ORIGINAL RESEARCH

Outcomes of Visual Acuity after Paediatric Cataract Surgery at a hospital in Haldia

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ABSTRACTS

Introduction: Juvenile cataracts account for 5–20% of blindness in children globally and an even larger proportion of juvenile visual impairment in underdeveloped nations. The occurrence of cataract in childhood has been estimated to range from 1 to 15 per 10,000 children. The causes of childhood cataract can be ocular defects, ocular trauma, prenatal infections, related disorders, or inherited factors.**Materials and method:**A cohort study was undertaken at the ophthalmology department of a tertiary care hospital. The study involved the collection of medical records, both retrospectively and prospectively. A total of 100 patients (150 eyes) were examined. All patients who arrived without an appointment and were seen at the ophthalmology unit of the hospital, as well as the youngsters who were examined at different screening camps organised by the department, were included.**Results:**This study involved 100 eyes from 56 male children and 50 eyes from 44 female children. 50 children, accounting for 50% of the total, visited the outpatient department without prior appointment. Another 50 youngsters, also representing 50% of the total, were selected from screening camps and received free medical treatment. 60 children (60%) had cataract in one eye, while 40 children (40%) had cataract in both eyes. The average age of the study participants at the time of surgery was 8.2 ± 4.6 years.**Conclusion:**Our research found that most cases of paediatric cataracts are present from birth. To tackle cataract blindness, it is necessary to actively search for cases and provide guidance to parents, along with establishing clear paths for referrals. Surgery should be performed by a children's eye doctor in a well-equipped facility, with skilled staff, and various approaches may be needed to enhance post-surgery monitoring.

INTRODUCTION

juvenile cataracts account for 5–20 % of blindness in children globally and an even greater proportion of juvenile visual impairment in underdeveloped nations.[1-5]Childhood blindness is a key eye condition that is given high importance in the disease control plan of the "VISION 2020" programme.[6] In nations like India, cataract accounts for 7.4–15.3% of childhood blindness.[7-9]The occurrence of cataract in childhood has been estimated to range from 1 to 15 per 10,000 children.[10,11]Having difficulty seeing at a young age has significant effects on a child's life. It can impede education, restrict personality development, and limit professional options, so adding to the socioeconomic burden on the family and the community.[12]

The goal of cataract surgery in children is to allow them to develop or regain normal vision. Although contact lenses are a straightforward method to address aphakia in children following cataract surgery,[13,14]Intraocular lenses (IOLs) have been very effective and are commonly used to correct eyesight optically.[15-18]If cataract surgery is unsuccessful in babies, the final visual prognosis is determined by the development of deprivation amblyopia.

While most cataracts in children are present from birth, acquired cataracts, such as those caused by eye injuries, are nevertheless rather frequent.[19,20]The causes of childhood cataract can be ocular defects, ocular trauma, prenatal infections, related disorders, or inherited factors.[21]The ultimate result of paediatric cataract surgery is influenced by various factors, such as the age when the cataract is initially detected and the age at which the surgery is performed, any additional eye abnormalities, and the possibility of developing glaucoma after removal of the lens.[22-23]Several factors influence the probability of achieving a positive functional and morphological result following cataract surgery in children.

The results of cataract surgery in children in many developing nations are not satisfactory due to late detection, insufficient surgical facilities for children, lack of anaesthesia for children, and inadequate follow-up. There is limited literature available on the

assessment of how often school-going children use their glasses as part of programmes that check for refractive errors,[24]However, there is limited information on the topic of spectacle compliance after paediatric cataract surgery, as far as we know. The purpose of this study was to evaluate the visual results, both for distant and near vision, following cataract surgery in children.

MATERIALS AND METHOD

A cohort study was undertaken at the ophthalmology department of a tertiary care hospital. The study involved retrieving medical records, both retrospectively and prospectively. A total of 100 patients (150 eyes) were examined.

