

## Pediatric cataract blindness management and outcomes in North East India – hospital based study

Damaris Magdalene<sup>1</sup>, Dhaval Patel<sup>2</sup>, Akanksha Koul<sup>3</sup>, Diva Kant Mishra<sup>4,\*</sup>, Kalyan Das<sup>5</sup>, Prabhjot Kaur<sup>6</sup>

<sup>1</sup>HOD, Senior Consultant, <sup>2,3,4,6</sup>Resident, Dept. of Strabismus & Pediatric Ophthalmology, <sup>5</sup>HOD, Senior Consultant, Dept. of Cornea & Community Ophthalmology

**\*Corresponding Author:**

Email: divakant@gmail.com

### Abstract

**Purpose:** To study the visual outcomes and cause of poor visual prognosis in pediatric cataract patients in North East India.

**Methods:** Retrospective analyses of 283 eyes of patients with cataract below age of 18 years with minimum follow up of 6 months were included. Pre-operative and post-operative visual outcomes of patients undergoing cataract surgery at tertiary eye care hospital were analyzed. Statistical analysis was done using Chi Square test.

**Results:** There was a male preponderance with 194 males (68.5%) and 89 females (31.4%). The most common type of cataract encountered was developmental (28.9%). According to morphology, 48.08% eyes had lamellar/zonular cataract. Vision following surgery was greater than 6/60 in 144 eyes (50.8%). Vision could not be assessed in 15% cases pre-operatively compared to 7.7% post-operatively. IOL was implanted in 77.3% cases. The most common associated ocular condition was nystagmus in 57 cases (20.1%). The most important factor associated with poor visual outcome was amblyopia (38.2%).

**Conclusion:** Pediatric cataract continues to be a challenge and a major cause of reduced vision in developing countries. Awareness, early intervention go a long way in preventing the development of amblyopia and improving the morbidity of children with cataract.

**Keywords:** Amblyopia, Childhood blindness, Pediatric Cataract

### Introduction

Childhood cataract blindness is one of the major cause of avoidable blindness in the world and it was described as priority by World Health Organization global initiative for the elimination of avoidable blindness by year 2020.<sup>(1)</sup> Childhood cataract is not a single disease entity but it represents group of etiologies defined by age.<sup>(2)</sup>

In Asia, pediatric cataract is responsible for more than one million childhood blindness.<sup>(3)</sup> In developing countries like India, prevalence of childhood blindness due to cataract ranges from 7.4% to 15.3%.<sup>(4)</sup> Pediatric cataract blindness in developing world causes enormous problem in terms of human morbidity, economic loss and social burden. Restoring the eyesight of 10 elderly patients is equivalent to restoring the sight of one blind child.<sup>(5)</sup> Childhood blindness affects a child and family throughout life with influence on educational, personal, employment and social prospects. A number of studies regarding visual outcome of bilateral cataracts in children exist, but there are very few studies which have considered congenital, developmental as well as traumatic cataracts. In this light this study was done to evaluate visual outcomes and profile of all types of pediatric cataracts at a tertiary eye care centre in North East India.

### Materials and Methods

**Patients:** The present study was a retrospective medical record review of 283 eyes of pediatric cataracts. The study was approved by the institutional review board and ethics committee of the institute. The study was conducted in accordance with the Declaration of

Helsinki. All pediatric cataract cases below 18 years of age operated at the institute in the period from January 2011 to December 2012 were included in the study. Patients with co-existing systemic or ocular morbidity and those not willing to give consent were excluded.

Complete demographic information with a detailed history was recorded for all patients. Cataract was classified as developmental if the age at diagnosis was >1 year and congenital if present since birth or <1 year of age. A detailed ocular examination including pre operative and post operative visual acuity, slit lamp examination as well as fundoscopy was recorded.

