Nepal J Ophthalmol 2012; 4 (7):138-149

Review article

Cataract surgery in children: Controversies and practices

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Abstract

Pediatric cataract is totally different from adult cataract. The objective of this review article is to describe the peculiarities of pediatric cataract and the controversies and practices in pediatric cataract surgery. The differences in the surgical technique are discussed in the article. There are lots of controversies regarding IOL implantation in children. The result of the review is that the pediatric cataract surgery should be performed in between 6-8 weeks of age. There is no contra-indication for IOL implantation. Surgeons can implant either polymethylmethacrylate (PMMA) or Acrysoft foldable IOL.

Key- words: intra-ocular lens, pediatric cataract, pediatric cataract surgery

Introduction

It is estimated that there are at least 1.5 million blind children in the world. (Trivedi et al, 2005). Of those, 75% have treatable or preventable causes of blindness. Globally, an estimated 200,000 children are bilaterally blind from cataract. The overall incidence of clinically significant cataract (unilateral or bilateral) in childhood is unknown, but it has been estimated to be as high as 0.4 % (Hughes, 1985; Msukwa et al, 2009). According to Wilson in 2011, an estimated 1.4 million children are blind worldwide, with 1 million living in Asia and 300,000 in Africa. Congenital cataracts are responsible for about 10 % of all vision loss in children. Overall cumulative risk for cataract is one in 1,000 children. Kohler and Stoll have reported the prevalence of pediatric cataracts to range from 1.2 to 6 cases per 10,000 births. This range probably reflects the ethnic and racial diversities of the study populations (Kohler, 1973; Stoll, 1993).

Any opacification of lens and its capsule in children is defined as pediatric cataract. Pediatric cataract can be unilateral and bilateral. It can be subdivided based on morphology, as well as aetiology. Morphologically the most common type of pediatric cataract is the zonular cataract, which is characterized by an opacification of a discrete region of the lens. This type includes nuclear, lamellar, sutural, and capsular cataracts (Hughes, 1985).

Polar cataracts are opacities of the subcapsular cortex in the polar regions of the lens. Ninety percent of anterior polar cataracts are unilateral; bilateral anterior polar cataracts are commonly asymmetric and typically do not progress over time (Nelson et al, 1985). Posterior polar cataracts are often small, but even a small posterior polar cataract can impair vision (Eshagian, 1982). A distinctive type of posterior polar cataract is the posterior lentiglobus or lenticonus, in which a protrusion of the posterior capsule is present.

Membranous cataracts form when the lens, cortex, and nucleus are partially or completely reabsorbed, leaving a small amount of opacified lens material between the anterior and the posterior lens capsules (Duke-Elder, 1972)

Persistent hyperplastic primary vitreous (PHPV) is

Received on: 25.07.2011 Accepted on: 11.10.2011
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usually a unilateral ocular condition associated with a retrolenticular fibrovascular membrane. Although the lenses in most eyes with PHPV are initially clear, they often opacify over time (Goldberg, 1997). Even when the lens remains clear, the retrolenticular membrane is usually sufficiently opaque to obstruct the visual axis. The lens may also be pushed forward by the retrolenticular membrane, causing the anterior chamber to become shallow and often leading to the development of glaucoma (Mullner-Eidenbock et al, 2004).

Based on aetiology, pediatric cataract occurs due to genetic disease, metabolic diseases, maternal infections, and trauma and is idiopathic as well. The etiology of cataracts can be established in up to half of children with bilateral cataracts but in only a small proportion of children with unilateral cataracts (Merin et al, 1971).

Genetically, pediatric cataracts most commonly occur secondary to autosomal dominant, autosomal recessive, or X-linked recessive traits. Hertle in 2010 has mentioned that lamellar cataracts occur most frequently in the toddler and preschool years. It has the autosomal dominant transmission.

