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OUTCOME OF POSTERIOR CAPSULAR OPACIFICATION IN PRESCHOOL- AND SCHOOL-AGE PATIENTS AFTER PEDIATRIC CATARACT SURGERY WITHOUT POSTERIOR CAPSULOTOMY IN TERTIARY EYE HOSPITAL, BANGLADESH.

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ABSTRACT

Background: The most frequent postoperative consequence of cataract excision in children is posterior capsule opacification (PCO), often known as "secondary cataract." This is a rather prevalent problem in Bangladesh. **Objective:** In this study our main aim is to evaluate the efficacy of Posterior Capsular Opacification in Preschool- and School-Age Patients after Pediatric Cataract Surgery without Posterior Capsulotomy in a Tertiary Eye Hospital, Bangladesh. **Method:** This cross-sectional study carried out at tertiary eye hospital from June 2021 to February 2022. Where a total of 150 pediatric patients who underwent cataract surgery and IOL implantation were included as a population. Retinoscopy, biomicroscopy and dilated fundus examinations were done preoperatively in some patients based on extent of cataract and postoperatively in all patients. Pre- and postoperative best corrected visual acuity (BCVA) of compliant patients was recorded (Snellen). The diopter, brand and implantation location was recorded for implanted IOLs. **Results:** During the study, 55% belong to 7-9 age group. in addition, 35% had posterior polar surgery followed by 25% had nuclear, 21% had lamellar, 15% had nuclear and cortical and 4% had posterior and polar punctate. In addition, according to types of intraocular lens implanted and posterior capsular opacification status where 56% implanted Hydrophobic acrylic lens followed by 19% cases were acrylic, 25% cases were Hydrophilic-coated hydrophobic. In preoperative period 0.1-lower cases was 34% which was shifted to 11% after post operative where as in preoperative period 0.2-0.5 was 44% which was shifted to 46% after post operative. **Conclusion:** From our study we can say that, because young children have a high rate of PCO formation, cataract extraction with posterior capsulotomy (and anterior vitrectomy) is recommended for this age group. According to our recommendation, adequately competent surgeons should perform posterior capsulotomy and anterior vitrectomy on chosen preschool and school-age children during the same surgical session as cataract extraction.

KEYWORDS: capsular opacification (PCO), neodymiumdoped yttrium aluminium garnet (Nd:YAG), cataract extraction.

INTRODUCTION

Despite major breakthroughs in cataract surgery processes and intraocular lenses (IOLs), posterior capsular opacification is the most prevalent postoperative complication of juvenile cataract surgery (PCO). Age is the most essential factor in PCO development, with the incidence rising as one gets older. Following cataract surgery, PCO has been detected in up to 100 percent of neonates.[1-3]

It is beneficial to do posterior capsulotomy and anterior vitrectomy in the same surgical session as cataract extraction to avoid PCO from blocking the optical axis. However, neodymiumdoped yttrium aluminium garnet (Nd:YAG) laser capsulotomy is another therapeutic option for PCO in essential circumstances and with willing patients, particularly school-aged children.

Nd:YAG Certain disadvantages of laser treatment include transitory intraocular pressure (IOP) increase, high expense, restricted availability to equipment, noncompliance with laser therapy in young children, the necessity for general anesthesia, and a high rate of IOL destruction. Furthermore, remaining lens fibers may

migrate to the intact vitreous surface and create secondary opaque membranes even in the absence of the posterior capsule.[4,5]

There are several drawbacks to doing posterior capsulotomy and anterior vitrectomy at the same surgical session as cataract extraction. These include a lengthier surgical time, a greater need for the surgeon's knowledge and ability, vitreous loss, IOL displacement, and increased incidence of cystoid macular edema and retinal detachment.[2,3,4] As a result, surgeons are faced with a number of questions.

In this study our main goal is to evaluate the Outcome of Posterior Capsular Opacification in Preschool- and School-Age Patients after Pediatric Cataract Surgery without Posterior Capsulotomy in tertiary eye hospital, Bangladesh.

