DOI: https://doi.org/10.53350/pjmhs221610584

ORIGINAL ARTICLE

Study to Determine the Outcomes of Congenital Cataract Surgery

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ABSTRACT

Objective: The aim of this study is to determine the outcomes of congenital cataract surgery.

Place and Duration: Ophthalmology department of Hayatabad Medical complex Peshawar and Alshifa Trust Eye Hospital Rawalpindi for the duration from January 2022 to June 2022.

Methods: A total of 200 eyes of 130 patients aged 3 to 8 with visually significant congenital cataracts (diameter ≥ 3 mm) were included in the interventional study. In all cases, posterior capsulotomy and anterior vitrectomy were performed. All patients were followed-up for six months. At follow-up; the patients' surgical complications were managed along with treatment of amblyopia and visual acuity assessment was done. After six-months of follow-up; final outcome of congenital cataract surgery in relation of visual acuity was evaluated.

Results: At the conclusion of the study, good vision was achieved in 52% of patients, and the better visual outcome was higher significantly in the younger age groups. The communal complication in our analysis was the fibrinous reaction.

Conclusions: This study shows that early surgery for congenital cataract is beneficial and safe practice to obtain good visual acuity.

Keywords: Congenital Cataract, Amblyopia, Visual Outcomes.

INTRODUCTION

Vision 2020 is the global program to lessen the incidence of preventable blindness and child blindness as one of its top priorities[1]. Around 1.5 million blind children are estimated in the world, and about 1/3rd live in the developing countries. There is estimated prevalence of 10 blind children for every 10,000 children in Pakistan[2-3]. According to numerous studies conducted worldwide, between one-third and fifty percent of childhood blindness can be avoided or treated. The most common reason for childhood blindness in children is cataract[4-5]. Congenital cataracts account for 5-20% of childhood blindness globally, and their prevalence ranges from 1 to 15 per 10,000 live births. 54.7% of children in Pakistan have visual impairments, and 23% of them have congenital cataracts, according to a hospital study[6]. The congenital cataracts typically manifest as a white reflex in the eye called leukocoria. The morphology of a cataract is significant because it may reveal its potential genesis, mode of inheritance, and visual impact[7]. Early detection and treatment of congenital cataracts are necessary to prevent persistent vision impairment from amblyopia ("lazy eye")[8]. When congenital cataract surgery is performed early, adequate visual rehabilitation results in improved eyesight. Best Surgical treatment for congenital cataract in pediatric patients requires clear optical axis[9]. The opacification of posterior capsule, opacification and thickening of the hyaloid face, inflammatory membranes and lens epithelial cells proliferation result in obstruction of the visual axis. Children with an intact posterior capsule are more prone to an excessive amount of posterior capsular opacification[10]. In the postoperative period; continuous curvilinear posterior capsulorhexis in the treatment of congenital cataracts, anterior vitrectomy has become the gold standard for decreasing the opacification of the visual axis[11]. With this treatment, there will be less chance of the visual axis clouding and less need for a post-operative yag capsulotomy. In children with posterior capsulotomy and anterior vitrectomy, posterior intraocular lens (PC-IOL) implantation is a treatment that is becoming more popular and well-accepted globally[12]. Various postoperative problems are seen in children following surgery which includes fibrinous reaction, membrane formation, posterior synechiae formation caused by uveal tissue's increased reactivity[13]. It may result in rise of intraocular pressure and pupillary blockage in the postoperative period. The aim of this study is to determine the outcomes of congenital cataract surgery in a tertiary care hospital.