Laboratory investigations

In most cases, laboratory tests are not indicated for infants with unilateral cataracts. Unless there is a definite hereditary basis for the cataracts, laboratory tests for infants with bilateral cataracts should include a fasting blood sugar level, plasma calcium and phosphorus levels, an assay for urine-reducing substances after milk feeding, red blood cell transferase and galactokinase levels, and antibody titers including toxoplasmosis, rubella, cytomegalovirus, and herpes simplex (Chung et al, 2004)

The most common metabolic disturbance leading to cataract is galactosemia, which may be caused by transferase, galactokinase, or epimerase deficiency. Early on, lens changes have the appearance of oil droplets in the center of the lens; these changes are initially reversible with the elimination of galactose from the diet. If Lowe syndrome is suspected, urine should be screened for amino acids.

Indication for surgery

In contrast to adults, indications for cataract surgery in children are much more difficult to determine. Subjective visual acuity cannot be obtained; greater reliance must be placed on the morphology, location of the lens opacity and the behavior of the child (Pavloviæ et al, 2000; Lambert, 1997).

The degree of visual impairment induced by lens opacity depends on the location of the opacity. Generally, the more posterior and central cataract impairs the vision more than the anterior ones. Nuclear cataracts, which are generally denser centrally, degrade vision more than lamellar cataracts, which are less dense centrally (Lambert, 1996). Wright et al (1993) and Scott (2011) have recommended that all central lens opacities of 3 mm or greater be removed. According to Wilson (2011) the most valuable tool for diagnosis in the ophthalmology office is the ophthalmoscope and retinoscope in the examination of children. It reveals the cataract shape, location and density and may show optical distortion for several more millimeters beyond the edge of the cataract. All of this can be done at an arm's length before using a slit lamp. If the cataract completely blackens the central red reflex, that is a danger sign and the child needs the surgery.

The timing of surgery

The timing and techniques for removing cataracts in infants have changed considerably during the past two decades. In the 1970s, it was recommended that surgery be deferred until an infant was 3 to 6 months old. Although pediatric cataracts have been removed within the first 24 hours of life, the first 6 weeks of life may represent a latent period for visual development. It was recently shown that good visual outcomes can be obtained if surgery is performed before 10 weeks of age (Lambert, 2005). According to Gold (2011), the general consensus to perform surgery on a child that has a congenital cataract is somewhere around 8 to 10 weeks of age.

History of technique of surgery

Pediatric cataract surgery in the first two thirds of the 20th century had risks of thick secondary membranes, glaucoma, and corneal decompensation after multiple surgeries were very high. Thus, surgical aggressiveness seemed pointless.

In 1957, Costenbader and Albert stated that they had not seen a single child benefited by the removal of a unilateral congenital cataract. Bilateral congenital cataract patients were also likely to have poor visual outcomes. They commonly developed nystagmus and almost always required multiple procedures (Costenbader, 1957).

In 1960, Scheie recommended aspirating the lens cortex as a single procedure. However, one or more dissections of the posterior lens were immediately required postoperatively.

The advent of vitreous suction cutting devices in the mid-1970s revolutionized pediatric cataract surgery. Anterior capsulotomy openings were easily made and aspiration of cortex was complete. In addition, Parks and others began posterior capsulotomy and anterior vitrectomy in young children with the help of the new automated devices. When Calhoun introduced the vitreous cutting instruments in pediatric population, it became more feasible to remove most pediatric cataracts with a single operation (Forbes et al, 2006).

Pediatric vs. adult cataract surgery

Benefits of cataract surgery are more significant in children than in older adults because there is a lifetime effect in children. According to Buckley in a child, the vision system is still developing, so any visual disturbance can result in permanent loss. Children's eye size is smaller and the tissue is different. Many eyes are also microphthalmic. A child's cataract tends to be more complicated, and there is significantly more inflammation requiring more postoperative medication to decrease the post-operative inflammation. It is also common to see pre-existing plaques on the posterior capsule (Zetterström, 1997; Buckley, 2011).

Wilson in 2011 emphasized that both presurgical process and long-term follow-up are equally important in pediatric cataract. This involve patching and drops, counseling parents, compliance, monitoring changes in eye growth, exchanges of implants etc.

