Management of Pediatric Cataract: A Challenge

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Abstract:

Pediatric cataract is an important cause of visual morbidity in early childhood and ranks as third major cause of childhood blindness. Management of pediatric cataract is still a challenge because facilities for management of pediatric cataract are inadequate in India. The aim of surgery is to provide long term visual axis by preventing Posterior capsular opacification (PCO). Surgery for pediatric cataract is aspiration by using two way irrigation- aspiration (IA) canula or automated IA. Membranous cataract needs phacoemulsification. IOL implantation is recommended after 2 years of age. Primary posterior capsulotomy with or without anterior vitrectomy is considered to prevent PCO.

Key words: cataract, Irrigation Aspiration [IA], IOL, posterior capsulotomy, visual rehabilitation.

Current Surgical Techniques:

The aim of the surgical technique is to provide a long term clear visual axis by preventing PCO or secondary membrane. The best current technique is "Phacoaspiration with primary posterior capsulotomy with or without anterior vitrectomy and capsular bag implantation/optic capture of intraocular lens"[4].

Preoperative Evaluation:

A thorough history is useful to diagnose whether the cataract is congenital, developmental or traumatic in origin. Leucocoria is usually noticed in congenital cataract, so other causes of leucocoria should be excluded. Maternal history of drug use, infection or exposure must be ascertained. Family history of cataract and families with inherited cataracts should receive genetic counselling. Each child should be examined by a paediatrician for thorough systemic work up to rule out systemic associations, anomalies or congenital rubella.

Assessment of visual function: it includes History of behavioural change like bringing objects close to eye, frequent fall or hitting the wall etc. Ruling out nystagmus/nystagmoid movements, squint and noting for central, steady and maintained fixation. Slit lamp examination to evaluate various types of cataract. Congenital cataracts are more amblyogenic than developmental cataracts.

Evaluation of fundus and B-Scan ultrasound whenever required. Examination to rule out congenital abnormalities like microphthalmos, coloboma and persistent hyperplastic primary vitreous.
Preoperative Investigations:


IOL Power Calculation:

The type of biometric formula for IOL power calculation is not defined and different theories have been proposed by different surgeons. Most reports have recommended under-correction anticipating the myopic shift following IOL implantation. The axial length and keratometry readings should be measured for power calculation. The most preferred approach is the one put forwarded by Dahan et al. [5] thus; children between 2-3 years are under corrected by 30%, 3-5 years by 20% and 5-8 years by 10%. After 8 years, the IOL power is targeted for emmetropia.

Indications For Pediatric Cataract Surgery:
Cataract which occupy visual axis and occupy 3mm or more of the pupil. Unilateral partial or complete cataract to prevent amblyopia. Cataract with squint, nystagmus / unsteady fixation. Poor retinoscopy reflex: if during retinoscopy reflex is poor due to cataract.

Timing of Surgery:
Once indicated child may be operated as early as 2 weeks of age. Unilateral cataract needs early surgery and in bilateral cataract, after operating first eye, second eye may be operated within a week or two to prevent amblyopia. In general optimum age for surgery for unilateral cataract is 6 weeks and bilateral cataract is 8 weeks.

Preoperative Counselling:
Preoperative counselling is most important. Parents must understand that surgery is the first step of management. The following points to be stressed. Follow up for a long period for repeated correction and occlusion therapy. Possibility of postoperative complications and need of secondary intervention must be emphasized.

Anaesthesia:
Surgery is performed under general anaesthesia.

Cataract Removal In < 18 Months:
Two side ports are created at the limbus and with a guillotine type vitrectomy probe an opening is made in the anterior capsule. Lens material is aspirated and a posterior continuous curvilinear capsulorhexis (PCCC) and anterior vitrectomy is done. For secondary IOL after 2 years of age, a capsular rim is left. The small side port entry may have to be sutured if required. Nowadays this surgery can be done with 25 gauge vitrectomy instruments also [6].

Pediatric Cataract Surgery with IOL Implantation:
A scleral tunnel incision is preferred due to better wound apposition [7]. But with the availability of soft foldable lens which require
incision of 3 mm or less some surgeons are shifting to clear corneal incision with good results. Two paracentesis incisions are made in the clear cornea.

A Continuous curvilinear capsulotomy (CCC) is challenging as the anterior capsule is more elastic. Rhexis should be aimed as small as possible. The desirable size is 5.0 to 5.5 mm in diameter. It is preferable to use a cohesive viscoelastic agent. Maximum removal of cortex and lens epithelial cells from the equatorial region is essential. Cortical material is aspirated using two port irrigation-aspiration (IA).

As Posterior capsular opacification (PCO) is the most frequent complication after a successful surgery in children, primary posterior capsulotomy with anterior vitrectomy needs to be done [8,9].

An ideal PCCC should be around 3-4 mm circular ring and should be performed under the age of 6 years. Most surgeons prefer doing anterior vitrectomy to decrease the PCO, stabilise the IOL and vitreous prolapsed in the anterior chamber. The vitrectomy may be performed using limbal or pars plana route.

Capsular bag implantation is the best choice. Hydrophobic acrylic, foldable lens are preferred now a days [10,11]. Some surgeons prefer optic capture, whereby haptics are placed in the bag and optic is pushed through the PCCC. The principle behind the optic capture is to avoid the need for vitrectomy and better IOL centration.

All incisions should be closed with a suture because of lower scleral rigidity with higher risk of fish mouthing of the incision.

For secondary IOL in paediatric aphakia, the IOL is can be implanted in the sulcus, and very rarely into the capsular bag. PMMA lenses are preferred over acrylic IOLs for lesser chances of decentration [12].

Post-Operative Management:

Pediatric eye tends to show more tissue reaction and chances of fibrinous reactions are significantly high. Hence post-operative management include frequent instillation of high potent topical steroid like prednisolone acetate and a cycloplegic agent. If required systemic steroid have to be administered.

Visual Rehabilitation:

Visual rehabilitation is as important as surgery itself. Amblyopic therapy should be instituted meticulously. Children <2 years retinoscopy is done on the table after surgery and prescribe glass immediately. Occlusion therapy for unilateral cataract after surgery should be instituted early as these children are at a higher risk of developing amblyopia. Children after cataract surgery need to undergo refraction routinely due to the frequent refractive changes.

Conclusion:

Management of paediatric cataract is challenging, if not treated early, may be associated with dismal results. However early surgery combined with appropriate refractive correction and aggressive amblyopic therapy usually provide encouraging results. The role of parents is as important as the paediatric ophthalmologist for optimum visual outcome.

References: