

A CLINICAL STUDY AND MANAGEMENT OF PAEDIATRIC CATARACT, OUR EXPERIENCESatish D. Shet¹, Ravi Shankar M²¹Assistant Professor, Department of Ophthalmology, KIMS, Hubli, Karnataka.²Postgraduate Student, Department of Ophthalmology, KIMS, Hubli, Karnataka.**ABSTRACT****BACKGROUND**

Control of childhood blindness is one of the priorities identified for achieving the goals of Vision-2020 by WHO. This is considered a priority because blind-years (number of years that a blind person lives after going blind) due to childhood blindness are second only to cataract and half of childhood blindness is avoidable (treatable/preventable). Paediatric cataract accounts for 12% of the 1.4 million blind children globally. The prevalence of childhood cataract has been reported as 1 to 15 cases in 10,000 children in developing countries. Compared to industrialised countries, this figure is 10 times higher. Early detection and timely treatment of various childhood disorders such as congenital cataract are the most crucial factors for successful outcome. A suitable measure to address amblyopia and posterior capsule opacification post operatively is imperative for successful visual rehabilitation of such children.

The objectives of this study were-

- 1) To study the clinical profile of paediatric cataract.
- 2) To evaluate the visual outcome after cataract surgery in these patients.
- 3) To evaluate different causes of visual impairment following management.

MATERIALS AND METHODS

A prospective study conducted at Karnataka institute of medical sciences department of ophthalmology from October 2015 to September 2016. All children below 14 years of age presenting with cataract will undergo thorough ophthalmologic examination and cataract surgery.

RESULTS

The results of the present study with 25 paediatric patients (36 eyes) indicates that excellent vision can be expected after cataract surgery and posterior chamber IOL implantation coupled with appropriate amblyopia therapy.

CONCLUSION

The paediatric cataract patients are referred from primary health centers, and district hospital from north Karnataka to KIMS Hubli. All paediatric patients are from lower socio economic status. Early detection of cataracts and referrals to the ophthalmologist can result in early treatment and better visual outcome.

KEYWORDS

Paediatric Cataract, IOL, Posterior Capsule Opacification, Amblyopia.

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BACKGROUND

Paediatric cataracts are relatively common and constitute one of the most treatable causes of childhood blindness.¹ However the management of cataract in infancy and childhood is more challenging and demanding than adult cataract management.² Intra operative surgical complexities, a marked propensity for post-operative inflammation, the changing refractive status, increased incidence of capsular opacification and secondary membrane formation, occurrence of post-operative glaucoma and the

potential to develop amblyopia all add to the difficulty of achieving successful outcome in paediatric cataract surgery.² The surgical technique need to be tailored and customized to address the low scleral rigidity, increased elasticity of the anterior capsule and high vitreous pressure seen in this group of patients. Advances in surgical techniques, availability of better visco-elastic materials, accessibility of appropriately sized and deigned IOLs all have significantly improved paediatric cataract surgery outcome.

Incidence- There are 1.5 million blind children (corrected visual acuity <20/400 in the better eye.) in the world and one million of them live in Asia.¹ The prevalence of childhood cataract has been reported as 1 to 15 cases in 10,000 children in the developing countries.³ It is estimated that globally, there are 200,000 children blind from bilateral cataract.⁴

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Aetiology of Childhood Cataract

Indian data shows unknown cause is the most common.⁵ The main causes of infantile cataract are genetic, metabolic disorders, prematurity and intrauterine infections.^{2,5,6} Other causes of childhood cataract in older children include trauma, drug-induced, radiation and laser therapy for ROP.⁶ Trauma is one of the commonest causes of unilateral cataract in the developing countries.³

An area of great interest is in the molecular genetics of cataracts. Inherited cataracts contribute significantly in the aetiology of childhood cataracts.⁶ Approximately, half of the families have mutations in crystallins and a quarter have mutations in connexins.⁷ Zonular cataract is the commonest type of congenital cataract.^{5,7}

