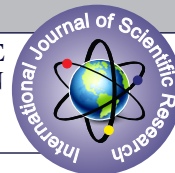


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RETROSPECTIVE STUDY OF ETIOLOGY, CLINICAL PROFILE, VISUAL OUTCOME AND COMPLICATIONS FOLLOWING EXTRACAPSULAR CATARACT EXTRACTION (ECCE) WITH INTRAOCULAR LENS (IOL) IMPLANTATION IN PEDIATRIC EYES AT PRAVARA RURAL HOSPITAL, LONI



Ophthalmology

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ABSTRACT

The purpose of this study is to analyze and study the etiology of pediatric cataract, visual outcome and pattern of complications following extracapsular cataract extraction (ECCE) with intraocular lens (IOL) implantation in paediatric eyes. **Methods:** This is a retrospective study of all paediatric patients who underwent cataract extraction with posterior chamber IOL implantation between January 2018 to December 2020 at Pravara Rural Hospital, Loni. The data was collected from hospital records. The results were evaluated for etiology, clinical profile, early and delayed complications related to IOL, and posterior capsule were studied. The Best Corrected Visual Acuity (BCVA) was evaluated for the last follow up and related reasons were studied. Additional intervention such as neodymium YAG laser therapy (Nd:YAG) was done when necessary.

Results: Total 27 cases of paediatric cataract were evaluated with the mean age being 10 years. Males were more affected (70.3 %). Congenital or developmental cataract outnumbered those with ocular trauma either open globe or close globe injury (44.44%). The complications in children varied based on age and cause of cataract. The common events included increased inflammatory response and posterior capsular opacification. Few patients had Cystoid Macular Edema (CME) and decentration or dislocation was rarely seen. In majority of the patients, BCVA was less than 6/12.

Conclusion: We report this study on etiology, clinical outcomes of paediatric cataract in rural area. The age, delay in treatment, etiology, mode of injury, and posterior segment involvement adversely affected the visual outcome. Timely surgical intervention and proper globe repair should be done in all the cases.

KEYWORDS

Paediatric, Cataract, Visual Outcome, Etiology

INTRODUCTION:

Paediatric cataract is a leading cause of childhood blindness¹. The incidence is on rise with social, economical, and emotional burden to the child, family, and society. The prevalence of childhood blindness in India is estimated to be five times than that which is seen in the developed world^{2,3,4,5}. There are many potential causes of pediatric cataract, and the timing of onset and the cause of the cataract can affect the risk of surgical complications. Common cause is congenital/infantile or developmental cataract but there are also acquired cataracts following ocular trauma. In infants, visually significant congenital cataracts need to be removed promptly to prevent irreversible deprivation amblyopia. Developmental cataracts develop during the early childhood.

Ocular trauma is an important cause of morbidity and acquired unilateral blindness in this age group. Pediatric cataract accounts for 15% of cataracts. Ocular trauma accounts for 8-12% of ocular injuries. Cataracts of certain morphology are associated with better prognosis. Lamellar and anterior polar cataracts carry a better prognosis than nuclear or posterior polar cataracts⁶. The common cause is congenital or developmental cataract with rise in incidence of pediatric ocular trauma. The parents were counseled regarding the risk, complications and long term follow up. The risks of long-term complications, including opacity of the posterior capsule, glaucoma, dislocation of the intraocular lens, retinal detachment, failure to achieve normal vision and need for further treatment or surgery for any of these complications was explained. Early detection, social education and specialized treatment can give good prognosis. They are the key to success.

AIM:

To study the etiology, clinical profile, visual outcome and complications in patients of paediatric age group who underwent cataract extraction with PCIOI implantation at Pravara Rural Hospital, Loni.

OBJECTIVES:

- To find out the common cause of cataract in paediatric patients.
- To assess the visual acuity and factors associated with the outcome.
- To study the incidence and common complications.

CRITERIA:

Inclusion Criteria

- Patients of paediatric age group undergoing cataract surgery in

PRH, Loni.

- Patients with parents/guardians willing to give written informed consent.
- Patients between 3 - 16 years of age.
- Patients of either gender.
- Patients willing to give consent for the study.

Exclusion Criteria:

- Patients less than 2 years of age
- Patients more than 16 years of age.
- Patients with acute eye conditions.
- The patients who had posterior capsular tear.