METHODS

A total of 200 eyes of 130 patients aged 3 to 8 with visually significant congenital cataracts (diameter ≥ 3 mm) were included in the interventional study. It was conducted at the Ophthalmology department of Hayatabad Medical complex Peshawar and Alshifa Trust Eye Hospital Rawalpindi for the duration from January 2022 to June 2022. The children's guardians gave their informed consent for treatment. Other congenital anomalies like microcornea and microphthalmia, traumatic cataract, a history of intrauterine infection, nystagmus, congenital glaucoma, strabismus, ptosis, retinal pathology, fundus dystrophies and systemic diseases like galactosemia, hypoglycemia and hyperglycemia were excluded. After detailed history, the patients underwent a thorough examination and appropriate investigations were accomplished. Visual acuity, anterior and posterior segment examinations using a slit lamp, B-scan ultrasound, keratometry and, if probable, the calculation of the intraocular lens' power was done in all patients. The non-cooperative children underwent an examination under anesthesia for the determination of intraocular lens power and keratometry prior to surgery. The SRK II formula was used to determine the IOL power. Preoperative pupil dilation was carried out using 2.5% phenylephrine and 1% cyclopentolate. Under general anaesthesia and sterile draping, a 3 mm super-temporal limb incision was given with 3.2 no surgical knife. Viscoelastic material was injected to maintain the anterior chamber depth and to make the surgical instruments entry easier with less tissue trauma. The anterior capsulorhexis was accomplished by bending a 26G needle or utrata forceps, depending on the anterior capsule elasticity. The irrigation-aspiration hand piece was used for aspiration of the lens matter. A foldable posterior chamber acrylic intraocular lens was implanted into the posterior capsular bag after lens matter aspiration. Posterior capsulotomy and anterior vitrectomy were carried out in all children. An air bubble was injected to maintain the anterior chamber depth after surgery, and the incision was stitched up with an interrupted 10-0 monofilament nylon suture. An antibiotic and 1% atropine were injected locally, and pad was applied. The eye pas was removed after 24 hours. After surgery, systemic antibiotics were given for 5 days. Topical steroids, cycloplegics and antibiotics were given during the six-week follow-up period. Following surgery, patients were followed-up for early postoperative complications on day 1, 1week, 1 month, 3 months, and 6 months later. Lea symbols and ETDRS tables were used to evaluate visual acuity in accordance

with the child's age, intelligence and co-operation. Children with visual acuity greater than log MAR 0.5 were given amblyopia treatment. Depending on the patient's age and the extent of their amblyopia, the amblyopia therapy was given. The eye with good visual acuity was patched and allows the patients to see with the lazy eye to improve amblyopia. The child's age determines the patching hours. Monthly visits were made to these patients to observe any visual acuity improvement. After six months, final visual acuity was evaluated, and good visual acuity was defined as a log MAR between 0.0 and 0.5.

RESULTS

The study included 200 eyes from 130 participants who had significant congenital cataracts. 75 (57.7%) of the 130 patients were men, and 55 (42.3%) were women. Regarding the eye's involvement; 95 (47.5%) have congenital cataract in the right eye and 105 (52.5%) in the left eye.

The final visual acuity was assessed at 6 months. In the first month, the mean BCVA was 0.9 ± 0.17; in the third month it was 0.8 ± 0.20; and at the sixth month it was 0.6 ± 0.28. The mean best-corrected visual acuity (BCVA log mar range 0.0 to 0.5) was present in 52% (104/200) of patients, while poor visual acuity (BCVA> 0.5) was present in 48% (96/20) of cases. BCVA was much improved between the ages of 3 and 5 in comparison to 6-8 years.

Table-1: shows the BCVA in children after congenital cataract surgery at six-months in relation to age-groups

Age-Groups	Final Best corrected visual acuity		Total
	Good	Not-Good	
3-5 Years	98(94.2%)	6(5.8%)	104
6-8 Years	6(6.3%)	90(93.7%)	96

On the first postoperative day, 30 (15%) eyes showed mild to severe anterior chamber inflammation (flare or +2 anterior chamber cells). Prednisolone acetate 1% and cyclopentolate 1% were given topically to these patients, and were followed up closely. After two weeks, the anterior chamber inflammation was completely resolved.