Ocular Examination- White or partially white reflex noted by the parents. Strabismus may be the initial manifestation, especially in unilateral cases, and nystagmus or poor visual fixation may herald the presence of bilateral lens opacities in infancy. It is important to quantify the visual acuity of the child with cataract as precisely as possible. The grade of visual fixation is also important. A thorough ocular and systemic examination is must in every child. Ocular examination should include visual acuity assessment, pupillary response and ocular motility. The slit lamp biomicroscopic examination should be carried out in each case to evaluate the size, density, and location of cataract to plan the surgical procedure. Fundus examination should be carried out after pupillary dilatation. A-scan helps to measure the axial length for calculating IOL power and monitoring the globe elongation postoperatively. B scan is an important tool in ruling out any posterior segment pathology as many of the pediatric cataracts are dense and preclude view of the fundus. Each child should be examined by a pediatrician for systemic work up to rule out systemic associations, anomalies or congenital rubella.

MATERIALS AND METHODS

Prospective study.

Source of Data- All children below 14 years of age presenting with cataract admitted in KIMS Hospital Hubli.

Study Design-Prospective study.

Study Period-October 2015-September 2016.

Methodology- All children below 14 years of age presenting with cataract will undergo thorough ophthalmologic examination using

1. Visual acuity.
2. Slit lamp examination.
3. Fundus, Ultrasound B scan and oculomotor examination.

OBSERVATION AND RESULTS

Around 25 paediatric patients presented to the KIMS from October 2015 to September 2016. All 25 patients (36 eyes) were evaluated in KIMS Ophthalmology department. Underwent surgery and were followed up at regular intervals. (Once a week for one month, twice a month for 2 months and monthly for 6 months and then at intervals

appropriate to the individual needs thereafter) to detect the complications following cataract surgery.

A cataract that is present at birth is considered congenital and one that appear at a later date is considered developmental. The patients ranged in age group from 4 months to 14 years at the time of surgery. The follow up period ranged from 2 months to 1 year.

The Cases were studied in the following Manner.

1. A detailed history regarding the onset of symptoms, consanguinity of parents, family history of cataract, history of intolerance to milk and history of trauma was obtained.
2. A detailed examination of the anterior segment of the eye was then performed including slit lamp biomicroscopy. This was done in conventional manner using the slit lamp (with child kneeling on the examination chair).The following features were specifically looked far and noted
 - a. The corneal diameter measured as reliably as possible, corneal scars for the evidence of trauma.
 - b. The density of cataract and the quality of red reflex was assessed following pupillary dilatation noting appropriate size and location of the opacities viewed against retroillumination.
3. Visual acuity testing was done by using Snellen optotype equivalents appropriate for the age of the child .In infants a change in fixation pattern or loss of central red reflex was considered an indication for surgery .The presence or absence of nystagmus or other unsteadiness noted.
4. Posterior segment evaluation with direct or indirect ophthalmoscope was done to look for underdevelopment / malfunction of the optic disc or macula .ultrasound B-Scan examination was performed on patients if no fundus view was obtained.
5. Intraocular pressure measurement was done on every eye with applanation tonometer whenever required. This part of the assessment was deferred to the operating room when surgery on evaluation under general anaesthesia was indicated.
6. when intraocular lens (IOL) implantation was under consideration, keratometry was performed with Bausch and Lomb keratometer in older children by the child kneeling on the examination chair and with a mummy wrap in younger uncooperative child and A scan axial length measurements were taken and appropriate IOL power calculated using modified sanders refzlaff-kraff II (SRK II) formula with the goal of attaining emmetropia or a match of the refractive error in the fellow eye according to the recommendations of hiles and dahan.

In bilateral cataract, the most severely affected eye was operated upon first and the fellow eye was operated on usually 3 weeks later, depending on the outcome of the first procedure.

Laboratory studies- TORCH titers and VDRL titers in unilateral cataracts. Urine for reducing sugar after milk intake, fasting blood sugar in bilateral cataracts.

Evaluation by Paediatrician- every child was evaluated by paediatrician at KIMS hospital, for systemic diseases, dysmorphic features and fitness for general anaesthesia.

Preoperative Preparation- Mydriasis of the eye to be operated was achieved with 1% atropine eye ointment {size of a rice grain} twice daily for 3 days. The eye was prepared for surgery in a standard fashion of cutting the eye lashes close to the lid margins after the induction of general anaesthesia. The conjunctival cul-de-sac was washed with 5% povidone iodine.

