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Original Article

Ophthalmology Section

# Clinical Profile of Congenital and Developmental Cataract in a Tertiary Care Centre of Southern India

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## ABSTRACT

**Introduction:** Cataract is an important cause of preventable blindness in children. Early detection and management of congenital cataracts is of extreme importance due to the risk of amblyopia and visual morbidity. Cataracts of certain morphology are associated with better prognosis.

**Aim:** To study the profile of congenital and developmental cataracts in our tertiary care centre and to evaluate the visual outcomes and complications following cataract surgery.

**Materials and Methods:** A retrospective study was done in a tertiary care centre of Mangalore, Karnataka, of all cases of congenital and developmental cataract, operated by a single surgeon, from February 2012 to September 2017.

**Results:** Bilateral cataracts were seen in 70.5% of patients. Lamellar cataract was seen in 44% of eyes. Phaco-aspiration with posterior chamber intraocular lens implantation was done in 61.3% of eyes. Postoperatively, 44.4% of eyes achieved best corrected visual acuity of 6/6 to 6/12. There is a significant association between the age of the patient, the presence of nystagmus and the type of cataract with the post-operative best corrected visual acuity.

**Conclusion:** The age of the patient, the presence of nystagmus and the type of cataract are significantly associated with the postoperative best corrected visual acuity in patients with congenital and developmental cataract.

**Keywords:** Nystagmus, Phaco aspiration, Visual acuity

## INTRODUCTION

Cataract is one of the leading causes of preventable blindness in children. The incidence of cataract in infants is reported to be as high as 1 to 13 per 10,000 live births [1]. Congenital or developmental cataracts may be inherited (33%), have systemic association (33%), or may be idiopathic (33%) [2].

Early detection and management of congenital cataracts is of extreme importance due to the risk of amblyopia and visual morbidity. Cataracts of certain morphology are associated with better prognosis. Lamellar and anterior polar cataracts carry a better prognosis than nuclear or posterior polar cataracts [3].

The difficulties associated with cataracts in young children include difficulty in patient examination, risks of general anaesthesia, choosing the right intraocular lens, risk of amblyopia, increased chance of postoperative inflammation, and the need for long-term follow-up. These factors make the management of cataract in children more challenging than in adults [4]. Over the last 40 years, there have been major advances in the surgical technique of cataract extraction in children with better visual prognosis [3]. This study aims to describe the profile of congenital and developmental cataract in our tertiary care centre and to evaluate the visual outcomes and complications following cataract surgery in these patients.

## MATERIALS AND METHODS

A retrospective study was done in a tertiary care centre–Kasturba Medical College, Mangalore, Karnataka, India. It was a time bound study. The study period was from February 2012 to September 2017. The study sample included all cases of congenital and developmental cataract during this study period in patients aged less than or equal to 18 years, and operated by a single surgeon. The study was done by examining patient records retrospectively. Post traumatic paediatric cataracts were excluded from the study. A total of 75 eyes of 44 patients were included in the study after getting their informed consent. Details of history including presenting complaints were noted from the records. Details of preoperative visual assessment were noted where visual assessment was possible, depending on the age and cooperation of the patient. Details of ocular examination including presence of nystagmus, strabismus, anterior segment findings on torch light and slit-lamp examination and posterior segment findings on indirect ophthalmoscope examination were noted. Details of systemic assessment were noted from the records. Intraocular lens calculation was done, whenever indicated, using Sanders-Retzlaff-Kraff II formula [5]. Intraocular lens power was adjusted for age of the patient, based on Dahan's criteria [6]. Details of cataract surgery done were noted. Postoperatively all patients were started on antibiotic-steroid eyedrops and cycloplegics for six weeks. Regular follow up was done postoperatively at two weeks, four weeks, six weeks and then monthly upto six months. Postoperative visual acuity, refraction and complications were noted.

### Ethics

As the study was a retrospective record-based study, approval was taken from the institutional authoritities for access to the patient records.

## STATISTICAL ANALYSIS

Analysis was done by descriptive statistics. Association was found by applying chi-square test. A statistical package SPSS version 17.0 was used to do the analysis. A $p< 0.05$ was considered significant.

## RESULTS

During the study period, 75 eyes of 44 patients with congenital or developmental cataract were included. There were 27 (61.4%) male patients and 17 (38.6%) were female.

