Secondary Artisan Phakic Intraocular Lens for Correction of Progressive High Myopia in a Pseudophakic Child

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An 8-week-old infant underwent unilateral cataract extraction and posterior chamber intraocular lens implantation for total cataract in the left eye. After surgery, a residual progressive myopic error was observed, ranging from −4.5 diopters (D) 6 months after the operation to −14.0 D at the age of 3 years. Because of parental noncompliance for contact lens and spectacles use, secondary implantation of Artisan phakic IOL of −14.0 D power was performed. No intra- or postoperative complications were observed. Nine months after this second operation, myopia diminished to −3.25 D.

After pediatric cataract extraction, an increase in both ocular axial length and myopic shift in refraction has been observed.[1] For this reason and for the prevention of a large myopic error after surgery in children younger than age 3 years, the implantation during surgery of an intraocular lens (IOL) that will result in a large hyperopic error in the immediate postoperative error has been recommended.[2,3] Despite this approach, high postoperative myopia can be found,[4] and optical rehabilitation with contact lens, spectacles, or IOL exchange will be necessary. Alternatively, secondary implantation of piggyback lens in the ciliary sulcus or corneal refractive surgery can be performed.

Recently the use of Artisan (Ophtec BV, Groningen, Netherlands) IOL has been approved by the Food and Drug Administration in United States in adults for correcting high myopia. This lens has 2 pincer-like haptics through which a small knuckle of iris is drawn to secure the lens and the optic lies immediately anterior to the plane of the iris. There are a few reports on the use of Artisan IOLs in children.[5,6] These were reports in phakic anisometropic eyes. To the best of our knowledge, we herein describe for the first time the case of a child with progressive high myopia after cataract surgery successfully treated with Artisan phakic IOL implantation.

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CASE REPORT

In September 1999, an 8-week-old infant underwent cataract surgery for total cataract in the left eye. There was no family history of congenital cataract. The child was healthy and born without any other congenital abnormalities. Before surgery, ultrasound and computed tomography examinations were performed to rule out the coexistence of retinoblastoma and did not disclose any pathology. Axial length determined by contact method was 19.13 mm in the left eye and 20.02 mm in the right eye. Surgery was performed through a sclerocorneal incision. Lens washout, posterior chamber IOL implantation in the capsular bag, posterior capsulotomy, and pars plana vitrectomy were performed uneventfully. A polymethylmetacrylate (PMMA) IOL (Hanita Lenses Inc., Kibbutz Hanita, Israel) of +31.00 diopters (D) was used for an intended refraction of +4.00 D using the SRK/T formula and keratometric readings of 43.00 D. Six months after the operation, a myopic error of −4.5 D was observed in the operated left eye; refraction in the right eye was +1.5 D. Rehabilitation with contact lens and spectacles failed because of parental noncompliance; deep amblyopia, latent nystagmus, and large-angle left esotropia without alternation developed. No significant posterior capsular opacification in the visual axis was observed.

At the age of 14 months, bilateral medial rectus recession of 6.5 mm was performed because of a left esotropia of 30°. The patient was lost to follow-up and returned at the age of 3 years for examination. Uncorrected visual acuity measured with Allen pictures was 20/120 in the right eye and 2/200 in the left eye. In the left eye, residual esotropia greater than 15° and latent nystagmus was observed. Cycloplegic refraction was +1.5 D OD and −16.00 D OS. Axial length measured by contact method was 22.12 mm OD and 25.22 mm OS. Slit-lamp examination of the right eye was completely normal. In the left eye mild opacification of the peripheral anterior and posterior capsules was observed. Posterior chamber IOL explantation was considered to be a high-risk procedure because of capsular fibrosis with possibly need of anterior vitrectomy and implantation of anterior chamber IOL, with its consequent postoperative complications. We have reported the implantation of Artisan aphakic IOL in 4 eyes

with subluxated lenses and no complications, including endothelial cell loss have been observed after 2 years of follow-up.[7] After discussing the issue with the child's parents, the secondary implantation of Artisan phakic IOL was considered to be the better option. Preoperative endothelial count was impossible to perform because of the nystagmus.

A standard 6.0-mm sclerocorneal tunnel was prepared at the 12-o'clock position. Two paracenteses were placed at 10-o'clock and 2-o'clock positions. The anterior chamber was filled with sodium hyaluronate 2.3% (Healon®5, Pharmacia, Stockholm). The Artisan IOL (model 202; 5.0-mm optic) of −14.0 D power was inserted into the anterior chamber with forceps, and then fixated to the iris with enclavation needles. A peripheral iridectomy was performed at 12-o'clock position. The corneoscleral wound was closed with 3 interrupted 10/0 nylon sutures, and the viscoelastic material was manually aspirated.

The procedure was uneventful. Postoperatively, visual acuity improved from 2/200 to 20/400 at least. Refraction is −3.25 OS. Nine months after the operation, the refraction remains stable. There is no sign of iritis and the Artisan lens is well centered. Postoperatively, endothelial count examination was unsuccessful because of the nystagmus. Because parents were more compliant after surgery, treatment of the amblyopia was begun by occlusion of the right eye one month after the procedure. No further visual acuity improvement was observed.

DISCUSSION

Progressive axial myopia after unilateral cataract extraction is a known phenomenon.[8] Glaucoma should be considered when progressive myopia is detected. When this high myopic error is found, correction with contact lens or spectacles is mandatory to prevent amblyopia. In our patient, such treatments failed because of inadequate compliance. IOL explantation also can be attempted when technically possible. In our case the PMMA IOL induced capsular fibrosis; therefore, maneuvers during this surgery could result in prolapse of vitreous, significant bleeding, or damage to anterior capsule remnants, making impossible IOL implantation in the ciliary sulcus. The implantation of IOL in the anterior chamber with its inherent complications on the corneal endothelium and intraocular pressure or the more technically complicated scleral fixated IOL will be then the only options.

Piggyback implantation of a second IOL in the ciliary sulcus also can be performed providing the availability of such IOL power and free sulcus. A recent possibility with promising results is laser refractive surgery for treating high myopic anisometropic amblyopia.

In our opinion, implantation of Artisan IOL is an easier-to-perform modality. The use of Artisan in children with cataract was firstly reported by Van Der Pol and Worst, who described the results of aphakic Artisan IOL in 38 pediatric eyes.[9] An area of concern when implanting Artisan IOL is the endothelial cell loss. Budo et al[10] reported in adults an endothelial cell loss of 4.8% at 6 months postoperatively, which dropped to 0.7% at 3 years. To date, there are no data of endothelial cell loss after Artisan implantation in children. Endothelial cell loss could be more serious in children because of the risk of less compliance (eye-rubbing). Nevertheless, it seems that the major endothelial cell loss occurs during the surgical procedure and that there is not a continuous significant cell loss.

In our case, pre- and postoperative endothelial cell counts were impossible to perform because of nystagmus. The postoperative refractive error significantly diminished from −16.0 D to −3.25 D. Despite the deep amblyopia and nystagmus, the postoperative visual performance of the left eye also is better than preoperatively. Larger series of patients with longer follow-up and endothelial data are necessary.

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