Unique features of the child's eye have resulted in variations and, at times, completely different techniques from adults. Challenges include anatomical differences, timing of surgery, how to avoid and/or treat amblyopia, management of secondary visual axis opacification (VAO), and how to maintain visual stability and determine the model and power of IOL (Hertle et al, 2010).

Wilson mentioned in 2011 that when pediatric cataract surgery is performed, the growth of eye is interrupted and ultimately the refractive status is changed. Thus the refractive status is difficult to predict. Low scleral rigidity, increased elasticity of the anterior capsule, and high vitreous pressure, and unstable anterior chamber are the per-operative challenges that surgeons face. Typically, surgery is more difficult in a child because of elastic anterior capsule and posterior capsule opacification (PCO) occurs in 100% rate, if left in place. Consequently, issues such as predicting the appropriate lens power for IOL implant are paramount as per Plager 2011. Additionally, the healing response with pediatric cataract surgery is different, relying on the compliance of parents to properly care for their children.

Anesthesia

Children require general anesthesia for cataract surgery. Wilson mentioned in 2011 that pediatric anesthesia is very safe and efficient these days with quick wake-up and rapid return home.

Details of surgical steps

Incisions

Wound configurations that are self-sealing in adults often leak when used in children. Children have thinner and less rigid sclera. Even the corneal tissue is less likely to self-seal in children. Also, children tend to traumatize their eyes more often than adults do in the early postoperative period. Suture closure of tunnel wounds and paracentesis openings is highly recommended. However, the eyes are very soft and the tissues are less rigid. Loosely tied sutures promote leak, and tightly tied sutures created marked astigmatism. Cutting sutures later often requires a return to the operating room and to general anesthesia. Synthetic absorbable braided 10-0 sutures (e.g., Biosorb or Vicryl (polygalactic acid suture) and high-quality needles have allowed careful, snug closure of surgical wounds with a slow non-inflammatory dissolution of the suture after healing has occurred (Wilson et al, 2003).

Visco-elastic substances

Visco-elastics are now often referred to as ophthalmic visco-surgical devices (OVD) since their intended surgical role is visco-surgery (Arshinoff, 2000). A visco-adaptive (e.g., Healon 5; Pharmacia Corp., Peapack, NJ) or a superviscous OVD (Healon GV) is recommended for pediatric cataract surgery to facilitate the difficult intraocular manipulations that must be performed. These OVDs are cohesive, help maintain anterior chamber stability, and help offset the low scleral rigidity and increased vitreous up-thrust found in pediatric eyes. Cohesive OVDs are also indispensable for secondary IOL implantation in aphakic children. The visco-elastic substances help to dilate the poorly functioning pupil as well as reducing the trauma of releasing extensive posterior synechiae. The author (UDS) has the experience of using hydroxy propyl methyl cellulose (HPMC) with satisfactory results. The superviscous OVDs are more expensive and less easily available.

Anterior capsule management

The anterior capsule is highly elastic in the pediatric patient and poses challenges in the creation of the capsulotomy. While a manual continuous curvilinear capsulorhexis (CCC) is ideal for adults, it is more difficult to perform in young eyes. Because of the increased elasticity of the pediatric anterior capsule, more force is required when pulling on the capsular flap before tearing begins. Control of the capsulectomy and prevention of extensions out toward the lens equator are inversely related to the force needed to generate the tear. As a result, inadvertent extensions out to the lens equator (known as the runaway rhexis) are common in children. However, it is still the gold standard since it resists tearing once completed successfully (Andreo et al, 1999).

A mechanized circular anterior capsulectomy, known as a vitrectorhexis, has been tested in both laboratory and clinical settings (Wilson et al, 1994 and Wilson, 1999). This technique is an effective alternative for CCC for young children.

Lens substance removal

Pediatric cataracts are soft and gummy. That is the reason the term “Lens aspiration” is used for the pediatric lens substance removal. Because the anterior chamber may be unstable in these soft eyes, phacoemulsification may even be hazardous. Lens cortex and nucleus are usually aspirated easily with an irrigation-aspiration (I/A) or vitrectomy handpiece. In using the vitrector, bursts of cutting can be used intermittently to facilitate the aspiration of the gummier cortex of young children. We use a vitrector for lens aspiration in our center.

