

Visual outcome of congenital and developmental cataract surgery in North India

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Abstract:

Introduction:

The opacification of the lens, known as a cataract, is one of the major causes of blindness in children. For the improvement of management strategies, epidemiological data are required. Therefore, this study was carried out to account for the visual prognosis of congenital and developmental cataract surgery.

Materials and methods: This study was conducted in the department of ophthalmology at a tertiary care hospital. Ethical approval was taken from the institutional ethical committee. Written informed consent was obtained from each patient or parent, and detailed history was also taken and recorded. Pre-operative examinations like ophthalmic examination, including keratometry, retinoscopy, visual acuity, fundus examination, and relevant investigation were carefully done. The parents were well-pre-informed and discussed the risk, post-operative care, and benefits of surgery. Retinoscopy was used to evaluate refractive status postoperatively and continued for every follow-up. Similarly, patching was used to treat amblyopia. Patients were given optical adjustments for any remaining refractive problems. If needed, a near glass was prescribed after 6 weeks of surgery.

Results: A total of 117 eyes from 68 patients who had undergone unilateral or bilateral congenital and developmental cataract surgery aged up to 18 years were studied. Among 68 patients, 39 (57.35%) and 29 (42.65%) were males and females. 35 (51.47%) patients were 1-5 years age group followed by 5-10 years 19 (27.94%), 15-18 years 8 (11.77%), and 10-15 years 06 (8.82%). Among 68 patients, 49 (72.06%) suffered from bilateral cataracts, whereas 19 (27.94%) suffered from unilateral cataracts. Significant prognosis between pre and post-BCVA with $p < 0.01$ were observed.

Conclusion: Surgical intervention and parental commitment to provide regular optical correction to guarantee strong compliance with prescribed optical rehabilitation can result in the best visual results. Children's cataract awareness, early diagnosis, surgical treatment, and

post-operative care of residual uncorrected refractive error and amblyopia are key factors in preventing childhood cataract blindness. To avoid blindness and visual impairment, child eye health care services are required to diagnose pediatric cataracts as soon as possible.

Keywords: Congenital cataract, BCVA, Cataract surgery

Introduction:

The opacification of the lens, known as a cataract, is one of the major causes of blindness in children.¹ However, it blurs the retinal image and causes visual pathway development to be disrupted. Congenital cataract, which causes visual impairment and the establishment of amblyopia in children, is a common, treatable cause of visual impairment and low vision in children, accounting for 5% to 20% of blindness worldwide.² According to Foster et al., over 200,000 youngsters are blind due to cataracts.³ Congenital cataracts affect 1 in every 10,000 live births worldwide, according to studies.⁴ The epidemiology of childhood cataracts is complicated because it is a group of etiologies defined by age rather than a single disease entity. An estimated 190,000 (%) of the 1.4 million blind youngsters worldwide were caused by lens-related disorders.⁵⁻⁸

Pediatric cataracts can be caused by various factors, including genetic, idiopathic, ocular defects, multisystem syndromes, metabolic problems, maternal infection, pharmaceutical toxicity, and trauma.⁹ When compared to adult cataract surgery, pediatric cataract surgery is unique. Smaller eyes may make intraocular lens (IOL) implantation harder and low scleral stiffness (which increases wound leak), a more elastic lens capsule, and rapidly changing axial length, which makes calculating IOL power difficult.¹⁰

Early-life vision impairment can have a negative impact on a child's overall development, with personal, educational, occupational, and social consequences.¹¹ As a result, detecting and treating amblyopia at an early age is critical for optimal visual development and preventing amblyopia.¹² In terms of visual results and rehabilitation, treating congenital or developing cataracts challenges ophthalmologists, patients, and parents.¹³

There have been a few reports of pediatric cataract outcomes from South Asia, but they have all been limited to one to six weeks of follow-up.¹⁴⁻¹⁶ Pediatric cataract results, unlike adult cataract outcomes, vary over time as a kid grows and develops. South Asia has the highest number of children with pediatric cataracts, although there are few studies on long-term follow-up of these children of one year or more.¹⁷

Surgery is the only treatment for optimal recovery, for which the following two criteria should be met. First, diagnosing congenital cataracts as early as possible is important to prevent amblyopia. Second, the importance of follow-up after surgery should be emphasized to improve the residual refractive error, as well as to detect and manage any post-operative complications that need to be considered, such as increased post-operative inflammation,

axial growth after cataract extraction, implant-power calculation, secondary glaucoma, posterior-capsule opacification.¹⁸⁻²¹

For the improvement of management strategies, epidemiological data are required. Unfortunately, there is a paucity of data on congenital and developmental cataract surgery in North India. We aimed this study to account for the visual prognosis of congenital and developmental cataract surgery.

Materials and methods:

This study was conducted in the department of ophthalmology at a tertiary care hospital. Ethical approval was taken from the institutional ethical committee. Written informed consent was obtained from each patient or parent, and detailed history was also taken and recorded. Pre-operative examinations like ophthalmic examination, including keratometry, retinoscopy, visual acuity, and fundus examination along with relevant investigation were carefully done. The parents were well-pre-informed and discussed the risk, post-operative care, and benefits of surgery.

Inclusion criteria:

A total of 68 patients who had undergone unilateral or bilateral congenital and developmental cataract surgery aged up to 18 years without any other abnormalities were included in this study.

Exclusion criteria:

A patient diagnosed with any other abnormalities like Congenital glaucoma, optic nerve or fundus abnormalities, ocular trauma, prematurity, and cataract associated with other syndromes and systemic disorders were excluded from this study.

The qualified, experienced pediatric ophthalmologist performed the surgeries under general anesthesia. The possible complication, along with the detailed examination of both anterior and posterior segments, were examined in every follow-up. If any complications were noticed were managed accordingly. In every visit, visual acuity was also examined using the standard method.

Retinoscopy was used to evaluate refractive status postoperatively and continued for every follow-up. Similarly, patching was used to treat amblyopia. Patients were given optical adjustments for any remaining refractive problems. If needed, the near glass was prescribed after 6 weeks of surgery.

Results:

A total of 117 eyes from 68 patients who had undergone unilateral or bilateral congenital and developmental cataract surgery aged up to 18 years were studied. Among 68 patients, 39 (57.35%) and 29 (42.65%) were males and females. 35 (51.47%) patient were 1-5 years age group followed by 5-10 years 19 (27.94%), 15-18 years 8 (11.77%) and 10-15 years 06 (8.82%). Among 68 patients, 49 (72.06%) suffered from bilateral cataracts, whereas 19 (27.94%) suffered from unilateral cataracts (Table 1).

Table 1: Demographic distribution of patients

Variables	Frequency	Percentage	Mean ±SD	P-value
Gender				
Male	39	57.35	-	0.58
Female	29	42.65	-	

Total	68	100	-	
Age (years)				
1-5 years	35	51.47	2.86±1.02	0.41
5-10 years	19	27.94	6.39±1.97.	
10-15 years	6	8.82	13.05±2.61	
15-18 years	8	11.77	16.23±1.75	
Total	68	100	5.18±2.39	
Laterally of cataract				
Unilateral	19	27.94	-	<0.01
Bilateral	49	72.06		
Total	68	100		
Cataract				
Congenital	31	45.59	-	0.002
Developmental	37	54.41	-	
Total	68	100	-	

Significant prognosis between pre and post BCVA with p<0.01 were observed (table 2)

Table 2: Comparison between pre and post-operative BCVA

BCVA	6/6-6/18	<6/18-6/60	<6/60-3/60	<3/60-PL	Good F&F	Poor F&F	Total	p-value
Good prognosis	4	36	31	10	24	7	112	<0.01
Stationary	1	0	0	0	3	0	4	
Worse prognosis	0	0		0	0	0	1	
Total	5	36	31	10	27	7	117	

The minimum post-operative complications were observed in this study (fig.1).

