Editorial

Pediatric Cataract Surgery: Current Trends and Concepts

Cataract is an important factor in visual disability in children across the globe leading to significant deficiency in neurological milestones of a child. Pediatric cataract can affect three to six per 10,000 live births[1] which accounts for approximately 200,000 children affected across the world. Congenital cataract presents in the first year of life while developmental cataract is seen after infancy or trauma. Factors such as onset age, laterality, cataract morphology, ocular associations and systemic diseases will decide the plan of management of a pediatric cataract.

A lot of factors are important in pediatric cataract surgery to obtain good visual results. These include excessive postoperative uveitis, growth of eye ball with increasing age, calculation of intraocular lens power, glaucoma secondary to surgery, opacification of the posterior capsule and amblyopia[2,3].

Family history, antenatal history, morphology of cataract and baseline laboratory investigations have shown that cataracts are idiopathic in 60% of children. Investigations for Toxoplasma, Rubella, Herpes simplex, Varicella and Syphillis should be done in all cases with a history of infection of the mother during pregnancy, deafness, microcephaly, developmental delay and cardiac abnormalities. On the other hand unilateral cataract usually does not warrant extensive laboratory tests.

Galactosemia and viral infections (TORCH, toxoplasmosis, rubella, cytomegalovirus and herpes simplex) need to be ruled out in well children with bilateral cataracts. While in toddlers who are well we need to screen for deficiency of galactokinase. In unwell children with jaundice and failure to thrive Galactosemia is present when reducing substances are present in their urine and erythrocyte assays are abnormal[4]. In unwell children Lowe Syndrome (Oculocerebrorenal Syndrome) is seen when patients have congenital glaucoma, developmental delay and hypotonia. Urine should be checked in them for amino acids. Certain conditions require serum calcium, phosphorus and glucose based on the systemic examination of the child. General assessment of health of the child by a pediatrician are also done in all such cases.

Amongst all the congenital cataracts, 8 – 29% are genetically transmitted with autosomal inheritance in most of the cases. Therefore a geneticist should be involved in the evaluation of inheritance and identification of any associated syndromes.

Non-Surgical Management

The need for cataract surgery depends on the visual function. Close observation can be done for lens opacities which have a diameter of less than 3 mm. Patching and glasses should be used for the associated amblyopia. Other types of anterior polar or pyramidal cataracts are visually insignificant but need correction only if lenticular astigmatism is significant. The use of dilating agents can be considered for central visually significant opacities.

Surgical Management

It is now well established that removal of cataracts which are unilateral should be done by 4 – 6 weeks and bilateral cataracts by 6 – 8 weeks can prevent amblyopia and nystagmus[5].

Contact lenses, Aphakic glasses or primary intraocular lens implantation are options for optical correction after removal of the cataract. Choosing an appropriate IOL power to achieve postoperative emmetropia is still a challenge. Most of the IOL calculations have to be done under anesthesia and a study has suggested that Immersion biometry is more reliable than contact technique for IOL power calculation in pediatric population. In doing unilateral cataracts it is important to keep in consideration the refractive status of the other eye.

The infant aphakic treatment study (IATS) suggested Holladay 1 and SRK/T for the eyes of infants. In 5 years refractive errors ranging from +5.0 to -19.00D were seen and it concluded that the failure to foresee axial increase in pediatric eyes was the main

reason for such a broad variety of errors of refraction[6,7].

IOL implantation, Design and Material

Primary implantation of IOL is still controversial; however in a few tertiary centers in the UK, primary implantation of IOL is the procedure of choice excluding microphthalmic and PHPV eyes. Since the IATS most of the treating centers have deferred the use of IOL in the newborn and would implant them after the age of one year.

In the last few years Acrylic IOLs have moved ahead of polymethy methacrylate (PMMA) IOLs. In children the foldable acrylic IOLs are better because of greater biocompatibility, smaller size and slow onset of posterior capsule opacification formation. 93% of the pediatric ophthalmologist in the developed countries uses hydrophobic intraocular lenses. Single pieces lens are placed in the bag whereas the three piece IOLs are placed in the sulcus or the bag. The use of IOLs in Uveitic cataracts should be avoided but Heparin coated PMMA lenses have reported lower rates of inflammation[8].

Management of Posterior Capsule

Good postoperative visual outcome after pediatric cataract surgery is seen in patients with clear visual axis. An intact capsule opacifies 100% in less than 4 years. It is very important to perform primary posterior capsulotomy and anterior vitrectomy in all pediatric patients[9].

Postoperative Management

In children there is an exaggerated inflammatory response, it is absolutely crucial to use intraoperative steroids such as Kenalog (half the adult dose) given as orbital floor. Post operative they should use topical steroids 2 hourly for a week then gradually taper it down over a period of 6 weeks. The use of tropine is also helpful; firstly prevent membrane formation on the lens surface and also aides in view of the posterior pole and checking the refraction, in the postoperative clinic visits.

Secondary Glaucoma

It is one of the most feared complications and is commonly seen in infants. IATS and other studies have shown that intraocular lens implantation usually does not protect from secondary glaucoma. A study by Mataftsi et al, however has found that the risk of glaucoma after cataract surgery in infants appears to be related with intervention during the first month of the baby[10].

Visual Rehabilitation

Contact lenses, aphakic glasses and intraocular lens implantation, are the main treatment options for visual development. Glasses are well tolerated by children up to the age of 4 years. Contact lenses are very popular among children and they can be changed according to the ocular growth. Clinicians prefer to use rigid gas permeable contact lenses in most of the cases. Silsoft lenses by Bausch and Lomb are popular in the developed nations but its use in a developing nation would be very costly.

Recent developments

Researchers in China and at the University of California, San Diego have used stem cells successfully. Pre existing lens epithelial cells are able to regenerate with a new surgical procedure. In a human trial involving this procedure it was found out that after three months a clear and regenerated biconvex lens was seen in all 12 infants under the age of 2 years[11].

Pediatric cataract surgery is challenging in all aspects, it is very important to emphasize to parents that removing the cataract is only one part of the procedure which is then followed by refractive adaptation, treating amblyopia and regular follow ups. The use of appropriate postoperative steroids is very important to prevent adhesions and membrane formation, which then may necessitate a secondary procedure.

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Dr. Muhammad Irfan Khan
Consultant Ophthalmologist
Moorfields Eye Hospital Dubai, UAE

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