MATERIALS AND METHODS:

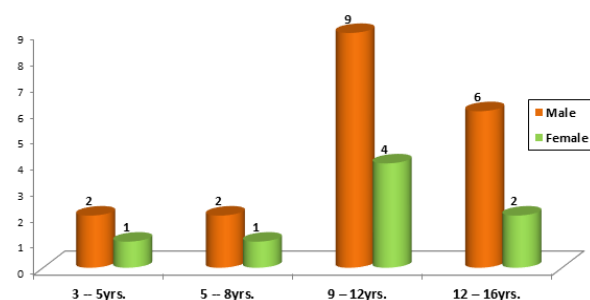
Approval of the Ethics Committee of the Institute was obtained for the data collection. The present study is retrospective hospital based study of 2 year duration from June 2018 to June 2020 concerning pediatric cataract in age group 5 to 16 years. It was conducted at Pravara Rural Hospital, Loni. All the patients with age group between 5 to 16 yrs of either sex who underwent surgery and were followed up at 6 months were included in this study. All the enrolled patients were categorized according to age, sex, etiology, technique of surgery, type of IOL implanted, collateral corneal damage in case of traumatic cataracts, early and delayed complications with reasons for decreased best corrected visual acuity (BCVA). The study design is descriptive longitudinal study. Total 27 patients were included in this study. The data was analyzed using appropriate statistical tests. The visual acuity was evaluated with perception of light, fixation and following central steady maintenance and preferential looking. Slit lamp examination of the anterior segment, fundus examination and intra ocular pressure by NCT was measured in all cases except open globe injuries. Cataract was classified as congenital, if the patient gave history of presence of cataract since 2 year of life and developmental if the age of diagnosis was later. The other features like nystagmus, squint, and IOP were noted. IOL power calculation was done on the basis of keratometry and axial length using the SRK II formula⁷. Post-operatively, patients routinely received topical steroids, antibiotics, and cycloplegics. Patients were examined on day 1, at the first week and after 4 weeks and 6 months. A detailed dilated slit lamp examination to ascertain inflammation, IOL centration, posterior capsule status and fundus examination was carried out at every visit. Intraocular tension was recorded with non-contact tonometer. Final visual acuity was evaluated after 6 months post operatively. The best corrected visual acuity (BCVA) was recorded in operated eyes. Early as well as delayed postoperative complications were evaluated.

Study Sample :

Total 39 eyes of 27 patients between the age group of 3 to 16 yrs were included in this study that were admitted and treated at Pravara Rural Hospital, Loni.

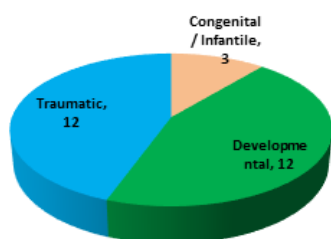
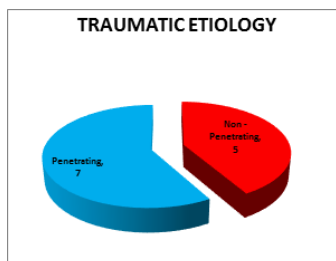
RESULTS:**TABLE 1****Age wise distribution:**

Age in Years	Gender		Total	%
	Male	Female		
3 -- 5	2	1	3	11.11%
5 -- 8	2	1	3	11.11%
9 -- 12	9	4	13	48.15%
12 -- 16	6	2	8	29.63%
Total	19 (70.37%)	8 (26.63%)	27	100.00
Mean $\pm$ SD	10.51 years $\pm$ 2.47 years	10.06 years $\pm$ 2.01 years	10.37 years $\pm$ 3.52 years	

Age wise distribution**FIGURE-1****ETIOLOGY WISE DISTRIBUTION:****TABLE-2**

Etiology	Number of Patients	%
Congenital/ Infantile	3	11.12%
Developmental	12	44.44%
Traumatic	12	44.44%
Total	27	100.000%
Traumatic	12	44.44
Non - Penetrating	5	18.52%
Penetrating	7	25.92%

By applying Z test of sample proportions, the proportions of developmental and traumatic etiology is significantly higher than other etiology ($p=0.0001$).