**Vision Analysis:** Age adjusted visual acuity charts from Snellen's chart to lea symbols were employed to analyse the visual acuity. In case of inability to recognize the largest optotype at 6 meters, vision was recorded as counting finger at 1, 2 or 3 meters. In case of infants, presence or absence of CSM (central steady maintained) fixation was assessed. Slit lamp examination included recording of morphology of cataract as well as assessment for presence of squint and nystagmus. Posterior segment evaluation was done using indirect ophthalmoscope, 90 D Volk lens or ultrasound B scan. In very small children an Examination under anesthesia was performed. All patients underwent cataract surgery at the institute with primary IOL (intra ocular lens) implantation in significant number of cases with the IOL power being calculated by optical biometry using SRK II formula. Post operatively all patients were put on regimen of topical steroid and antibiotic combination. Follow up visits were done on day 1, Day 3, 3 weeks and 6 months following surgery. Post operative best corrected visual acuity was recorded at each visit.

**Statistical Analysis:** The primary outcome measure was taken as the visual acuity with statistical analysis done using Chi Square test. The chi-square is 78.86 at degree of freedom 3 and a p value <0.0001 was considered statistically significant.

## Results

The study included 283 eyes which met the inclusion and exclusion criteria. There was a male preponderance with 194 males (68.5%) and 89 females (31.4%). A small percentage (16.60%) of patients reported was less than 2 years of age and majority of the cases presented were in the age group of 5 to 10 years (35.3%). The different types of cataract encountered were: congenital cataract (22.2%), developmental cataract (28.9%) and traumatic cataract (20.4%). The most common associated ocular condition was nystagmus in 57 cases (20.1%) followed by strabismus in 34 (12%) cases.

Analysis of morphological variants showed that lamellar/zonular cataract was the most common subtype encountered in 48.08% patients and total cataract was seen in 60 patients. The least common cataracts subtype recorded in this study were membranous (3 patients) and anterior sub capsular cataract (3 patients).

In the pre-operative stage, of the 283 eyes analyzed, 20.4 % (58 eyes) had vision greater than 6/60; in 5.6% (16 eyes) visual acuity was <6/60 and >3/60; in 31.09% (88 eyes) vision recorded was <3/60 to HM (hand movement) of examiner. Perception of light (PL) in all four quadrants was seen in 10.6% cases (30 eyes) while perception of light was absent in one patient. In 16.9% cases (48 eyes) central steady maintain fixation was present and visual acuity could not be assessed in 15% of cases.

The most common surgical procedure done for therapy was phacoaspiration with IOL implantation in 139 (49.1%) cases. Secondary IOL implantation after a primary phacoaspiration was done in 24 (8.4%) cases [Table 1].

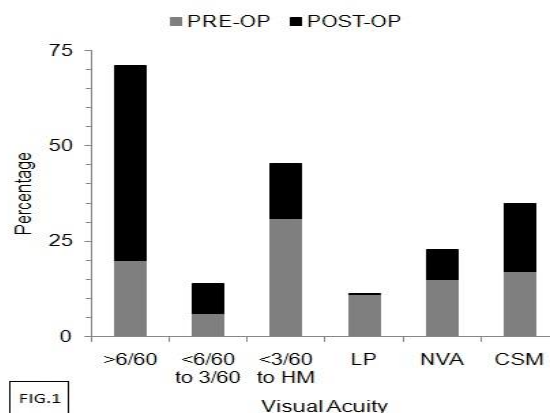
**Table 1: Surgical procedure**

Surgical Procedure	Number of Patients (%)
Phacoaspiration+PCIOL*	139(49.1)
Phacoaspiration	64(22.7)
Phacoemulsification+PCIOL*	58(20.4)
Phacoaspiration+PPC† +LAV ‡ +PCIOL*	22(7.7)

\*PCIOL- Posterior Chamber Intraocular Lens, †PPC- Primary Posterior Capsulorrhexis, ‡ LAV- Limited anterior vitrectomy

For therapy, IOL was implanted in 77.3% cases. On the 6 month follow up visit, of the 283 eyes operated, greater than 6/60 post operative vision was seen in 144 eyes (50.8%), visual acuity of <6/60 and >3/60 was present in 22 eyes (7.7%) and 41 eyes (14.4%) had vision

of <3/60 to HM. One patient who did not possess PL pre-operative stage improved to having perception of light in all the four quadrants. In 53 eyes (18.7%) central steady maintain fixation was present but visual acuity could not be assessed in 22 patients (7.7%). [Fig. 1]



**Fig. 1: Visual acuity percentages in pre- and post-operative cases of childhood cataract.** The patients were classified into different groups based on the visual acuity at presentation (pre-operative stage, PRE-OP). The changes in the visual outcome for the same patients have been recorded post-operatively (POST-OP). HM-Hand movement; LP-light perception; NVA-No vision analysis was possible; CSM-Central steady Maintained

## Discussion

This is the first study of its kind in north east India to understand the effect of surgical intervention in restoring or improving the sight in pediatric cataract blindness cases. The difficult terrain, lack of easily available medical care and ignorance in this part of the country remains a hindrance to proper management of pediatric cataracts.