All patients who arrived without an appointment to the ophthalmology unit of the hospital, as well as the youngsters who were examined at different screening camps organised by the department, were included. The study population consisted of children under the age of 16 who had cataracts, regardless of the cause. The vision of each eye was evaluated using different visual acuity charts based on the child's age and cognitive abilities. Snellen charts were used for school-aged children, Cambridge cards for preschoolers (3-5 years old), Cardiff cards for toddlers (1-2 years old), and lea symbols for newborns. If a child couldn't identify the sign on the top line of the Snellen chart placed 6 metres away, we would instruct him/her to count the number of fingers held up by the examiner at distances of 3, 2, and 1 metre. The detection and display of light were examined in each of the four quadrants, and the visual results were documented. Refraction was attempted wherever feasible to assess any improvement in eyesight. Visual acuities were measured both with and without assistance. An examination of the front part of the eye was performed using a slit lamp, and a magnifying lens was utilised for newborns. Ocular alignment was measured using the Hirschberg corneal reflex test. The cornea was assessed for the existence of congenital anomalies such as small cornea, any cloudiness in the cornea and its connection to the visual axis, presence of any partial-thickness or full-thickness corneal tear, and the site of entrance in cases of injury. The examiner observed the kind and thickness of cloudiness in the lens, as well as any signs of partial dislocation, complete dislocation, or weakening of the zonules. Examination of the back part of the eye was performed either by using a +90D lens with the slit-lamp or an indirect panretinal ophthalmoscope with a +20D lens. In cases where the lens was completely opaque, a B-scan was conducted to evaluate the back part of the eye. For youngsters who were working together, we collected keratometric measurements and determined the power of the intraocular lens (IOL). Biometric measurements were taken while the youngsters were under anaesthesia, even though they were little and recalcitrant. The typical operation performed for juvenile cataracts was removing the cataract and implanting posterior chamber intraocular lenses (PCIOLs). Primary posterior capsulorrhexis with anterior vitrectomy (PPC + AV) was performed in all children under the age of 6 and in those who were deemed uncooperative for subsequent laser capsulotomy. Only cataract extraction/aspiration with posterior capsulotomy and anterior vitrectomy was performed for children under the age of 2. In cases where trauma was the cause, cataract removal was done along with the release of adhesions and, if necessary, the removal of part of the iris. The next day, all the youngsters who had surgery were inspected using a slit-lamp. Visual clarity was evaluated correctly and documented. In certain situations (such as those involving severe manipulation of the iris tissue, traumatic causes, or cases where vitrectomy was performed), oral steroids (at a dosage of 1 mg/kg body weight) were initiated on the day of the surgery as a single dose in the morning after eating breakfast. Both oral antibiotics and oral anti-inflammatory medicines were administered to all patients for a duration of 5 days starting from the day of the surgery. The treatment plan included a combination of eye drops including steroids and antibiotics, to be used every hour (1% prednisolone acetate with 0.3% ofloxacin). Additionally, a mydriatic agent should be used two or three times a day, either in the form of 2% homatropine eye drops or eye ointment with 1% atropine. The oral steroids were gradually reduced over the course of two weeks. The gradual reduction of topical steroids was carried out over a span of 6 weeks. The use of mydriatic drugs was discontinued after one week. The subsequent appointments were arranged for day 1, day 3, 1 week, and 6 weeks after the procedure. During all subsequent appointments, the patient's uncorrected visual acuity was assessed, and a comprehensive examination with a slit lamp was performed. Any complications, if there were any, were observed and handled accordingly. At 6 weeks, an examination was done to measure refraction, and the best corrected visual acuity (BCVA) for both distance and near vision was found. A prescription for glasses was provided, including the necessary addition for close-up vision. Amblyopia treatment after surgery, if necessary, involved requiring patients to wear an eye patch at home for 6 hours. The youngster was assigned tasks in close proximity during that time period for at least one hour. Spectacle adherence was observed at 6 months after the surgery, with the reason for non-adherence being documented if spectacles were not used.

RESULTS

This study involved the participation of 100 eyes from 56 male youngsters and 50 eyes from 44 female children. 50 children (50%) were walk-in patients who came directly to the outpatient department, and 50 children (50%) were selected from screening camps and received free medical treatment. 60

children (60%) had cataract in one eye, while 40 children (40%) had cataract in both eyes. The average age of the participants at the time of operation was 8.2 ± 4.6 years. The youngest child to have surgery was 6 months old, while the oldest child was 16 years old.

Table 1- Age and sex wise distribution of study participants (N=100)

Age (years)	Sex	Frequency (%)
<4	M	9
	F	7
4-6	M	13
	F	4
7-10	M	19
	F	12
>10	M	15
	F	21

Table 2- Causes of paediatric cataract (N=150)