Operative Procedure- Small Incision Cataract Surgery with Lens Aspiration. After conjunctival peritomy and corneoscleral tunnel of appropriate length was made and the anterior chamber was formed with viscous agent. Anterior capsulotomy was performed with a 26 gauge bent needle. Primary posterior capsulorhexis with or without anterior vitrectomy. Balanced salt solution was used for irrigation. The posterior chamber intraocular lens (IOL) were one piece all PMMA, with 6.5 mm optic and 12-12.5 mm length. PCIOL implanted for children of more than 1 year. The viscous agent was removed with the aspiration cannula at the end of the procedure and wound closed with 9.0/10.0 nylon sutures. Subconjunctival gentamycin and dexamethasone was injected into cul-de-sac.

Postoperative Care- During the first two weeks–gatifloxacin and prednisolone was installed every hour while the patient is awake and moxifloxacin eye ointment at night for one week. Homatropine (2%) eye drops was instilled twice daily for first 2 weeks. Oral prednisolone was prescribed at a dose of 1 mg /kg of body weight /day for 5 days, reduced by one third after 5 days and then reduced again by one third for the final 5 days.

Patients were examined on post-operative days 1-7 and every week for one month, twice a month for two months and at intervals appropriate to the individual needs thereafter.

Post-operative refractions were performed at each visit and spectacles were prescribed at the end of 2 weeks .secondary posterior capsulotomies for posterior capsule opacification were performed, when indicated by using ND: YAG laser.

Around 25 paediatric patients presented to the KIMS from October 2015 to September 2016. All 25 patients (36 eyes) were evaluated in KIMS.

Age Group	Total Number of Eye (Patients)	Percent
0-1 yr.	6 (3)	12%
1-8 yr.	26 (18)	72%
8-14 yr.	4 (4)	16%
Total	36 (25)	100%

Table 1. Age Incidence of Cataract in Different Age Groups

Sex	Number of Patients	Percent
Male	17	68%
Female	8	32%
Total	25	100%

Table 2. Sex Incidence of Cataract in Children

Eye	Number of Patients	Percent
Right eye	7	28%
Left eye	7	28%
Both	11	44%
Total	25	100%

Table 3. Laterality of Cataract in Children at Presentation

Type	Number of Eyes (Patients)	Percent
Partial	20 (15)	60%
Total	15 (9)	36%
Traumatic	1 (1)	4%

Table 4. Type of Cataract in Children at Presentation

Etiology	Unilateral	Bilateral	Total Patients
Non-traumatic			
Hereditary	1	3	4
CRS (congenital rubella syndrome)	1	2	3
Complicated	2	1	3
Undetermined	9	5	14
Traumatic			
Trauma	1	0	1

Table 4A. Etiology of Cataract in Children at Presentation

Post-operative Findings	Number of Eyes	Percent
Corneal edema	21	58.33%
Decentred pupil	3	8.33%
Iris capture	2	5.55%
Vitreous in anterior chamber	-	-
Deposits on IOL	4	11.11%
Posterior synechiae	3	8.33%
Shallow AC	3	8.33%
Total	36	100

Table 5. Post operative Findings

Sl. No.	Vision	No. of Eyes
1	No PL	0
2	PL+, PR accurate	6
3	Fixation not maintained	6
4	Central, steady maintained fixation	0
5	Fixes & follows	9
6	Hand movements	3
7	CF	3
8	1/60	2
9	2/60	3
10	3/60	3
11	6/60	1

Table 6. Pre-operative best Corrected Visual Acuity in Children

Sl. No.	Vision	Number of Eyes
1	No PL	0
2	PL+, PR accurate	0
3	Fixation not maintained	0
4	Central, steady maintained fixation	2
5	Fixes & follows	3
6	Hand Movements	4
7	CF	1
8	1/60	0
9	2/60	0
10	3/60	0
11	6/60	3
12	6/36	6
13	6/24	4
14	6/18	5
15	6/12	6
16	6/9	1
17	6/6	1

Table 7. Post-operative best Corrected Visual Acuity in Children

Cause	Number of Eyes	Percentage
Posterior segment pathology	1	2.77%
Amblyopia	10	27.7%
PC opacification	8	22.2%
Secondary glaucoma	1	2.77%