The maximum number of patients were seen in the age group of more than nine years (31.8%), followed by the age group of four to six years (25%) [Table/Fig-1].

Bilateral cataracts were seen in 31 (70.5%) patients and unilateral cataract in 13(29.5%) patients.

The most common presenting complaint among patients was diminution of vision, seen in 28 (63.6%) patients. The next most common presenting complaint was leucocoria which was seen in 11 patients (25%). Nystagmus and squint were the other presenting complaints [Table/Fig-2].

History of rubella was present in three patients. There were two patients who had inborn errors of metabolism. There was a patient with Imerslund Grasbeck syndrome. There was family history of congenital cataract in one patient.

On examination, nystagmus was found in 13 (29.5%) patients and strabismus was seen in 12 (27.2%) patients. However these were not the presenting complaints in all these patients. There was one patient with an iris coloboma.

The most common type of cataract (determined on slit-lamp examination) was lamellar cataract seen in 33 (44%) eyes. Total cataract was seen in 12 eyes (16%). Combined cataracts were seen in 10 (13.3%) eyes. The other types of cataract that were seen included membranous cataract, nuclear cataract, posterior subcapsular opacification, sutural cataract, coralliform cataract and posterior polar cataract [Table/Fig-3].

Phaco aspiration with Posterior Chamber Intraocular Lens (PCIOL) implantation was done in 46(61.3%) eyes. Phaco aspiration with primary posterior capsulorrhexis, anterior vitrectomy and posterior chamber intraocular lens implantation was done in 14 (18.7%) eyes. Phaco aspiration alone was done in 13 eyes. Phaco aspiration with primary posterior capsulorrhexis and anterior vitrectomy was done in 2 eyes [Table/Fig-4]. Secondary intraocular lens implantation was done in 13 eyes (17.3%).

Postoperatively, 28 (44.4%) eyes achieved Best Corrected Visual Acuity (BCVA) of 6/6 to 6/12. BCVA was 6/60 or less in 18 eyes [Table/Fig-5]. Due to poor patient cooperation and young age, visual acuity could not be measured in 12 eyes.

Most common postoperative complication seen was posterior capsular opacification in 39 (52%) eyes, which was seen from two months to four years postoperatively. Visual acuity was reduced in these patients. Optic capture and late postoperative iritis were seen in one eye each.

Comparison was done between the postoperative BCVA in bilateral and unilateral cataracts. It was found that the difference in postoperative BCVA was not statistically significant (p= 0.257) [Table/Fig-6].

Among the patients that had nystagmus on examination, 77.8% had a postoperative best corrected visual acuity of 6/60 or less. This was statistically significant (p=0.015). In this study, among the 12 patients who had strabismus on examination, 7 had a postoperative BCVA of 6/6 to 6/12 [Table/Fig-7].

It was found that the correlation between the type of cataract and postoperative BCVA was highly significant (p=0.008). Among patients with lamellar cataract, 46.9% had a postoperative BCVA of 6/6 to 6/12, whereas majority of patients with total cataract (55.6%) had a postoperative BCVA of 6/60 or less. Patients with membranous cataract and posterior subcapsular opacification had a postoperative BCVA of 6/60 or less. Patients with sutural cataract, coralliform cataract and posterior polar cataract had a postoperative BCVA of 6/6 to 6/12 [Table/Fig-8].

The association between the age of the patient at the time of surgery and the postoperative BCVA was found to be statistically significant (p = 0.033). Among patients aged two to three years, 50% had a postoperative BCVA of 6/60 or less; whereas among patients who were more than nine years of age, 75% achieved a postoperative BCVA of 6/6 to 6/12. [Table/Fig-9].

| | | Number of patients(n) | Percentage (%) |
|---|---|---|---|
| Gender | Male | 27 | 61.4 |
| | Female | 17 | 38.6 |
| Age distribution | Less than 2 years | 6 | 13.6 |
| | 2-3 years | 4 | 9.1 |
| | 4-6 years | 11 | 25 |
| | 7-9 years | 9 | 20.5 |
| | More than 9 years | 14 | 31.8 |