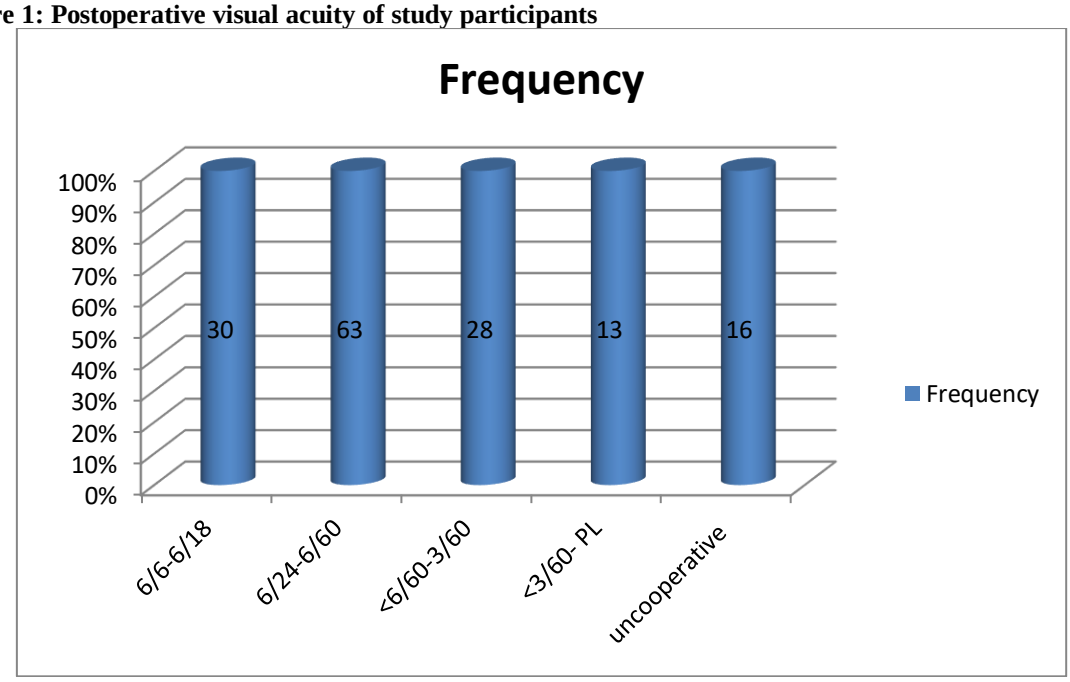
Types of cataract	Number of eyes (%)
Congenital	63 (42%)
Developmental 20	42 (28)
Traumatic	39 (26)
Others	6 (4)

The most often reported type of cataract in children was congenital cataract, accounting for 63 cases (42%). This was followed by developmental cataract, which accounted for 42 cases (28%).

Table 3- Types of surgical procedures performed (n=150)

Procedures	Number of eyes (%)
Cataract extraction	15 (10%)
Cat ext + PPC	27 (18%)
Cat ext + IOL+ PPC+ AV	33 (22%)
Cat ext + IOL 32	63 (42%)
Others	12 (8)

Figure 1: Postoperative visual acuity of study participants



DISCUSSION

Several studies that discuss the visual results of cataract surgery in children mostly concentrate on the kind of cataract (either unilateral or bilateral) and the various techniques employed to treat aphakia.[25,26]Implanting lenses in children with aphakia is still a topic of debate.[27]

There was no connection between the surgical procedure used and the later occurrence of PCO, which was the most common complication after surgery. Our examination of the big group indicated that aphakic glaucoma is a significant risk factor following congenital cataract surgery in individuals with ocular or syndromic abnormalities.

Paediatric cataract surgery is different from adult cataract surgery in several respects. There may be a delay in diagnosis due to amblyopia, the sclera is less rigid, the length and refractive status of the eye continue to change, and there is a higher risk of postoperative inflammation. Therefore, the visual outcomes of cataract surgery in children are not as impressive as those in adults. However, the intervention is still necessary, as restoring a child's vision is a significant accomplishment in terms of saving years of blindness. A study conducted in Spain28 also found that congenital cataract was the most common cause of paediatric cataract. Similarly, a study from central India,[29]Studies indicate that trauma is the primary factor contributing to the development of cataracts in children. The post-surgery visual acuity outcomes of 18.57% of patients with BCVA ≥6/18 are similar to the findings from Central India.[29] Tanzania,[30] and Nepal.[31]

A study conducted in southern India found that 39.5% of patients had a best-corrected visual acuity (BCVA) of 6/18 or better.[32] In a research conducted at Postgraduate Institute Chandigarh, 25 eyes with a complete capsule and 5 eyes with PPC + AV developed PCO after surgery, regardless of the type of IOL used.[32]In our investigation, we observed that 20% of eyes with PPC + AV had PCO, while 17% of eyes without PPC + AV acquired PCO. In a research undertaken in Miraj (Maharashtra) to examine the obstacles to postoperative care in children undergoing cataract surgery,[33,34]The authors reported a low follow-up rate of only 20.6%. Poor follow-up was largely due to the lack of affordability. Therefore, there is no available data on the patients' postoperative condition. In another study conducted in Tanzania, an analysis that considered multiple factors found that gender, being near a hospital, and minimal delay in seeking surgery were all independent predictors of positive follow-up after 2 weeks. However, only distance from a hospital and having preoperative vision (not being blind in the eye to be operated on) were predictors of positive follow-up after 10 weeks.

CONCLUSION

Our research showed that most cases of paediatric cataracts are present from birth. Cataract removal with the implantation of intraocular lenses (IOLs) using posterior capsulotomy and anterior vitrectomy (PPC + AV) is the preferred treatment for treating cataracts in children. Since the number of study participants was insufficient to assess certain results in comparison to other studies. In order to tackle cataract blindness, it is necessary to implement active case detection along with providing guidance to parents and establishing clear paths for referrals. Surgery should be performed by a children's eye doctor in a well-equipped facility, with skilled staff, and numerous approaches may be necessary to enhance postoperative follow-up. Future studies are being established to tackle some of the constraints mentioned in this case series.

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