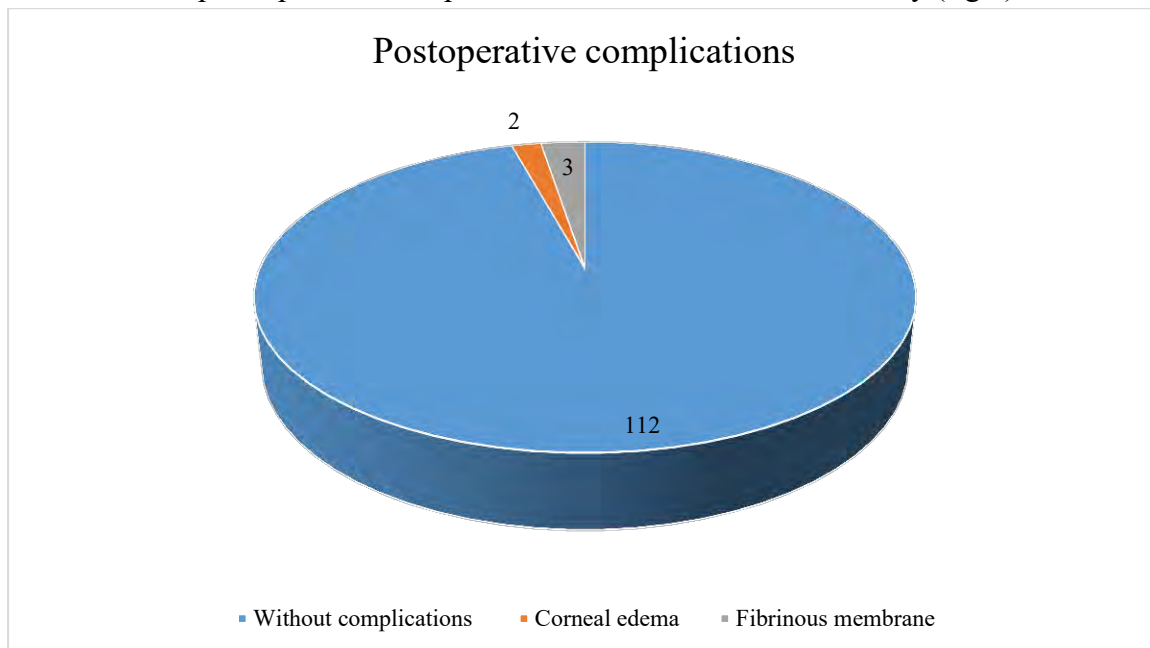


Figure 1: Post-operative complications

Discussion:

Total 117 eyes from 68 patients who had undergone unilateral or bilateral congenital and developmental cataract surgery aged up to 18 years were analyzed. This study was conducted to account for the visual prognosis of congenital and developmental cataract surgery. No significant difference was reported in terms of gender and age.

Mean age of 5.18 ± 2.39 (years) was observed in this study. While in the study in Korea, Iran, Nepal, and India were 3.17, 3.2, 6.2, and 9.6 years respectively.^{14,22-24} These differences would be due to early age diagnosis of congenital cataract.

The first year of life is the optimal time for cataract surgery.²⁵ Overall, diagnosing congenital cataracts is challenging since most children with moderate congenital cataracts will not significantly impact their daily lives until they reach school age and experience difficulties reading and learning.²⁶

In this study, we did not observe gender differences. A similar observation was reported in a study done in UK.²⁷ Studies done in Spain and Guatemala reported more patients had bilateral cataracts; a similar observation was noted in this study.²⁸⁻²⁹

The comparison of the visual outcome by BCVA between pre and post-operative was significantly better after surgery. This observation was similar to Rogers et al., Jain et al., and Hua et al.³⁰⁻³²

Children with congenital cataracts now have a far better visual prognosis. Most pediatric ophthalmologists now concur that early discovery, rapid treatment and management of amblyopia, breakthroughs in microsurgical methods and tools, and IOL developments have all helped to improve congenital cataract therapy.³³⁻³⁴

Children with visual impairment have increased rates of morbidity and mortality. However, one of the key ongoing issues in the long-term management of children after cataract surgery is predicting the refractive outcome.³⁵ Early diagnoses and treatment, before the development of the aberrant foveolar function, are critical for adequate visual acuity and binocular vision in unilateral and bilateral cataracts.

Conclusion:

Surgical intervention and parental commitment to provide regular optical correction to guarantee strong compliance with prescribed optical rehabilitation can result in the best visual results. Children's cataract awareness, early diagnosis, surgical treatment, and post-operative care of residual uncorrected refractive error and amblyopia are key factors preventing childhood cataract blindness. To avoid blindness and visual impairment, child eye health care services are required to diagnose pediatric cataracts as soon as possible.

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