VISUAL OUTCOME AND COMPLICATIONS OF PEDIATRIC CATARACT SURGERY AT LUMBINI EYE INSTITUTE, NEPAL

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ABSTRACT

INTRODUCTION: Pediatric eye care, including cataract surgery, has become much more common in Nepal in recent years in tertiary facilities such as the Lumbini Eye Institute (LEI). This study provides the first report of visual outcome and complications after cataract surgery at that Institute.

MATERIAL AND METHODS: This is a prospective observational study of all cataract surgical patients <16 years of age between March 1, 2011, and February 28, 2012. Visual outcome was assessed by two optometrists with pediatric eye care training. Clinical data were gathered in a specifically designed pediatric eye program database and demographic data were taken from hospital administrative records.

RESULTS: In 2011-12, 334 children (248 boys [74%]) underwent cataract surgery, including 89 Nepali (27%) and 245 Indian (73%) children. In total, 320 (96%), 270 (81%), and 190 (57%) attended their first, second and third follow up visits respectively. Pre-operative visual acuity was <6/60 (91%), 6/60 to <6/18 (7%) and >6/18 (2%). Post-operatively, visual acuity was <6/60(27.5%), 6/60 to <6/18 (36.5%) and 6/18 or better (36%). The mean best corrected visual acuity was 6/38 first follow up, 6/34 second follow up, and 6/30 third follow up. Intraoperative complications were 1.6% pupillary capture and post-operative complications were 35.3% posterior capsular opacification (PCO).

CONCLUSION: For 63% of children, visual acuity significantly improved with cataract surgery beyond their presenting vision of <6/60, with over 38% of children achieving visual acuity (>6/18). Follow up beyond one month needs significant improvement to treat postoperative complications particularly posterior capsular opacification.

KEY WORDS: Cataract surgery; Pediatrics; Visual outcome

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BACKGROUND

Lumbini Eye Institute (LEI) in Bhairahawa, Nepal, has become the tertiary pediatric referral center for western Nepal and the northern Indian state of Uttar Pradesh (and to a lesser extent Bihar) with a pediatric ward and dedicated operating rooms as well as ophthalmologists, nurses, and ophthalmic assistants specializing in pediatric care. Its program, similar to other pediatric programs in Nepal[1] and other low-income countries [2,3,4] needs systematic and ongoing evaluation of the visual and functional outcome of the surgical program.

A study in 2011-12, evaluating a new pediatric cataract surgical follow-up program at LEI, reported a significant increase in the proportion of children attending their first, second, and third follow-up visits compared to 2009-10.[5] However, they did not report details of visual outcome or complications.

MATERIAL AND METHODS

All children <16 years of age at LEI from March 1, 2011, to February 28, 2012, who had surgery for congenital, developmental, or traumatic cataract were included. Children receiving a second cataract surgical operation were excluded. Data were prospectively collected in a newly developed pediatric database for all eligible children. Data were gathered on standardized preoperative, intra-operative, and postoperative forms and included social and demographic information on parents' education and occupation and place of residence. Both the pediatric counselor and the program director were responsible for data collection.

First follow-up was defined as any visit up to 3 weeks after surgery. The second follow-up (only for children attending first follow-up) was up to 12 weeks, and the third follow-up (only for attainders of the first 2 visits) was up to 24 weeks. The research adhered to the guidelines of the declaration of Helsinki. Ethical approval was obtained from the Ethics Committee of Lumbini Eye Institute that includes a research monitoring function.

RESULTS

In 2011-12, 334 children (248 males [74%]), including 89 Nepali (27%) and 245 Indian (73%) underwent cataract surgery (Table 1). These included traumatic 152(45%), congenital 126 (38%) and developmental 56 (17%) cases.

Table1: Cataract surgical cases by age and sex

	Boys	Girls	Total (%)
≤2 years	26	10	36 (11)
>2 ≤ 6 years	55	27	82 (25)
>6 ≤ 15 years	167	49	216 (64)
Total	248	86	334

Table 2: Pre and post operative visual acuity by age group

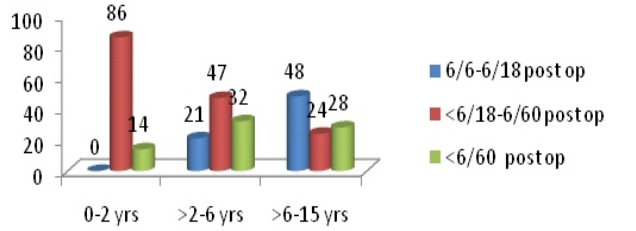
Age range	Pre operative visual acuity				Post operative visual acuity at different visits			
	6/6-6/18 N(%)	<6/18-6/60 N(%)	<6/60 N(%)		6/6-6/18 N (%)	<6/18-6/60 N (%)	<6/60 N (%)	Total
0-2 yrs	0	0	36(100)	36	0	31(86)	5(14)	36
>2-6 yrs	2(2)	4(5)	80(93)	86	18(21)	40(47)	28(32)	86
>6-15 yrs	5(2)	21(10)	186(88)	212	102(48)	51(24)	59(28)	212
Total	**7(2**	**25(7)**	**302(91)**		**120(36)**	**122(36.5)**	**92(27.5)**	**334(100)**

Pre-operative visual acuity was<6/60 (91%), 6/60 to <6/18(7%) and 6/18 or better (2%). Postoperatively, visual acuity was <6/60 (27.5%), 6/60 to <6/18 (36.5%) and 6/18 or better (36%). (Table 2) The mean final post operative BCVA in unilateral cases was 6/40 unit and it was 6/38 unit for the bilateral cases.