Controversies and practices in IOL implantation

Epstein placed an IOL in the eye of a child as early as 1951. As IOL designs and biomaterials have evolved, implantation in children has become safer and more acceptable, even for children in the first 2 years of life (Wilson, 1996). IOL use in children has evolved slowly (Letocha et al, 1999). IOL at the time of cataract removal was the major revolution in the treatment of childhood cataracts (Wilson et al, 2003).

Cataract extraction in children has improved and became more popular over the past few decades but, due to particular features of children’s eyes, still remains controversial—especially regarding the intraocular lens implantation. IOL implantation in a growing eye of a young child brings several problems unique to this age group. The surgical treatment of pediatric cataracts with IOL remains a challenge for all ophthalmic surgeons. The surgical difficulties are related to such factors as scleral rigidity, anterior lens capsule elasticity, and the small size of the young eye (Zetterström, 1997).

In children pediatric ophthalmologists have various schools of thought and practices regarding calculated and implantation of IOL power. Some pediatric ophthalmologists make the child emmetropic during the time of surgery, some target to make the child emmetropic in future.

However there are other factors that play important role in IOL power calculation. The refractive status of the children undergoes a myopic shift. There are also questions about the impact of the lens on development of the eyeball. In normal eyes of children, axial length increases rapidly until 2 to 3 years of age, slows, and stabilizes between 8 and 10 years of age.

In contrast, corneal curvature decreases with age and stabilizes at approximately 1 year of age. The average calculated lens power decreases 20 D from birth to adulthood, maintaining the refraction close to ametropia. Therefore, choosing the correct power of IOL in pediatric patients is challenging because the corneal curvature and axial length change with age (Forbes, 2006).

Enyedi et al in 1998 suggested targeting a postoperative refraction of +6 D in 1-year-old children, +5 D in 2-year-old children, +4 D in 5-year-old children, +3 D in 4-year-old children, and +2 D in 5-year-old children. Hyperopic under-correction on the basis of a child's age has also been recommended by Awner et al (1996) who reported in 1996 that +3 D should be chosen in children 1 to 3 years old, +2.50 D in children 2 to 4 years old, +2.00 D in children 4 to 5 years old, and +1.00 D in children 5 to 7 years old.

Axial length has also been considered one of important factors in choosing IOL power in children. Dahan and Drusedau (1977) have recommended that +28, +27, +26, +24, and +22 D-power lenses be implanted for axial lengths of 17, 18, 19, 20, and 21 mm, respectively. It is also critical to match the refraction of the fellow eye to minimize the anisometropia to less than 3 D in children with unilateral cataracts. Better understanding of the rate of refractive growth in children's pseudophakic eyes may help predicting future refractions in children's eyes more accurately. Correct IOL selection is a hot topic, according to Buckley (2010), because of the difficulties with biometry measurements and IOL calculations in this population (Linn et al, 2010).

Another issue as per Buckley is what power of lens to implant. Because the child's eye is still growing and will continue to do so until the child is in his or her late teens, whatever lens is inserted will not be correct years later. It is difficult to predict what the refraction would be and what the final outcome will be (Buckley, 2011).

The age at which to implant an IOL versus leaving the child aphakic has been the subject of debate for many years. Lambert said his personal opinion is that children older than 6 months of age will do better with an IOL than a contact lens.