Table 8. Causes of Subnormal Vision following Surgery



Figure 1. Occlusion Therapy

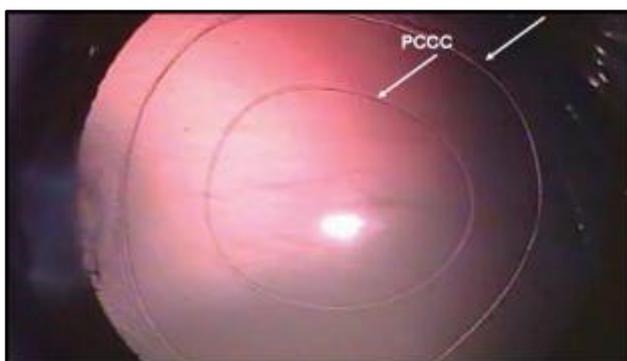


Figure 2. PCCC

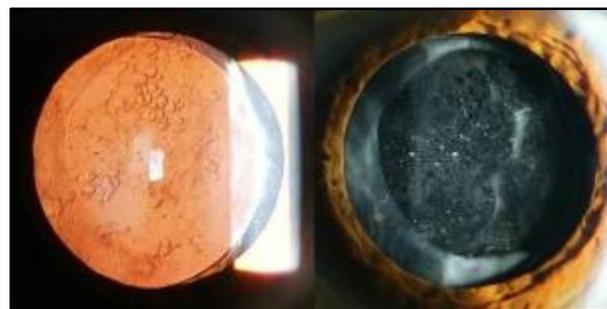


Figure 3. Posterior Capsule Opacification



Figure 4. Slit Lamp Image



Figure 5. Zonular+ Cataract

DISCUSSION

The results of the present study indicates that excellent vision can be expected after cataract surgery and posterior chamber IOL implantation coupled with appropriate amblyopia therapy.⁸ Most of the patients did not require second surgical intervention. The secondary membrane formations were treated by ND: YAG laser.

Of the 25 (36 eyes) patients that presented at KIMS Hubli. It was noted that boys had a higher incidence of cataract (17 patients) compared to girls (8 patients). It was attributed to the fact that boys are generally more likely to be brought to the hospital than girls.

In patients with unilateral congenital or developmental cataract, anatomic results were good and other than secondary membranes that required ND: YAG laser posterior capsulotomy, no operative complications occurred and second surgical interventions were required.

In patients with bilateral developmental cataracts, no operative complications occurred and second surgical interventions were required, other than ND: YAG laser posterior capsulotomy.⁹ As expected, the visual results in this group of patients were better when compared with those of unilateral cataract groups.

The ND: YAG laser allows for non-invasive posterior capsulotomy in children of any age.⁹ laser treatment at the first sign of PC opacification.¹⁰ usually at about three postoperative weeks in younger patients allows for early institution or continuation of amblyopia therapy. ND: YAG laser was performed on 22 eyes. No complications other than lens pitting were noted after the laser treatment.

When evaluating visual outcome with paediatric population it is important to appreciate that there may be a deterioration in visual acuity with long term follow up unless there is closely supervised amblyopia therapy and commitment to this therapy by both the patient and the parents. There is also a possibility that complications may occur at a later date and is particularly important to detect and treat them as soon as they occur in a potentially amblyogenic child.¹⁰

SUMMARY AND CONCLUSION

The aim of the study was to identify the different types and causes of cataract and various modes of their management with final visual outcome in children. Partial developmental cataract is the most common type. The cause could not be identified in majority of cases. Traumatic cataract and hereditary cataract is the most common. Penetrating injury is the common cause for traumatic cataract. Management of paediatric cataract by intraocular lens implantation gives a better visual outcome coupled with appropriate amblyopia therapy in unilateral and bilateral cataract. Unilateral

congenital or developmental cataract have poorer visual outcome than bilateral cataracts. ND: YAG laser is an effective non-invasive procedure to treat secondary membrane formation in children. In conclusion early referrals, timely surgical correction and early institution of amblyopia therapy can go a long way in preventing amblyopia and resulting morbidity.

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