**[Table/Fig-1]:** Characteristics of patients in the study.

| Presenting complaint | Number of patients(n) | Percentage (%) |
|---|---|---|
| Diminution of vision | 28 | 63.6 |
| Leucocoria | 11 | 25 |
| Nystagmus | 3 | 6.8 |
| Squint | 2 | 4.6 |

**[Table/Fig-2]:** Presenting complaints.

| Type of cataract | Number of eyes(n) | Percentage (%) |
|---|---|---|
| Lamellar cataract | 33 | 44 |
| Total cataract | 12 | 16 |
| Combined cataract | 10 | 13.3 |
| Membranous cataract | 7 | 9.3 |
| Nuclear cataract | 5 | 6.7 |
| Posterior subcapsular opacification | 3 | 4 |
| Sutural cataract | 2 | 2.7 |
| Coralliform cataract | 2 | 2.7 |
| Posterior polar cataract | 1 | 1.3 |

**[Table/Fig-3]:** Types of cataract.

| Type of surgery | Number of eyes(n) | Percentage (%) |
|---|---|---|
| Phaco aspiration with PCIOL* implantation | 46 | 61.3 |
| Phaco aspiration with primary posterior capsulorrhexis, anterior vitrectomy and PCIOL* implantation | 14 | 18.7 |
| Phaco aspiration | 13 | 17.3 |
| Phaco aspiration with primary posterior capsulorrhexis and anterior vitrectomy | 2 | 2.7 |

**[Table/Fig-4]:** Types of surgery.
*PCIOL – posterior chamber intraocular lens

| Best corrected visual acuity | Number of eyes(n) | Percentage (%) |
|---|---|---|
| 6/6 to 6/12 | 28 | 44.4 |
| 6/18 to 6/36 | 17 | 27 |
| 6/60 or less | 18 | 28.6 |

**[Table/Fig-5]:** Postoperative BCVA.

| | | Number of eyes with best corrected visual acuity (%) | | |
|---|---|---|---|---|
| | | 6/6 to 6/12 | 6/18 to 6/36 | 6/60 or less |
| Cataract | Bilateral | 23 (46) | 15 (30) | 12 (24) |
| | Unilateral | 5 (38.5) | 2 (15.4) | 6 (46.1) |

**[Table/Fig-6]:** Comparison of postoperative best corrected visual acuity in unilateral and bilateral cataracts.
$\chi^2 = 2.72$, p= 0.257, Statistically insignificant; p< 0.05 was taken as statistically significant, p-value was calculated using chi-square test

| | Number of eyes with BCVA (%) | | |
|---|---|---|---|
| | 6/6 to 6/12 | 6/18 to 6/36 | 6/60 or less |
| Nystagmus | 0 (0) | 2 (22.2) | 7 (77.8) |
| Strabismus | 7 (58.3) | 2 (16.7) | 3 (25) |

**[Table/Fig-7]:** Postoperative BCVA in patients with nystagmus and strabismus.
$\chi^2 = 8.34$, p = 0.015, Statistically significant; p< 0.05 was taken as statistically significant, p-value was calculated using chi-square test

| | | Number of eyes with BCVA (%) | | |
|---|---|---|---|---|
| | | 6/6 to 6/12 | 6/18 to 6/36 | 6/60 or less |
| Type of cataract | Lamellar cataract | 15 (46.9) | 12 (37.5) | 5 (15.6) |
| | Total cataract | 1 (11.1) | 3 (33.3) | 5 (55.6) |
| | Combined cataract | 6 (85.7) | 0 (0) | 1 (14.3) |
| | Membranous cataract | 0 (0) | 0 (0) | 2 (100) |
| | Nuclear cataract | 1 (20) | 2 (40) | 2 (40) |
| | Posterior subcapsular opacification | 0 (0) | 0 (0) | 3 (100) |
| | Sutural cataract | 2 (100) | 0 (0) | 0 (0) |
| | Coralliform cataract | 2 (100) | 0 (0) | 0 (0) |
| | Posterior polar cataract | 1 (100) | 0 (0) | 0 (0) |