ETIOLOGY**FIGURE 2****TRAUMATIC ETIOLOGY****FIGURE 3****PREOPERATIVE VISUAL ACUITY:****TABLE-3**

	Number of patients	Percentage (%)
Fixation Pattern – (Congenital & Developmental)		
Steady	13	48.15%
Unsteady	1	3.70%
Nystagmus	1	3.70%
Perception of light	5	18.52%
HM	4	14.81%
< 3 meters	2	7.40%
< 6/60	1	3.70%
TOTAL	27	100.00%

TOTAL EYES OPERATED**TABLE-4**

Etiology	No. Of Eyes Operated	Percentage (%)
Congenital / Infantile	5	12.82%
Developmental	22	56.41%
Non- Penetrating	05	12.82%
Trauma		
Penetrating Trauma	07	17.95%
Total	39	100.00%

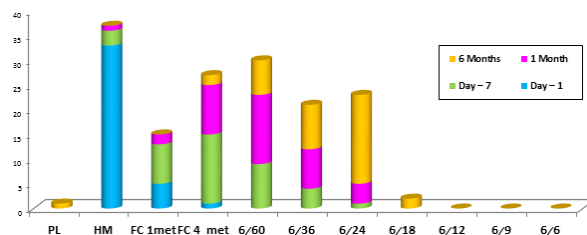
POST OPERATIVE VISUAL ACUITY – UNCORRECTED**TABLE-5**

Visual Acuity	Day – 1	Day – 7	1 Month	6 Months
PL				1
HM	33	3	1	Nil
FC 1met	5	8	2	Nil
FC 4 met	1	14	10	2
6/60		9	14	7
6/36		4	8	9
6/24		1	4	18
6/18				2
6/12				
6/9				
6/6				

Value of $\chi^2 = 174.80$, $p=0.0001$, significant

By applying chi-square test there is a significant association between uncorrected post operative visual acuity and follow-up ($p=0.0001$)

Also, by applying Z test of sample proportions there is a significant improvement of uncorrected post operative visual acuity from day 1 to 6 month follow up ($p=0.0001$)

POST OPERATIVE VISUAL ACUITY - UNCORRECTED**FIGURE-4****Postoperative Follow Up:****TABLE-6**

CLINICAL FINDINGS	DAY 1	DAY 7	MONTH 1	MONTH 6
LID EDEMA	37	6	Nil	Nil
CONGESTION	39	28	11	Nil
AC REACTION				
Gr- 1		19	4	1
Gr- 2	3	12	1	Nil
Gr- 3	26	5	Nil	Nil
Gr- 4	10	3	Nil	Nil
PUPIL				
Circular	18			
Irregular	14			
Peaked	03			
Loss of Uveal Tissue	04			

IOL POSITION				
Central	34	34		
Slightly Decentered			4	4
Decentered				1
Vitreous Reaction	Could not be appreciated	Could not be appreciated	5	Nil
FUNDUS DETAILS	Not Seen	Not Seen	Hazily seen in 18	Seen in 21

Delayed Complications

TABLE-7

Complications	Congenital/Infantile	Traumatic	Total
Slightly decentration	1	3	4
Decentration of IOL	0	1	1
Cystoids Macular Edema	2	1	3
Posterior Capsular Opacification	14	12	26
Secondary Glaucoma	1	1	2
Retinal Detachment	0	1	1

Value of $\chi^2=3.463$, $p=0.6290$, not significant

By applying chi-square test there is no significant association between delayed complications ($p=0.6290$)

Delayed Complications

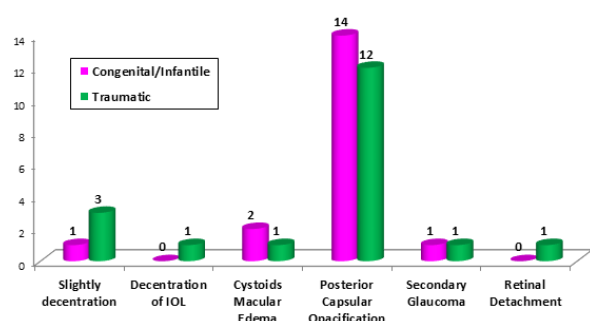


FIGURE-5

Best Corrected Visual Acuity (BCVA):

TABLE-8

VA	PL	HM	FC 1met	FC 4met	6/60	6/36	6/24	6/18	6/12	6/9	6/6
Patients	1	NIL	NIL	1	2	2	16	3	2	NIL	NIL
%	3.70%			3.70	7.40	7.44	59.25	11.11	7.44		

RESULTS:

