*Correspondence to:
Dr Riffat Rashid
Department of Oculoplasty, Ispahani Islamia Eye Institute & Hospital, Firmgate; Dhaka; Bangladesh
E-mail: drriffatrashid@gmail.com

How to cite this article:
Rashid R, Hassan MJ, Afzal F, Alam S, Ahmed JN, Deen Mohd. Noorul Huq DMN. Management of pediatric cataract with acrylic foldable intraocular lens: our experience. Chatt Maa Shi Hosp Med Coll J 2013; 12(1): 25–29.

Abstract

Background: In Bangladesh, one-third (31%) of childhood blindness are from cataract. The management of which remains a challenge; treatment is often difficult, tedious and requires a dedicated team effort. The study was done to observe the postoperative visual acuity and complication following implantation of foldable acrylic hydrophobic intraocular lens (IOL). **Methods:** This prospective study was done during the period of July 2006 to June 2011. This study comprised of patients in the age group of 2–16 years with unilateral and bilateral, congenital and developmental cataract, who underwent cataract surgery and implantation of foldable acrylic hydrophobic IOL. They were followed up at day 1, day 7, 1 month, 6 months and 1 year after operation to assess the incidence of posterior capsular opacity (PCO) and occurrence of postoperative complications. **Results:** Thirty-eight eyes of 30 pediatric patients underwent cataract surgery and underwent acrylic foldable IOL implantation. Postoperative anterior chamber reaction was minimum and the incidence of PCO was 18.32%. But, no severe PCO developed. Other complications like pupillary capture and decentration of IOL was also absent. **Conclusions:** It can be concluded that foldable acrylic hydrophobic IOL is well tolerated in the pediatric eye. There is less chance of postoperative inflammation and development of PCO.

Key words: Pediatric cataract; Foldable acrylic intraocular lens; Postoperative complications of IOL.

INTRODUCTION

In Bangladesh, one-third (31%) of childhood blindness are due to cataract.[1] In our country most of the children with cataract remain untreated due to illiteracy, poverty and limited medical facilities. Even those who are detected and operated are having reduced vision due to improper management.

The aim of pediatric cataract surgery is to provide and maintain a clear visual axis and a focused retinal image. This is accomplished by timely removal of the opacified crystalline lens and appropriate optical rehabilitation.[2]

Previously there were hesitation among some ophthalmologists to implant intraocular lens (IOL) in the pediatric population because of fear of the long-term effects of synthetic material, the changing refractive status of the developing eye and the increased inflammatory response that occurs in pediatric eyes. But now, IOL insertion is a routine part of cataract surgery in children over 2 years old. Because, an IOL can provide a full time correction with optics that closely simulates those of the crystalline lens.[2]

Two types of IOL are used: Polymethylmethacrylate (PMMA) and acrylic hydrophobic IOL. Acrylic hydrophobic IOLs have specific advantages in children due to increased biocompatibility.[3] The most important complication of pediatric cataract surgery is increased inflammatory response and posterior capsular opacity (PCO). PCO is caused by the regeneration and extracellular matrix production of the residual lens epithelial cells.[4] Management of PCO determines the outcome of surgery to a great extent.[5] Acrylic hydrophobic IOLs have been reported to a significantly lower rate of PCO.[6]

The study was done to observe postoperative visual acuity and complication following implantation of foldable acrylic hydrophobic IOL in pediatric patient.

MATERIALS AND METHODS

This prospective study was done in the Department of Pediatric Ophthalmology, in a super specialized eye hospital and a clinic at Dhaka from July 2006 to June 2011. The Ethical and Research Committee of Institute has approved the protocol and given permission to undertake this study. Patients' parents/guardians were explained about the nature, purpose and potential risks of all procedures of the examination, investigations and surgery. An informed written consent was also taken prior to participate in this study.

We included patients in the age group of 2–16 years with unilateral and bilateral, congenital and developmental cataract. The exclusion criteria comprised of patients less than 2 years and more than 16 years of age, who had traumatic cataract, cataract associated with ocular or systemic disease, nystagmus, microcornea, persistent hyperplastic primary vitreous (PHPV) and eyes with any previous ocular surgery.

Cataract was diagnosed by taking history and slit-lamp examination of anterior segment. Prior to cataract surgery the following investigations were commonly done: complete blood count, chest X-ray P/A view, routine and microscopic examination of urine and stool, biometry, keratometry and A-Scan, B-Scan, titers for TORCH (in case of congenital cataract).