The Infant Aphakia Treatment Study (IATS), conducted by Wilson, Lambert, Buckley, Plager and colleagues, aims to answer questions about visual outcomes in 114 infants between 1 and 6 months of age who had a unilateral congenital cataract and were treated with primary IOL implantation versus contact lens. Researchers evaluated visual acuity and adverse events. The contact lenses were used to correct aphakia in those who did not receive IOLs. Early results of 1-year primary outcome data of IATS presented at Kiawah Eye 2010 showed no statistically significant difference in visual acuity in the contact lens vs. non-contact lens group at 1 year. However, complications were higher in the IOL group, with patients returning for a second operation more frequently after primary implantation (63 % vs. 12 %; $P < 0.001$). Most of these additional operations were to clear lens re-proliferation and pupillary membranes. Based on these preliminary results, Wilson said to be cautious when using IOLs in patients in the first 6 months of life until this study is followed for a longer time. Every child with cataracts will need an IOL, but the question is when should that happen?

In young children refractive power prediction is inaccurate. Hence, Stahl recommended in 2011 that IOL placement should be done in children of age 1 year or older. Results of the IATS are ongoing, and the researchers will follow patients to 5 years of age. Secondary outcomes will include parental stress associated with managing the child's condition and patient adherence to the discretionary patching protocol. In our institute, based on the biometry of the children, IOLs are implanted as per the calculated power and the children are made emmetropic (Shrestha et al, 2009).

IOL type and material

In a worldwide survey, as per Wilson et al (2001), 69.0% of pediatric ophthalmologists were using hydrophobic acrylic IOLs. Acrylic IOL can be inserted through small incision. Until very recently, the most popular acrylic IOL (AcrySof) was available only in a three-piece design with PMMA haptics. Wilson et al (2001), Argento et al (2001) and Stager (2002) have shown these lenses to be biocompatible with the pediatric eye. Difficulties that can occur with the three-piece design include kinking of the haptics and inadvertent sulcus fixation, which can be minimized with the use of the newer single-piece, all-acrylic AcrySof SA series IOLs.

Kuchle et al (2003) studied the results and complications of hydrophobic acrylic IOLs versus PMMA IOLs in children. They concluded that there were significantly fewer complications and a lower rate of VAO in the acrylic group than in the PMMA group. Trivedi and Wilson have suggested that single-piece acrylic IOLs in children are safe (Trivedi et al 2,003).

The single-piece acrylic AcrySof SA series lenses are well suited for implantation into the small capsular bag of children. The soft haptics can be manually placed in position if necessary using an intraocular hook or push-pull instrument. The haptics unfold very slowly yet retain enough memory after placement to resist equatorial lens capsule fibrosis. The Monarch II injector allows the IOL to be placed into the eye through a 3-mm incision with good control, even in a very soft eye. Single-piece AcrySof and Monarch II injectors have elicited the problems of dialing and asymmetric fixation. However, the single-piece AcrySof SA series IOLs are not recommended for sulcus fixation. For sulcus fixation either a three-piece acrylic or a PMMA lens are preferred.

Multifocal IOL implantation is already a viable alternative to monofocal pseudophakia in children (Jacobi et al, 2001). Also, newer-generation multifocal IOLs and accommodative IOLs are being developed that will eventually provide the child with a functional alternative to the natural accommodation expected at the ages these patients are operated. Restoring accommodation to a child is more important that with elderly adults, who did not lose accommodation as a result of the crystalline lens removal. Recently introduced IOL manufacturing technology allowing adjustable powers and blue-light filtering will also be important during the long lifespan of children after implantation.

In TIO, both PMMA and foldable IOLs are implanted in the bag. Implantation of an IOL at the time of lens aspiration appeared to be well tolerated and produced significant visual improvement in pediatric patients in Nepal. Primary posterior capsulotomy and anterior vitrectomy helped prevent VAO without a significant increase in complications (Thakur et al, 2004).

Primary IOL implantation

Primary IOL implantation in young children has continued to become more popular as surgical techniques and biocompatible IOL materials and designs improve.