Table-2: shows the Anterior Chamber Inflammation in patients and treatment response

Anterior Chamber Inflammation	No	Resolved with treatment
Mild-Moderate	30 (15%)	30(100%)
Severe	40 (20%)	30 (75%)

40 (20%) eyes had severe anterior chamber inflammation (flare with grade +3 to +4 anterior chamber cells) on the first day following surgery. They were prescribed 1% topical atropine and systemic steroid therapy for two weeks. The inflammation was resolved in 30 (75%) children while the remaining 10 (25%) children had Yag laser membranectomy. These patients were given steroid treatment for one-month with continuous follow-up at 1 week interval. In the first week following surgery, 15 (7.5%) eyes showed an increase in intraocular pressure. These patients received topical anti-glaucoma treatment (beta-blockers) and were followed-up for intraocular pressure measurement one week later.

Table-3: shows the various complications after surgery

Parameters	No(%)
Raised IOP	15 (7.5%)
Pupillary Deviation	9 (4.5%)
IOL decentration	11(5.5%)
Loose Corneal sutures	5(2.5%)

9 (4.5%) eyes showed pupillary deviation. This resulted from an iris injury sustained during surgery. Four (2%) eyes showed IOL capture. Nine (5.5%) eyes showed IOL decentration. In 5 (2.5%) individuals, loose corneal scleral sutures were seen. In younger children, the loose sutures were removed under sedation; in cooperative and older children, the sutures were removed using a slit lamp.

There were no substantial postoperative problems such retinal detachment, endophthalmitis, glaucoma, or significant inflammation with synechia's or lens deposits.

DISCUSSION

Due to sensory deprivation during the process of eye maturation, congenital cataract is the communal reason of visual impairment in children[14]. Congenital cataract surgery's final visual outcome is significantly influenced by the posterior capsule's treatment, amblyopia's intense treatment, and refractive therapy[15]. The prevalence of posterior capsule opacification in children has been reduced by the use of numerous surgical techniques[16]. The most often used surgical technique for treating congenital cataracts is the posterior chamber IOL implantation combined with anterior vitrectomy and posterior capsulotomy[17]. It is debatable at what age to execute posterior capsulotomy and anterior vitrectomy. The findings of numerous studies vary. Children under the age of eight underwent anterior vitrectomy and primary posterior capsulotomy according to Basti et al study[18]. In youngsters under the age of 8, Dahan and Salmenson advised posterior capsulorhexis and anterior vitrectomy[19]. In children under the age of five who have congenital cataracts, Vasavada and Desai proposed that an anterior vitrectomy with a continuous curved posterior capsule is preferable[20]. In our study, we used an anterior vitrectomy and posterior capsulotomy in all cases to reduce the extent of visual axis obstruction and to offer early postoperative visual rehabilitation. Good visual acuity outcomes after congenital cataract surgery can vary. Kim et al. reported that 51.7% of patients had improved visual acuity[21]. 50% of patients showed improvement, according to Lai et al[22]. According to Magnusson et al., 52% of children had better vision after surgery[23]. In first month of the follow-up period; no improvement in visual acuity was seen, but in later follow-ups, the majority of patients had good vision with a mean log MAR value of 0.5. A mean log MAR value of 0.5 was also shown by Magnusson et al at the conclusion of the study[24]. In 13% of eyes, there was severe anterior chamber inflammation. According to Keech et al., 10% of the eyes experienced secondary membrane formation and inflammation[25]. According to Zwaan et al., 13% of eyes results in fibrinous membrane development following surgery. In 7.5% of the eyes, an increase in intraocular pressure was seen. Increases in intraocular pressure were recorded in 4.3% of cases by Ondraaek and Lokaj[26]. 4.5% of the eyes had pupillary deviation in our study and 3.8% of the eyes had pupil deviation in Ondraaek and Lokaj study. 2.5% of the eyes had IOL capture in this study and 2.6% of patients had IOL capture in Luo et al study.

CONCLUSION

This study shows that early surgery for congenital cataract is beneficial and safe practice to obtain good visual acuity.

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