Surgical procedures and postoperative follow-up

All cases were operated under general anesthesia and acrylic foldable IOL implantations were done. Atropine eye ointment was used before the surgery. About 5% of povidone iodine (aqueous solution) was instilled into the conjunctival sac as well as in the periorbital and orbital region. Small incision cataract surgery (sics) tunnel was made. An anterior capsulotomy was made with 26 Gaze needle and lens matter was aspirated with a simcoe two-way cannula. This part of the procedure was similar in all cases but surgery was then continued differently based on the age of the patient and other factors. In the patients aged 2 to 4 years, irrigation aspiration, anterior vitrectomy with PCIOL implantation and aged more than 4 to 6 years, irrigation aspiration with PCIOL implantation was done. (Figures 1 & 2).

The wound is closed by a single stitch with 10-0 monofilament nylon suture. In all cases, 5% povidone iodine was used at the end of surgery. Subconjunctival steroid and antibiotic injection was given in the eye and a light patch and shield was placed over the eye. Intravenous steroid 0.15 mg/kg body weight was given.

Postoperative medications was administered to all the patients including oral antibiotic for 1 week, topical steroid drop for 4 weeks or more, topical antibiotic drop for 3 to 4 weeks, mydriatics eye drop for 2 weeks, systemic oral prednisolone were given in cases of severe anterior chamber inflammatory reaction.

All the patients were examined and followed up at day 1, day 7, 1 month, 6 months and 1 year after operation. The following

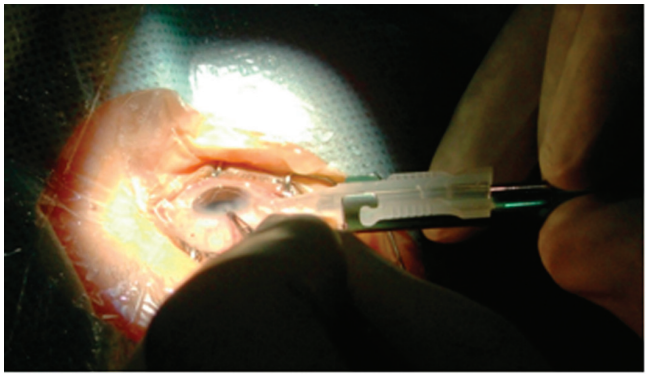

Figure 1: Implantation of acrylic foldable IOL into the eye

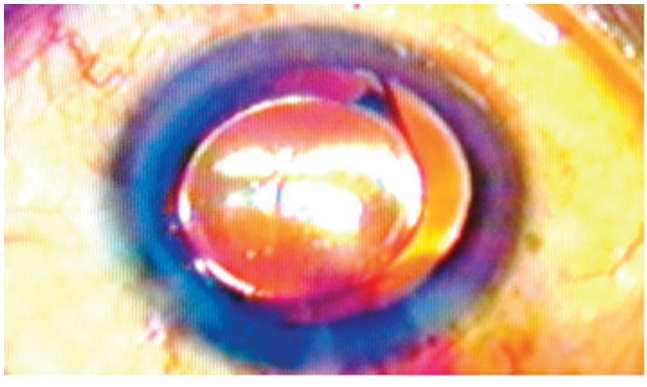

Figure 2: Acrylic foldable IOL into the capsular bag

parameters were observed: visual acuity, anterior chamber reaction, pupillary capture, IOL position and PCO.

All the routine preoperative and postoperative examinations follow a standard protocol. This consists of a complete ocular examination, including slit-lamp examination, before and after dilatation of the pupil fundus examination. Information was recorded on a pre-designed data collection sheet, and analyzed. It included age, sex, clinical type of childhood cataract, type of lental opacity, visual acuity, ocular adnexa, conjunctiva, corneal oedema, anterior chamber, pupil, iris, secondary membrane, pupillary capture, IOL position, PCO.

RESULTS

The study included a total of 38 eyes of 30 pediatric patients with congenital and developmental cataract, underwent cataract surgery and acrylic foldable IOL was implanted.

Patient's demographic and clinical findings are given in Table 1. Preoperative visual acuity was measured in all patients and found, visual acuity was 6/60 or worse in most of the eyes ($N = 33$).

