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Case Report

Secondary Intraocular Lens Implantation after Glaucoma Drainage Device Surgery in Childhood Glaucoma Associated to Congenital Cataract Surgery: A Case Series

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Abstract

Objective: To report the results of secondary Intraocular Lens (IOL) implantation in aphakic children with secondary glaucoma who had previously undergone Ahmed valve implantation via pars plana for glaucoma control.

Methods: Three children with bilateral congenital cataract who underwent lensectomy with anterior vitrectomy without IOL developed secondary glaucoma in only one eye of each patient. In order to control glaucoma, patients underwent posterior via pars plana vitrectomy with Ahmed drainage device implantation placed in the superior temporal quadrant.

Results: All patients achieved intraocular pressure control, with or without topical medication after glaucoma device surgery. After a minimum of six months of follow-up they underwent secondary IOL implantation in the scleral sulcus, using the remaining capsular bag as support. All children improved their quality of life after IOL implantation and maintained glaucoma stability.

Conclusion: This case series demonstrates the possibility of secondary IOL implantation in aphakic children previously treated with Ahmed implant device with the device placed via pars plana, maintaining glaucoma control with the best optical correction for aphakia.

Keywords: Case Report; Aphakic Glaucoma; Congenital Cataract; Pediatric Cataract; Glaucoma Drainage Device; Ahmed Valve; Secondary Intraocular Lens; Secondary Glaucoma

Introduction

Secondary glaucoma is a frequent and serious complication in children that undergoes congenital cataract surgery as it can lead to irreversible vision loss. This glaucoma type can be treated clinically or surgically. Glaucoma drainage devices placed in the vitreous cavity after a pars plane vitrectomy have high rates of success in controlling IOP in these eyes and seem to have a safe profile for most of these cases. They have become the preferred primary surgical intervention for many patients with aphakic glaucoma [1-3].

In this article were reported the results of secondary Intraocular Lens (IOL) implantation in three aphakic eyes that had previously undergone Ahmed valve implantation via pars plana for aphakic glaucoma control.

Case Reports

Case 1

A female 8-year-old patient, who was diagnosed with bilateral congenital cataract, underwent a sutureless 25G minimally invasive pars plicata lensectomy (TT-Technique) at 30 days of life in the Right Eye (RE) and at 45 days of life in the Left Eye (LE) [4]. Six months after surgery, the RE showed an increase in Intraocular Pressure (IOP) above 21 mmHg, an increase in axial diameter and an increase in corneal diameter (12.5 mm), in addition to a progressive reduction in hyperopia. Intraocular pressure control was not possible with anti-glaucomatous medications. The patient then underwent trabeculectomy with mitomycin 0.03% but in the first post operative month there was fibrosis of the fistula and the surgery failed. Two months after the anti-glaucomatous surgery, the implantation of an Ahmed ® tube, model FP7, was indicated. The glaucoma device was placed in the upper temporal quadrant with the intraocular tube portion placed in the vitreous cavity of the RE eye, associated with pars plana vitrectomy. IOP control in the RE after implantation of the Ahmed® tube remained adequate, with the use of topical timolol maleate 0.5%. The LE showed no clinical signs of glaucoma. At the age of 8 years, secondary IOL implantation in the RE was indicated due to intolerance to contact lens use. The IOP measures remained under control with the use of topical medication and visual acuity achieved 20/30 in both eyes.

Case 2

A 2-month-old boy diagnosed with Lowe Syndrome presented with bilateral congenital nuclear cataract and underwent a sutureless 25G minimally invasive pars plicata lensectomy (TT-Technique) in both eyes. Six months after surgery secondary opacities were detected and anterior Elschnig's pearls aspiration and fibrotic membrane excision with anterior vitrectomy were performed in the RE. At 18 months of age, the patient presented with bilateral high IOP and underwent bilateral trabeculectomy with mitomycin, but no IOP control was achieved in both eyes, and, at 24 months of age, a glaucoma drainage tube (Ahmed valve) was implanted in the RE. A secondary IOL was implanted in the RE at 4 years and 9 months of age and IOL was implanted in the LE at 5 years of age. The patient maintained IOP under control with the use of topical antiglaucoma medication since then. His last follow up, at 15 years old, he presented with low vision in both eyes (20/100 in both eyes) and effective IOP control.

Case 3

A 1-month-old female patient presented with bilateral leukocoria at birth. A dense lamellar cataract was observed in both eyes. Ocular doppler ultrasound detected bilateral and asymmetrical posterior form of Persistent Fetal Vasculature (PFV) with no blood flow. Cataract surgery was performed using the 25-gauge lensectomy technique. This minimally invasive technique, performed via pars plicata, does not require sutures in the conjunctival and scleral incisions. This technique avoids conjunctival and Tenon's capsule scarring [4]. The procedure was performed at 2 months of age in the RE and at 3 months of age in the LE. Aphakic glasses were prescribed and she was referred to an early visual intervention program. Two months after surgery secondary visual axis opacification occurred in the LE. Neodymium-YAG laser was applied and successfully release the visual axis. At the age of 23 months the patient has had secondary IOL implantation in the LE.