**[Table/Fig-8]:** Type of cataract and postoperative BCVA.
$\chi^2 = 32.9$, p = 0.008, Statistically significant; p< 0.05 was taken as statistically significant, p-value was calculated using chi-square test

| | | Number of eyes with BCVA (%) | | |
|---|---|---|---|---|
| | | 6/6 to 6/12 | 6/18 to 6/36 | 6/60 or less |
| Age of patient | 2-3 years | 2 (25) | 2 (25) | 4 (50) |
| | 4-6 years | 5 (25) | 7 (35) | 8 (40) |
| | 7-9 years | 6 (40) | 4 (26.7) | 5 (33.3) |
| | More than 9 years | 15 (75) | 4 (20) | 1 (5) |

**[Table/Fig-9]:** Age of the patient and postoperative BCVA.
$\chi^2 = 13.7$, p = 0.033, Statistically significant; p< 0.05 was taken as statistically significant, p-value was calculated using chi–square test

## DISCUSSION

The management of paediatric cataracts is quite challenging. This study showed the various characteristics of patients that presented to our hospital with congenital or developmental cataracts.

In our study 61.4% of patients were male. A 70.5 % of patients had bilateral cataracts. Rahi JS et al., in their study of 243 patients with congenital or infantile cataract, had bilaterality in 66% of patients [7].

The most common presenting complaint in this study was diminution of vision in 63.6% of patients. Yang ML et al., also reported diminution of vision as the main presenting complaint in 33.3% of patients [8].

Haargaard B et al., in their study had nuclear or lamellar cataract among 34% of eyes, and total cataract among 15% [9]. This was similar to the findings in our study where lamellar cataract was seen in 44% of eyes and total cataract in 16%.

In a study by Kim KH et al., it was found that strabismus was present in 28% of patients with congenital or developmental cataract. Nystagmus was seen in 15% of patients [10]. In our study it was found that nystagmus was more common in 29.5% of patients and strabismus was seen in 27.2% of patients.

In a study done by Gogate PM et al., the most commonly done cataract surgery was phacoaspiration with posterior chamber intraocular lens implantation [11]. This was similar to our study where the most commonly done surgery was phaco aspiration with intraocular lens implantation (61.3%).

In the present study a postoperative BCVA of 6/12 or better was seen in 44.4% of eyes. Sukhija J et al., in their study showed that 73% of eyes with congenital cataract had a BCVA of 6/12 or better following cataract surgery with primary intraocular lens implantation [12]. The better BCVA in the study by Sukhija J et al., may be due to earlier age of cataract diagnosis and surgery (less than two years), with possibly less chance of amblyopia.

The commonest complication following cataract surgery in our study was Posterior Capsular Opacification (PCO) seen in 52% of eyes. This is similar to the findings by Khanna RC et al., where PCO was also the most common complication following surgery in 27.4% of eyes [13]. Many studies show a high incidence of PCO. Gogate PM et al., had PCO in 63.2% of patients [11]. This would suggest that PCO is a significant cause of postoperative visual morbidity requiring long-term follow up of these patients.

In our study, we found the postoperative BCVA to be significantly associated with the age of the patient, presence of nystagmus and the type of cataract. Older patients (more than nine years) had good postoperative BCVA as compared to younger patients (two to three years). Sutural, coralliform and combined cataracts had good postoperative vision whereas patients with membranous cataract and posterior subcapsular opacification had low postoperative BCVA. Patients with nystagmus had poor postoperative BCVA. In our study majority of patients with strabismus had good vision postoperatively. This may be related to the type of cataract in these patients. Gogate PM et al., showed that postoperative visual acuity was significantly associated with the type of cataract, type of surgery, intraocular lens implanted, age of the patient and preoperative vision [11]. Hence preoperative evaluation of patients with congenital and developmental cataract would help in determining postoperative visual prognosis. Future studies may be done on a larger scale to identify other factors influencing postoperative BCVA.

## LIMITATION

The limitation of this study is the small sample size.

## CONCLUSION

In this study, congenital and developmental cataracts were bilateral in majority of patients. The most common presenting complaint was diminution of vision. The morphology of cataract that was most commonly seen was lamellar cataract. Phaco aspiration with PCIOL implantation was the most commonly used surgical technique. PCO was the most commonly noted postoperative complication. There is a significant association between the age of the patient, the presence of nystagmus and the type of cataract with the postoperative BCVA. Hence, these factors could be useful in determining preoperatively the visual prognosis of patients with congenital or developmental cataract.

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