Table 1: Demographic of the patients

Variables	Patients = 30; Eyes = 38
Age	
<8yrs	19
>8yrs	11
Range	3–13 years
Mean	6.85 ± SD 2.9
Gender (*N* = 30)	
Male	23 (76.66%),
Female	7 (23.34%).
Male: Female	3.3:1
Side of cataract (*N* = 30)	
Unilateral	12 (40%)
Bilateral	18 (60%)
Types of cataract (*N* = 30)	
Congenital	3 (10%)
evelopmental	27 (90%)
Types of lentil opacity (*N* = 38)	
Zonular opacity	12
Polar opacity	7
Total opacity	19

All the patients were examined and followed up at day 1, day 7, 1 month, 6 months and 1 year after operation. Following parameters were observed: visual acuity (Table 2), anterior chamber reaction, pupillary capture, IOL position and PCO. Anterior chamber reaction and posterior capsular opacity were observed is some cases (Figure 3; Table 3). But no patients developed pupillary capture and all the IOL was found in situ up to 12 months follow-up.

DISCUSSION

The aim of pediatric cataract surgery is to provide and maintain a clear visual axis and a focused retinal image. This is accomplished by the timely removal of the opacified crystalline lens and appropriate optical rehabilitation.[2] Several advances for surgical management of childhood cataracts have occurred in the last decades owing to advances in microsurgical techniques, availability of better ophthalmic viscosurgical agents and appropriately sized and styled implants suitable for small eyes.[2] In pediatric cataract surgery, PCO is a disabling complication. Apart from reducing visual acuity, PCO may impair contrast sensitivity, causes difficulties with glare or give rise to monocular diplopia.[7] PCO is caused by the regeneration and

Table 2: Postoperative uncorrected visual acuity

	Visual acuity			
Follow-up	**≥6/9 (*N*)**	**6/12–6/18 (*N*)**	**6/24–6/36 (*N*)**	**≤6/60 (*N*)**
PO day 1	18	18	2	—
PO day 7	23	12	3	—
PO month 1	24	13	1	—
PO month 6	24	13	1	—
PO month 12	17	20	1	—

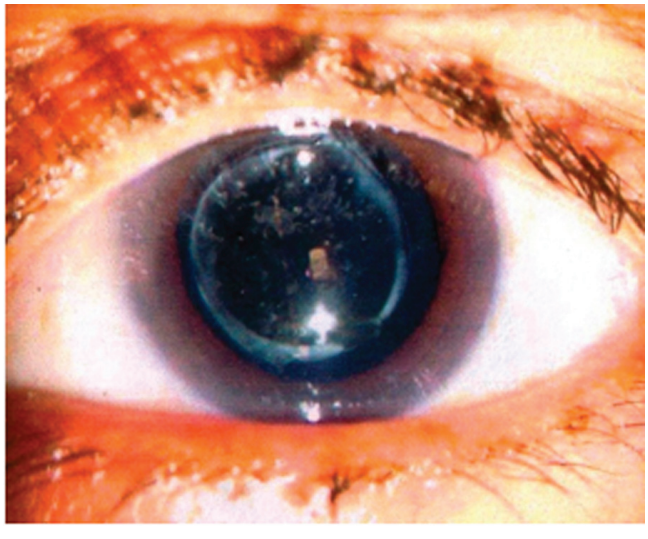

Figure 3: Posterior capsular opacity

Table 3: Postoperative finding of anterior chamber reaction, posterior capsular opacity (number & percentage)

Anterior chamber reaction					
Postoperative (PO) follow-up	**Quiet:**	**Cells and flare:**			
		Grade I	**Grade II**	**Grade III**	**Grade IV**
PO day 1:	18 (47.36)	8 (21.05)	10 (26.31)	2 (5.26)	—
PO day 7:	25 (65.78)	11 (28.95)	—	—	2 (5.26)
PO month 1:	38 (100.0)	—	—	—	—
Posterior capsular opacity					
	None	**Mild**		**Moderate**	**Severe**
PO month 1:	36 (94.73)	2 (5.26)		—	—
PO month 6:	36 (94.73)	2 (5.26)		—	—
PO month 12:	31 (81.57)	4 (10.52)		3 (7.9)	—

extracellular matrix production of the residual lens epithelial cells.[4] Management of the posterior capsule determines the outcome of the surgery to a great extent.[5] To overcome these difficulties, foldable lens was introduced. Implantation of the newer foldable acrylic IOL results in a lower rate of PCO and allows small incision surgery, thus it may be a good IOL for the pediatric population.[8] The management of PCO in a child is difficult. The efficacy of Nd: YAG laser capsulotomy in the pediatric population largely depends upon the density of the membrane and the cooperation of the child. Also recurrence of opacification of visual axis has been noted following Nd: YAG capsulotomy in young children.[9] The foldable acrylic lens has a thinner optic due to its higher refractive index and more defined squarer edge profile. A square edge to the posterior side of the optic may lead to better adhesion to the posterior capsule and a decreased incidence of PCO.[10]

In this study, the preoperative visual acuity in the operated eyes were 6/60 or less in 33 patients. Postoperative uncorrected visual acuity on 12th month was 17 (44.74%) within 6/6 to 6/9, 20 (52.63%) within 6/12 to 6/18 and 1 (2.63%) within 6/24–6/36. Aasuri et al.[11] on their study shown, postoperatively, 95.6% patients with acrylic IOLs either maintained or improved their vision. Our study is almost similar.

