Original Article

PREVALENCE OF POSTERIOR CAPSULAR OPACIFICATION AFTER INTRAVITREAL DEXAMETHASONE AND SUBCONJUNCTIVAL MYDRIACAINE INJECTIONS IN PAEDIATRIC CATARACT SURGERY

Khalid Waheed, Amtul Mussawar Sami and M. Tayyib

Objective: To determine the prevalence of posterior capsular opacification in congenital cataract surgery after intravitreal dexamethasone and subconjunctival mydriacaine injections.

Material & Methods: This prospective study was conducted in Eye unit 1, Services Hospital, SIMS, Lahore from 21/7/2008 to 26/6/2013. During this period we evaluated 30 eyes in 30 children aged 4 months to 2 years with congenital cataract with no other associated anterior or posterior segment pathology after intravitreal dexamethasone and subconjunctival mydriacaine injection. A comprehensive detailed history, demographic data, surgical techniques and the prevalence of delayed post-operative complication like posterior capsular opacification was noted.

Results: The incidence of posterior capsular opacification was observed in 64% of the congenital cataracts after surgical intervention with intravitreal dexamethasone and subconjunctival mydriacaine injections.

Conclusion: The present study revealed that use of intravitreal dexamethasone and subconjunctival mydriacaine injections during paediatric cataract surgery provides better surgical outcome in terms of clearer visual axis due to less inflammation and synechiael formation which decreases the incidence of posterior capsular opacification in these cases of congenital cataracts.

Keywords: Congenital cataracts, amblyopia, posterior capsular opacification, dexamethasone, blindness.

Introduction
Congenital and developmental cataracts are the most common cause of treatable childhood blindness. The global incidence of this congenital disorder has been reported to be 1-15/10,000 live births. Foster et al reported that about 200,000 children are blind as a result of congenital cataracts. The lack of visual stimulus in these children during the early years of life can adversely affect overall development of the child with far reaching effects on self esteem, psychosocial and peer interaction, educational, and occupational aspects. Restoring the vision of one blind child from cataracts may be equivalent to restoring the sight of 10 elderly adults due to disability burden in terms of blind year. It is of utmost important to detect and diagnose congenital cataracts to prevent amblyopia and blindness. It has been noted that treatment of congenital cataract is a challenge to ophthalmologists, patients and parents in terms of visual development and rehabilitation in the developing world. During the last few decades, the advancements and development in micro-surgical techniques in congenital cataract surgery have improved the safety and visual status of paediatric patients. Several studies have concluded that posterior capsular opacification is the major delayed complication of congenital cataract surgery which can lead to amblyopia and blindness. Several techniques have been developed for prevention of posterior capsular opacification, such as posterior curvilinear capsulorhexis, anterior vitrectomy, intraocular lens implantation with optic capture and lens in the bag technique, but still this major complication needs attention for the prevention of blindness. The objective of this study was to assess the incidence of posterior capsular opacification, after intra-vitreal dexamethasone and subconjunctival mydriacaine injections during congenital cataract surgery.

Material & Methods
This prospective study was conducted in Eye-unit 1, Services Hospital, Lahore affiliated to Services Institute of Medical Science, Lahore from 21.7.2008 to 26.5.2013. A total of 30 patients with 30 eyes were completely evaluated before surgical intervention. 22 male and 8 female patients were included in this study. Age range was between 4 months to 2 years. Informed consent was taken from the parents/
guardians of patients included in this study. Ocular trauma, congenital glaucoma, anterior segment dysgenesis, Lowe's syndrome, maternal rubella syndrome, trisomy, optic nerve abnormalities and retinopathy of prematurity were not included in this study. Pre-operative assessment included a comprehensive history, including perinatal history, history of ocular and systemic disorders, anterior and posterior segment examination, retinoscopy, keratometry and ultrasonography to assess retinal status. Pediatric evaluation was done in Paediatric unit of Services Hospital, Lahore. Specific tests like blood complete examination, urine complete examination, chest x-ray, serology for virus, renal function tests, serum calcium, parathyroid hormone and other necessary tests were done accordingly. Before surgical intervention, fitness for general anaesthesia was taken. Dilatation of the pupil was done by using cyclopentolate 1% and phenylepherine 10% at 90, 60, 30 and 15 minutes preoperatively. Surgical procedures included anterior capsulotomy/ anterior continuous curvilinear capsulorhexis, irrigation and aspiration of lens matter, posterior capsulotomy or posterior continuous curvilinear capsulorhexis, anterior vitrectomy, 0.1cc intravitreal dexamethasone and 0.05% mydricaine injections. All cases remained on topical steroids and cycloplegic eye drops for six weeks. Patients were followed on first postoperative day and first postoperative week for detection of early postoperative complications. Then patients were followed after three months, six months and one year. In every visit patient were completely evaluated, including fundoscopy, cycloplegic retinoscopy and record of intraocular pressure.

Results
A total of 30 patients with 30 eyes were completely evaluated before surgical intervention. Male were 22 and female were 8 (Fig-1).

Age range was between 4 months & 2 years. Posterior capsular opacification occurred in 64%, as shown in Fig-2.

Discussion
In this study we assessed the effect of intravitreal dexamethasone on posterior capsular opacification in congenital cataract surgery. This is the main late complication in congenital cataract surgery which can lead to poor visual prognosis due to amblyopia in children. The posterior capsular opacification occurs due to proliferation, migration, epithelial to mesenchymal transition, collagen deposition and lens fiber regeneration of lens epithelial cells. Two main morphological types of posterior capsular opacification can be differentiated; fibrotic and regenerative or pearl. The fibrotic type is caused by the proliferation and migration of lens epithelial cells which undergo the epithelial to mesenchymal transition, resulting in the fibrous metaplasia and leading to significant visual loss by producing wrinkles and folds in posterior capsule. The pear type is caused by the lens epithelial cells located at the equatorial lens region. They induce regeneration of crystalline-expressing lenticular fibers that form Elschnig's pearls and Soemmerring ring.

The histological features of posterior capsular opacification are now well established, but to date the molecular mechanisms influencing the behaviour of residual lens epithelial cells after cataract surgery are not completely understood. Its incidence after cataract surgery is nearly 100% in infants even when posterior capsulorhexis has been performed without disruption of anterior vitreous phase; opacification, caused by in growth of lens epithelial cells on the vitreous surface, can be found months after surgery. In our study the posterior capsular opacification was noted in 19 (64 %) eyes. Its incidence is very less as
compared to several other studies. Our study was similar to Muzaffer et al who had noted posterior capsular opacification in 51.72% of cases in the first 90 days of follow-up. This may be due to anterior vitrectomy which removed the scaffold for lens epithelial cell migration & intravitreal injection of dexamethasone which inhibits inflammatory process and subconjunctival mydriacaine injection which keeps the pupil dilated & prevents synechial formation. Our results were also similar to Hosal and Biglan who have shown decreased risk of posterior capsular opacification after posterior capsulorhexis and anterior vitrectomy. However, our study is in contrast to Mazar et al in which rate of posterior capsular opacification is only 34%. The rate of different ocular complications in paediatric eyes is almost very high due to excessive fibrosis, in spite of modern surgical techniques which can be responsible for poor visual outcome.

**Conclusion**

The present study revealed that the use of dexamethasone and subconjunctival mydriacaine injections during cataract surgery provides better surgical results which can help in prevention of amblyopia to some extent. Visual outcome can further be improved by parent's guidance and motivation postoperatively. Further studies with a larger pediatric patients group are necessary to confirm the optimal treatment of congenital cataract surgery.

**References**