OBJECTIVE

To assess the outcome of Posterior Capsular Opacification in Preschool- and School-Age Patients after Pediatric Cataract Surgery without Posterior Capsulotomy in tertiary eye hospital, Bangladesh.

METHODOLOGY

This cross sectional study carried out at tertiary eye hospital from February 2021 to February 2022. Where a total of 100 pediatric patients who underwent cataract surgery and IOL implantation were included as a population. Retinoscopy, biomicroscopy and dilated fundus examinations were done preoperatively in some patients based on extent of cataract and postoperatively in all patients. Pre- and postoperative best corrected visual acuity (BCVA) of compliant patients was recorded (Snellen). The diopter, brand and implantation location was recorded for implanted IOLs. Cataract type was evaluated.

The data was entered in MS excel and analyzed using SPSS V 21. The continuous variables were represented using Mean and Standard deviation and categorical data was represented in the form of frequencies and proportions and chi square test will be used to check for association between quantitative data. P value less than 0.05 is considered to be statistically significant.

RESULTS

In table-1 shows age distribution of the study group where majority were belong to 7-9 years age group, 55% followed by 25% belong to 10-12 years and 20% belong to 4-6 years. The following table is given below in detail.

Table 1: Age distribution of the study group.

Age distribution	%
4-6 years	20%
7-9 years	55%
10-12 years	25%

In figure-1 shows distribution of cataract types where 35% had posterior polar surgery followed by 25% had nuclear, 21% had lamellar, 15% had nuclear and cortical and 4% had posterior and polar punctate. The following figure is given below in detail.

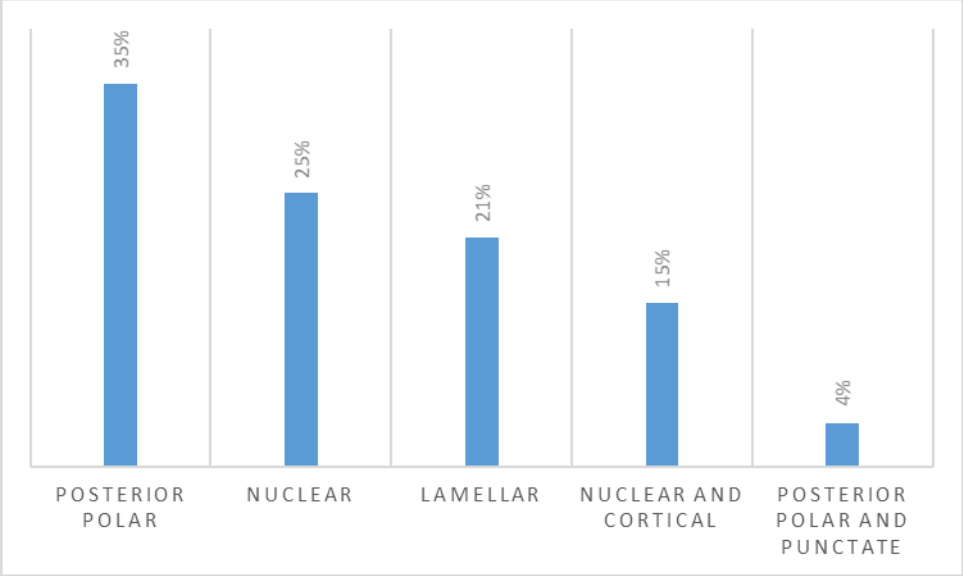

Figure 1: Distribution of cataract types.

In table-2 shows Types of intraocular lens implanted and posterior capsular opacification status where 56% implanted Hydrophobic acrylic lens followed 19% cases were acrylic, 25% cases were Hydrophilic-coated hydrophobic. The following table is given below in detail.

Table 2: Types of intraocular lens implanted and posterior capsular opacification status.

	% of implanted	PCO status
Hydrophobic acrylic	56%	41%
Acrylic	19%	100%
Hydrophilic-coated hydrophobic	25%	100%

In table-3 shows Pre- and postoperative best corrected visual acuity levels where in preoperative period 0.1- lower cases was 34% which was shifted to 11% after post operative where as in preoperative period 0.2-0.5 was 44% which was shifted to 46% after post operative. The following table is given below in detail.