27 patients of pediatric cataract who are included in this study underwent cataract extraction with posterior chamber IOL, the males were 19 (70.37%) and females were 8 (29.6%) (Table 1). Maximum number of patients were seen in the age group 5 -12 years. The mean age was 10 years. (Table and Figure 1). Patients with congenital cataract were 3 (11.11 %), developmental cataract patients were 12 (44.44 %), traumatic cataract patients were 12 (44.44%). (Table and Figure 2). Of the traumatic, 5 (18.21 %) were non- penetrating and 7 (15.92 %) were penetrating (Figure 3). Bilateral cataracts were seen in 15 (55.55%) and Unilateral cataracts in 12 (44.44 %). The most common presenting complaint was diminution of vision and leucocori. Nystagmus was seen in 1 patient. The most common cataract was developmental and followed by traumatic. The visual acuity was recorded as – Steady fixation in 12 patients. 2 patients with congenital /infantile cataract had nystagmus (1) and unsteady fixation (1). Perception of light was seen in 5 patients, HM vision in 4 patients. In 2 patients the vision was less than 3 meters and 1 patient had vision less than 6/60 (Table 3). Perception of light was present mostly in cases of traumatic cataract with penetrating injury. The total number of eyes operated were 39 (Table 4). The visual acuity was recorded on Day 1, day 7, 1 month and 6 months. The uncorrected visual acuity was recorded at 6 months. It was found that majority had VA of 6/24 (46.1%) (Table 5). In the post-operative period on the first day lid edema and inflammatory reaction in various grades was present in all the cases. The inflammation resolved with time and 2 patients had mild congestion and inflammation at time of 3 months which also resolved

at the end of 6 months. Fundus details were not appreciated due to inflammatory reaction and non cooperation of the patients. At the end of 6 months the fundus details were well appreciated in majority (53.84%) of patients who cooperated and hazily seen fundus details in those with PCO (Table 6). In the initial period in 37 patients the IOL appeared centrally and in 2 cases slight decentration was noted. At the end of 6 months slight decentration was noted in 4 patients and in 1 patient the IOL was dislocated with the edge of IOL in pupillary area. The common delayed complication seen was PCO in 26 (66.66%) patients, slight decentration in 4 (10.25%), 3 (7.69%) patients had CME and 2 (5.12%) patients had glaucoma and 1(2.56%) patient had retinal detachment (Table 7). BCVA at the end of 6 months is co-related to type and etiology of cataract. The 21 (77.77%) patients had visual acuity 6/24 or better. The patients with developmental cataract had BCVA of 6/24 or more while in case of congenital/infantile cataract and traumatic cataract the BCVA achieved was less 6/36 or less due to presence of unsteady fixation, delay in presentation and in case of traumatic cataract due to associated corneal injury leading to irregular astigmatism. (Table 8)

DISCUSSION:

The management of paediatric cataract is quite challenging. Studies show various characteristics of patient presented to our hospital with infantile, developmental and traumatic cataracts. In our study males were 70.37% and females were 29.6% and bilateral cataracts were 55.5%. The main etiology was congenital/infantile or developmental followed by traumatic. Rahi JS⁸ et al found in their study of 243 patients with congenital / infantile or developmental cataract, that 66% cases were bilateral. Yang ML et al⁹ in their study reported diminution of vision as the main presenting complaint in 33.3% of patients. Similar findings were seen in this study. The recording of visual acuity was challenging in lower age group. Nystagmus was present in one case and unsteady fixation in one i.e. 4% which is quite less as compared with study of KIM KH et al¹⁰ wherein this presentation was 27%. Phaco aspiration was done in 53.84% patients this is similar to study done by Gogate P M et al¹¹ where phaco aspiration was done in 60% patients. In the present study the BCVA of 6/24 or better was seen in 77.7% of patients. The visual acuity was satisfactory because primary IOL implantation was done. The presence of nystagmus and unsteady fixation and corneal trauma are indicators of poor visual outcome. Poor outcome was defined as less than 6/60 acuity or poor fixation. The most common complication in our study was PCO 66.6%. This is similar to seen in many studies that show high incidence of PCO. Gogate PM et al¹¹ had PCO in 63% cases. Kamath et al¹² in their study had PCO as complication in 52% of eyes. This suggests that PCO is a significant cause of post operative diminution of vision. The best corrected visual acuity is associated with etiology of cataract. It was better in eyes with developmental cataract where there was good macular fixation. In patients of traumatic cataract the visual acuity was less because of cause of associated corneal injury and severe inflammatory reaction.

Limitation of study:

The limitation of study is small sample size.

CONCLUSION:

In this study the congenital/infantile and developmental cataracts were bilateral in majority of patients. The most common presenting symptom was diminution of vision. Traumatic cataracts were associated with significant inflammatory reaction. PCO was the most common complication noted. BCVA was associated with technique and nature of trauma and associated corneal injury. Hence these factors are useful in determining the visual prognosis.

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