In this study, on 7th POD: quiet anterior chamber was 25 cases, Grade-IV cells and flare (fibrinous uveitis) was found in two (5.26%) eyes, which were resolved with steroid therapy. Michael et al.[12] revealed the presence of 10% of post-operative fibrinous uveitis in acrylic IOL inplantation and Aasuri et al[11] found, none.

We found no pupillary capture and decentration of IOLs on 12th month follow-up. But Aasuri et al.[11] found 8.7% pupillary capture in acrylic IOL implantation.

In this study, posterior capsular opacity was found on 1st postoperative and subsequent follow-ups. On 1st and 6th postoperative month only 2 cases of mild PCO was found. On 12th PO month: 4 cases of mild and 2 cases of moderate PCO was found. The overall incidence of PCO formation was 18.32%. The finding was almost similar to the other studies. Aasuri et al.[11] found 21.1% PCO in acrylic IOLs. Studies by Ursell et al.[13] on adult patients found 11.75% PCO and that by Rezina[14] found 6% PCO in acrylic IOLs.

CONCLUSION

Based on the findings of the present study we can conclude that hydrophobic foldable acrylic lens is well tolerated in the pediatric eye. There is minimum chance of postoperative inflammation and development of PCO.

ACKNOWLEDGMENTS

The authors would like to express their gratitude to all the patients, their guardians, hospital staffs and all colleagues, who participated and helped in this study.

REFERENCES

1. Bangladesh National Council for the Blind (BNCB). National Eye Care Plan for Implantation of Vision 2020 in Bangladesh. Dhaka: Ministry of Health & Family Welfare; 2002.
2. Suresh KP, Ashok G, Vidushi S, David JA, editors. Advances in ophthalmology. New Delhi: Jaypee; 2003. pp. 74–244.
3. Wilson ME, Elliott L, Johnson B, Peterseim MM, Rah S, Werner L, et al. AcrySof acrylic intraocular lens implantation in children: clinical indication of biocompatibility. J AAPOS. 2001;5(6):377–80.
4. Hideyuki H, Ken H, Fuminori N, Fumihiko H. Quantitative comparison of posterior capsule opacification after polymethyl methacrylate, silicon, and soft acrylic intraocular lens implantation. Arch Ophthalmol. 1998;116:1579–82.
5. Abhay R. Vasavada, Rupal H. Trivedi, Vandana C Nath. Visual axis opacification after AcySof intraocular lens implantation in children. J Cataract Refract Surg. 2004;30:1073–81.
6. Takayuki A. Cataract surgery past and present. Asian J Ophthalmol. 2007;9(4):2–3.
7. Kanski JJ, editor. 'Lens' in clinical ophthalmology, 5th ed. Edinburgh, UK: Butterworth Heinemann; 2003. pp. 162–91.
8. Andrea ME, Michael A, Elisabeth M, Andreas K. Morphological and functional results of AcrySof intraocular lens implantation in children. J Cataract Refract Surg. 2003;29:285–93.
9. Reda Z, Vytautas J, Valerijus B, Gerd UA. Prevention of posterior capsular opacification using different intraocular lenses. Medicina (Kaunas) [Internet]. 2004;40(8):721–30. Available from: http://www. medicina.kmu.lt
10. Calvin R. Intraocular lenses materials. Highlights of Ophthalmol. 2005;34(6):16–22.
11. Aasuri MK, Fernandes M, Pathan PP. Comparison of acrylic and polymethylmethacrylate lenses in a pediatric population. Indian J Ophthalmol. 2006;54(2):105–9.
12. Michael K, Berthold L, Gabriele CGS. Results and complication of hydrophobic acrylic vs PMMA posterior chamber lenses in children under 17 years of age. Graefe's Arch Clin Exp Ophthalmol. 2003;241:637–41.
13. Ursell PG, Spalton DJ, Pande MVJ, et al. Relationship between intraocular lens biomaterial and posterior capsular opacification. J Cataract Refract Surg. 1998;82:1182–8.
14. Rezina Q. Visual outcome of phacoemulsification using PMMA and acrylic intraocular lens [MS thesis]. National Institute of Ophthalmology & Hospital, (NIO & H): University of Dhaka; 2006.