Secondary IOL implantation

The vast majority of children undergoing secondary IOL implantation have had a primary posterior capsulectomy and anterior vitrectomy (Biglan et al, 1997). If adequate peripheral capsular support is present, the IOL is placed into the ciliary sulcus. Viscodissection and meticulous clearing of all posterior synechiae between the iris and the residual capsule is mandatory. A PMMA IOL may center better than a foldable acrylic lens sulcus placement unless optic capture is used. Prolapsing the IOL optic through the fused anterior and posterior capsule remnants is useful in preventing pupillary capture and ensuring lens centration. If the capsular openings are appropriately sized for this optic capture technique, a smaller optic PMMA lens or an acrylic foldable lens become more acceptable. Soemmering's ring formation may keep the anterior and posterior leaflets separated from one another, thus maintaining a peripheral capsular bag. Whenever possible, the surgeon should reopen the capsular bag, aspirate the material in the Soemmering's ring, and place the IOL in the capsular bag. When secondary in-the-bag fixation (rather than sulcus fixation) is anticipated, a foldable acrylic IOL can be more safely used (Wilson et al, 1999).

When inadequate capsular support is present for sulcus fixation in a child, implantation of an IOL is not recommended unless every contact lens and spectacle option has been explored fully. Transscleral fixation of a posterior chamber IOL in children has also been well tolerated, but complications such as pupillary capture, suture erosion, and refractive error from lens tilt or anterior/posterior displacement have been reported.

Contraindication for IOL

Age wise there is no contraindication to the IOL implantation. However, micropthalmia, microcornea, trauma, lens dislocation or uncontrolled uveitis are the contra- indications for the IOL implantation.

Management of the posterior capsule

Posterior capsulotomy is done by vitrector or capsulotomy forceps. Neodymium-yttrium aluminum garnet (Nd:YAG) laser posterior capsulotomy is usually necessary in children when the posterior capsule is left intact. This procedure also carries a risk of retinal detachment and cystoid macular edema. In addition, larger amounts of laser energy often are needed as compared to adults, and the posterior capsule opening may close, requiring repeated laser treatments or a secondary pars plana capsulectomy.

Although the vitrectomy and posterior capsulotomy are most often performed from the anterior approach, the pars plana approach has been documented to be safe and effective. Ahmadiah et al in 1999 reported no statistically significant difference in complication rate between limbal and pars plana posterior capsulectomy and vitrectomy. Recently Alexandrakis et al (2002) reported a large consecutive series of children where the pars plana posterior capsulotomy anterior vitrectomy was used. They concluded that the technique is a safe, effective method of managing the posterior capsule in pediatric cataract surgery with IOL implantation. In young eyes, the IOL is mostly easily implanted before the posterior capsule is opened. Posterior capsulectomy and vitrectomy from the pars plana approach eliminates the possibility of a vitreous wick to the anterior wound and allows the surgeon to make a larger posterior capsulectomy in a controlled fashion after the IOL is secured in the bag. We perform pediatric cataract surgery through limbal approach in our institute.

Anterior vitrectomy

Leaving the posterior capsule intact after IOL implantation in children predisposes to an unacceptably high rate of PCO (Buckley et al, 1993 and Emery, 1999). Anterior vitreous acts as scaffold for the migration of the lens epithelial cells causing the formation of PCO. Top of Form PCO interferes with visual rehabilitation in children. Thus, primary posterior capsulotomy and anterior vitrectomy is done in all children below 8 years of age. The new terminology has been coined as visual axis opacification (VAO) for opacity of the media after pediatric cataract surgery, as there is no posterior capsule following surgery.

Complications

Even with a perfectly performed extracapsular cataract extraction and posterior chamber IOL implantation, postoperative complications can occur. These include increased inflammation, secondary glaucoma, refractive instability because of the growing pediatric eye, and early and severe VAO. In this article, only the most common complications: VAO and aphakic glaucoma has been discussed. Long-term complications such as vitreous or macular changes or retinal detachment several decades after anterior vitrectomy performed during pediatric IOL surgery have not been studied extensively. The rate of endophthalmitis in pediatric cataract surgery is less than 1/1000, probably 1/5000; still the risk is there, although it is small. This is one reason why bilateral cataract surgery is not done in one sitting in pediatric age group.