Table 3: Post operative BCVA at 1st, 2nd and 3rd follow up

Visual Acuity	Pre operative Visual acuity N (%)	1st follow up visit N (%)	2nd follow up visit N (%)	3rd follow up visit N (%)
6/6-6/18	7(2)	118(36.9)	102(37.8)	73(38.5)
<6/18-6/60	25(7)	117(36.6)	95(35.2)	74(38.9)
<6/60	302(91)	85(26.5)	73(27.0)	43(22.6)
Sub-total	**334(100)**	**320(96)**	**270(81)**	**190(57)**

The proportion of children with different levels of best corrected visual acuity were similar for all three post-operative visits: first follow up was in <6/60 (26.5%), 6/60 to <6/18(36.6%) and >6/18 (36.9%); second follow up <6/60 (27%), 6/60 to <6/18(35.2%) and >6/18 (37.8 %) and third follow up <6/60 (22.6%), 6/60 to<6/18-6/60 (38.9%) and >6/18 (38.5 %) (Table 3).



age groups

The proportion of children with post operative visual acuity >6/18 increased with increasing age, with the highest (48%) age>6 yrs (Figure 1). The proportion of children who had post-operative visual acuity >6/18 differed depending on the causes of cataract with 52%, 40%, and 24% for developmental, traumatic and congenital cataract, respectively (Table 4).

Table 4: Post operative BCVA at different types of cataract

Types of Cataract	BCVA at different f/u			Total
	6/6-6/18 N(%)	<6/18-6/60 N(%)	<6/60 N(%)	N(100)
Congenital	30(24)	60(48)	36(28)	126(100)
Developmental	29(52)	14(25)	13(23)	56(100)
Traumatic	61(40)	48(32)	43(28)	152(100)
Total	120	122	92	334

It was found that 35.3% children had posterior capsular opacification (PCO) and 1.6% had pupillary capture in post operative complication. There were 13% children with nystagmus.

DISCUSSION

Blindness in children remains the second leading cause of "blind-person years" worldwide[3]. Historically, the leading cause of blindness among Nepali children was corneal scarring secondary to measles and vitamin A deficiency.[6] However, these blinding corneal diseases have been significantly reduced in recent years by better primary health care and the success of international health promotion efforts, such as the WHO/UNICEF Extended Program of Immunization.[7-10] In contrast, data from hospitals and screening camps suggest that the prevalence of childhood cataract has not decreased in recent years and that it remains a leading causes of blindness in Nepal.[1]

Pediatric cataract, especially congenital cataract, often causes severe visual impairment because of sensory deprivation during the sensitive period of visual development. In our study, only 16% of congenital cataract (12% bilateral and 4% unilateral) received operations before the age of one year. A more comprehensive community-based program, perhaps tied to maternal-child health activities, near the time of birth is needed in Nepal to identify more of these children at a younger age.

In our series, 152 children (45%) had traumatic cataract.The high proportion of traumatic cataract is likely because Lumbini Eye Institute provides emergency surgical services for a very large primarily agricultural population where children, who must work in farm labor from a young age, are commonly injured.

The mean post-operative best corrected VA of congenital cataract was 6/40.This result is slightly worse than previous studies that reported the mean best corrected VA of 6/12 in bilateral cases and 6/60 in unilateral cases. This improved VA is likely due to more cases (40% bilateral and 50% unilateral cases) receiving operations by the age of 3 months.[11,12] The timing of congenital cataract surgery is the most important factor for visual prognosis, with earlier cataract extraction having a better visual outcome.[13]

In our study, 17% of pseudophakic eyes had >6/9.5 compared with only 1% of aphakic eyes. In a French study, the proportion of pseudophakic eyes with a visual acuity >6/9.5 was higher (40%) compared with the two aphakic eyes which were both <6/19.[14] Gimbel *et al.* reported on 24 pseudophakic eyes in children who were operated on over the age of 2 and found that the visual acuity was >6/12 4 years after surgery in 79.2% of cases.[15] Our surgical approach to cataract extraction and IOLimplantation in younger children included careful management of posterior capsule opacification which occurred in 35 % of children... Trivedi et al. reported a similar proportion of visual axis opacification in 37.9% of children less than 1 year of age even though a PPC with anterior vitrectomy had been performed[16].

In our study, 13% of patients had nystagmus preoperatively. It should be noted that in early bilateral cataracts, the existence of nystagmus plays a determining role in functional visual prognosis. The work of Robb and Petersen[17] has shown poor visual results in children who had nystagmus before surgery. The nystagmus did not appear to improve after surgery (based on clinical observation), which is in contrast to reports in a study from Africa.[3] In a previous study done in Nepal, 16% of the patients had nystagmus preoperatively.[1]

CONCLUSION

For 63% of children, visual acuity significantly improved with cataract surgery beyond their presenting vision of <6/60, with over 38% of children achieving visual acuity (>6/18). Follow up beyond one month needs improvement to treat postoperative complications.

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