In our study, visual acuity improved to >6/60 in 50.8% this which is comparable to the outcome achieved in Central India as reported by Khandekar et al<sup>(6)</sup> who reported a vision improvement of >6/60 in 33.5% cases but lower than that reported by Thakur et al<sup>(7)</sup> (69%) and Khanna et al<sup>(2)</sup> (82%). This might be due to late presentation and high percentage of rural population in our study group.

Similar to the reports by Khandekar et al<sup>(6)</sup> and Haargaard et al,<sup>(8)</sup> we also observed higher prevalence of cataracts in male population (68.5%) compared to the females. This can be attributed to possible increased outdoor activities chosen by male population compared to the females in the rural society. Unlike Khandekar et al<sup>(6)</sup> who reported high cases of unilateral cataract possibly due to trauma, we found high incidence (63.6%) of bilateral cataract similar to the reports by Haargaard et al<sup>(8)</sup> which was congenital in nature.

The most common cause of reduced postoperative vision was amblyopia seen in 38.2% cases which is slightly higher in our study than those reported by others

(31.4%)<sup>(9)</sup> which might be due to the late presentation resulting in dense amblyopia. Of the ocular associated co-morbidities we studied, nystagmus was seen in 20.1% and strabismus in 12% of preoperative cases. We have noticed that nystagmus did not improve after surgery and similar observation was reported also by Thakur et al.<sup>(7)</sup>

Poor visual outcome was seen in cases having other associated features. Notably, patients where surgery was performed at a later stage showed poorer visual outcomes post operatively compared to patients with early surgical intervention. Since the visual system fails to develop properly in the absence of stimuli, early surgical intervention is important in order to mitigate the possibilities of development of amblyopia in cases of dense bilateral cataracts.

### Conclusion

Pediatric cataract is one of the major causes of reduced vision in children and it presents a great challenge in terms of diagnosis and disease management compared to adult cataract cases. Thus, careful monitoring and early intervention is necessary and if diagnosis and surgery is performed at an early stage, it could lead to good visual outcome in most of the cases.

### References

1. Thylefors B, Negrel AD, Pararajasegaram R, et al. Global data on blindness. *Bull World Health Organ* 1995;73:115–21.
2. Khanna RC, Foster A, Krishnaiah S, Mehta MK, Gogate PM. Visual outcomes of bilateral congenital and developmental cataracts in young children in south India and causes of poor outcome. *Indian J Ophthalmol* 2013;61:65-70.
3. World Health Organisation Prevention of childhood blindness. Geneva: WHO;1992.
4. Kaid Johar S R, Savalia N K, Vasavada A R, Gupta P D. Epidemiology based etiological study of pediatric cataracts in Western India. *Indian J Med Sci* 2004;58:115-21.
5. Foster A, Gilbert C, Rahi J. Epidemiology of cataract in childhood: a global perspective. *J Cataract Refract Surg* 1997;23:601–4.
6. Khandekar R, Sudhan A, Jain BK, Shrivastav K, Sachan R. Pediatric cataract and surgery outcomes in Central India: A hospital based study. *Indian J Med Sci* 2007;61:15-22.
7. Thakur J, Reddy H, Wilson ME Jr, Paudyal G, Gurung R, Thapa S, *et al.* Pediatric cataract surgery in Nepal. *J Cataract Refract Surg* 2004;30:1629-35.
8. Haargaard B, Wohlfahrt J, Fledelius HC, Foster Rosenberg T, Melbye M. A nationwide Danish study of 1027 cases of congenital/infantile cataracts: Etiological and clinical classifications. *Ophthalmology* 2004;111:2292-8.
9. Yorston D, Wood M, Foster A. Results of cataract surgery in young children in east Africa. *Br J Ophthalmol* 2001;85:267–71.