Visual axis opacification

VAO results from the aggressive growth of fibrous material along the posterior surface of the iris, the capsule remnants, and the anterior vitreous face that tends to develop in the healing young eye. It is a major complication of congenital cataract procedures because it can quickly cause irreversible amblyopia. When cataract and IOL surgery was undertaken within the first year of life, a secondary surgical procedure was required in 37.9 % of eyes to maintain a clear visual axis. Most secondary surgery for VAO occurred within the first 6 months after surgery. According to Trivedi et al (2004)VAO was most common in eyes with associated ocular anomalies.

In adult cataract surgery, surgical tools and IOLs are now available that reduce the rate of PCO. Based on the analysis of 5416 pseudophakic human eyes obtained postmortem, Apple et al recommend the following to prevent PCO: hydrodissection-enhanced cortical cleanup; in-the-bag IOL fixation; a continuous curvilinear capsulorhexis (CCC) diameter of moderate size, slightly smaller than that of the IOL optic; a biocompatible IOL to reduce stimulation of cellular proliferation; maximum contact between the IOL optic and the posterior capsule; angulated haptics; “bio-adhesive” biomaterial to create a “shrink wrap”; and IOLs with a squared, truncated optic edge (Apple et al, 2001). Similar surgical methods are followed in the pediatric cataract surgery in addition to anterior vitrectomy to reduce the rate of VAO.

Posterior optic capture has been described by Gimbel and De Broff in 1994 for prevention of VAO without an anterior vitrectomy. They recommended performing a posterior manual capsulorhexis with IOL optic capture only. But, subsequent studies, have reported PCO despite the use of Gimbel’s technique (Koch, 1997 and Vasavada et al, 2000).

Vasavada et al (2001) showed that VAO occurred in 70% of those eyes in which vitrectomy was not done after posterior CCC in children aged 5 to 12. VAO was described as “reticular fibrosis of the anterior vitreous phase.”

Atkinson and Hiles in 1994 recommended leaving the posterior capsule intact, even in very young children and performing Nd:YAG laser posterior capsulotomy under a second general anesthesia in the early postoperative period before opacification occurs. Subsequently, however, they reported a 41 % closure of the laser capsulotomy when this protocol was followed (Brady, 1995).

Aphakic glaucoma

There are controversies regarding whether to implant or not to implant the IOL implantation in infants. However, intra-ocular lens implantation plays a protective role against aphakic glaucoma in children (Ahmadieh, 2001).

As per Chen et al (2004), onset of aphakic glaucoma after lensectomy was by 1 year in 37.1 % of eyes, by 6 years in 75.9 %, and by 33 years in 100

% of eyes.

It is controversial whether there is a specific time during the first year of life when having lensectomy is associated with a decreased risk for developing aphakic glaucoma. Knowing the optimal timing for lensectomy surgery is also important, because the other risk factors for aphakic glaucoma are largely out of the surgeon's control. Some of these suggested nonmodifiable risk factors include the following: anatomic or physiologic predisposition of the eye, microcornea, microphthalmos, type of cataract, poor pupillary dilation, and genetic predisposition. Other risk factors include retained cortex, residual lens particle and protein, uveitis, need for secondary surgery, poor vasculature or supporting structures of the optic nerve, corticosteroids, blockage of the angle by vitreous, and vitreous factors altering trabecular meshwork structure and maturation (Chen et al 2006).

Summary

Indications for cataract surgery in children are much more difficult to determine. Since subjective visual acuity cannot be obtained, greater reliance must be placed on the morphology and location of the lens opacity, and the behavior of the child. The ideal time for surgery of unilateral and bilateral pediatric cataract is at 6 and 8 weeks of age respectively. There is no controversy regarding the timing of surgery. The standard technique of surgery is lens aspiration with anterior vitrectomy with or without IOL implantation.

The surgical management of cataracts in children is markedly different from adults. The eyes are not only smaller because of age, but many are also microphthalmic. Decreased scleral rigidity and increased vitreous up-thrust make surgical manipulations within these eyes more difficult. The anterior chamber is often unstable and capsule management requires special considerations. New technology has made surgery in these young patients faster and safer.

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Source of support: nil. Conflict of interest: none