Table 3: pre-and postoperative best corrected visual acuity levels.

	Preoperative BCVA	Post operative BCVA
0.1 or lower	34%	11%
0.2-0.5	44%	46%
0.5-1.0		43%

DISCUSSION

There are several factors that affect the incidence of PCO development after pediatric cataract surgery. These factors include surgical age, accompanying ocular pathologies, extent of cortex clearance, surgical management of the posterior capsule and anterior vitreous, IOL parameters (design, material and location) and surgical trauma.

Ensuring a clear visual axis after pediatric cataract surgery is crucial for good visual acuity results. In young children, the inflammatory response is very intense and the visual axis may be obscured by fibrous membranes proliferating on the intact anterior vitreous surface.[6]

Opacification obscuring the visual axis is a common postoperative complication of pediatric cataract surgery. The rate of PCO development can reach 100% in children younger than 4 years old when the posterior capsule is intact.[7] Various surgical procedures are utilized to prevent PCO.

Opacity in the optic axis has been reported in up to 60% of patients who had primary posterior capsulotomy without anterior vitrectomy.[8,9] Some researchers have reported the lens epithelial cells and their remnants formed a basis for proliferation on the anterior hyaloid surface.[10] Opacity in the optic axis has been reported at rates less than 20% when anterior vitrectomy and posterior capsulotomy are performed together with cataract surgery.[4,11,12] Despite anterior vitrectomy, this opacity arose due to insufficient posterior capsule opening and anterior vitrectomy.[11]

Another technique used to prevent PCO is optic capture, in which the IOL haptics are positioned inside the capsule after the primary posterior capsulotomy (with or without anterior vitrectomy), thus fixing the optics posterior to the capsule. This prevents the proliferation of lens epithelial cells on the anterior vitreous surface. However, lens epithelial cells may migrate from the IOL haptic-optic junction and proliferate on the posterior of the capsule and the IOL surface. Therefore, this technique may also fail to completely prevent secondary membrane development.[5]

Another report expressed concerns that performing vitrectomy in the eyes of children negatively impacts ocular development.[13]

However, anterior vitrectomy should be performed with primary posterior capsulotomy in infants and young children due to the risk of amblyopia and high PCO incidence. For older children, Nd:YAG laser capsulotomy can be considered.[14]

There is no consensus on the age range within which posterior capsulotomy should be performed in the same surgical session as cataract extraction. Other study recommended up to the age of 5 years, whereas another study recommended up to 6 years old.[16]

In a study using acrylic IOLs (AcrySof) in children aged 2-16 years, PCO developed in 83.8% (27.7% requiring treatment) of patients that did not undergo posterior capsulotomy, 37.5% (7.5% requiring treatment) of patients that had posterior capsulotomy without vitrectomy, and 6.7% (treatment was not necessary) of patients that underwent both vitrectomy and posterior capsulotomy.[12] The authors also reported a significantly higher rate of PCO development in children 8 years old or younger compared with children over 8 years old ($p=0.01$).[12] In another study, 9 of 21 pediatric patients who underwent cataract surgery without posterior capsulotomy developed PCO and 7 of those patients required Nd:YAG laser therapy.[17]

whereas other study divided congenital cataract patients aged 2-5 years into 2 groups and determined PCO rate as 11.8% in the group that had posterior capsulotomy with vitrectomy versus 76.9% in the group that had cataract extraction. The rate of Nd: YAG laser capsulotomy was 2.9% and 57.7% in the groups, respectively.[11]

CONCLUSION

From our study we can say that, because young children have a high rate of PCO formation, cataract extraction

with posterior capsulotomy (and anterior vitrectomy) is recommended for this age group. According to our recommendation, adequately competent surgeons should perform posterior capsulotomy and anterior vitrectomy on chosen preschool and school-age children during the same surgical session as cataract extraction.

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