During postoperative follow-up, intraocular pressure in the RE gradually increased progressing to secondary glaucoma. Initially, the patient was treated clinically with anti-glaucomatous topical medication. At 19 months, IOP kept over 21 mmHg and there was an exponential increase in axial length, what led to the necessity of an anti glaucomatous surgery. Posterior pars plana vitrectomy was performed and an Ahmed's valve was implanted. The tube was placed at the superotemporal quadrant and inserted via pars plana. The surgery was uneventful. Intraocular pressure and axial length were maintained under normal levels since then. When the patient was 3-year-old, a secondary IOL implantation in the sulcus, in the RE, was performed.

The patient presented some episodes of anterior uveitis. Regarding the systemic clinical aspect, this patient was diagnosed with juvenile arthritis affecting her ankles and knees and has been using steroids and specific immunosupressive medication since she was 4 years old. At 14 years of age, visual acuity was 20/40 in the both eyes (Table 1).

Case	Gender	Diagnosis	Age at lensectomy (months)	Onset glaucoma (months)	Glaucoma 1st Surgery TREC (months)	Glaucoma 2nd Surgery Ahmed valve (months)	Secondary IOL Implantation (years)	Follow-up (years)	Final visual acuity
1	Female	Unknown	1	7	9	11	8	8	20/30
2	Male	Lowe Syndrome	2	16	18	24	4	15	20/100
3	Female	PFV + JIA	2	18	none	19	3	14	20/40
IOL: Intraocular Lens; TREC: Trabeculectomy; PFV: Persistent Fetal Vasculature; JIA: Juvenile Idiopatic Arthritis									

Table 1: Demographics characteristics of reported cases.

Discussion

Childhood glaucoma secondary to congenital cataract surgery is a challenging ophthalmological situation. It may cause severe visual impairment. Variable options of treatment and surgical techniques have been proposed in these latest years. Control of Intraocular Pressure (IOP) is extremely necessary in this ambliogenic phase of vision development. Blindness prevention is of utmost importance. In most cases of secondary aphakic glaucoma, patients undergo multiple surgeries.

Primary IOL implantation does not appear to be a protective factor for the development of glaucoma, as related in some previous studies and in clinical trials conducted in a medium-term 5 year-follow-up [5-8]. In a prospective cohort study conducted in the United Kingdom, glaucoma secondary to congenital cataract surgery was diagnosed and treated in 7% to 28% of cases followed for five years. Some of the patients had undergone filtering surgeries [5].

Risk of glaucoma related adverse events continues to increase with longer follow-up of children following congenital cataract removal in infancy and is not associated with primary IOL implantation. In a secondary analysis of a randomized clinical tria1, risk of glaucoma and glaucoma plus glaucoma suspect diagnosis at 10 years rose to 22% and 40%, respectively, with no difference between treatment groups (primary intraocular lens vs aphakia) [9].

Secondary glaucoma may occur at high rates, ranging from 7 to 80% after congenital cataract surgery. It can occur from 1 month to several years after congenital cataract surgery. Prompt glaucoma treatment has to be established in order to avoid optic nerve damage, loss of vision and vision field damage.

Glaucoma secondary to cataract surgery in childhood can be treated clinically in 50% of cases, but depending on its etiology and severity, surgery may be necessary [9]. Some cases of open angle respond to angle surgery. However, in more refractory cases, with optic nerve damage, very high pressures or damage to ocular structures, filtering surgeries may be necessary. These cases often require more than one intervention. Some patients remain under control, with intraocular pressure at adequate levels without progression of globe growth or glaucomatous neuropathy [10].

In aphakic children, drainage glaucoma device implantation, placed in the vitreous cavity, performed in association with posterior pars plana vitrectomy, appears to show a slightly better success rate than trabeculectomy. This location seems to be safer in children's eyes. It keeps the tube tip entry and location far from the corneal endothelium [10]. Glaucoma drainage implant surgery has been proven to have good results in those cases. Pars plana glaucoma implants in children are a good option. The drainage tube is located further back, avoiding cornea touch and endothelial damage [11]. Thus, children frequently rub their eyes when using eye drops after ocular surgery. Secondary IOL implantation in congenital cataract promotes less dependence on the use of glasses and contact lenses and has been indicated as an option. In some cases, there is intolerance to use of contact lens and corneal damage may occur as in case 2 in this report. Some children may present higher face sensibility or difficulty in adapting with aphakic glasses [12].

An IOL may also promote a barrier to vitreous to come to the anterior segment of the eye. To the best of our knowledge no cases

have been published in which secondary IOL implantation in children was performed in cases of aphakic glaucoma controlled with drainage implants placed via pars plana.

Conclusion

These cases here reported had secondary IOL implantation after pars plana glaucoma drainage device implantation. The drainage tube was located further back avoiding cornea touch and endothelial damage allowing the IOL implantation with no further complications. All patients had their IOP controlled after the procedure, with or without additional topical medication with the best optical correction for aphakia.

Conflict of Interest

The authors declare no potential conflicts of interest with respect to the research, authorship and/or publication of this article.

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Declaration of Patient Consent

The authors certify that they have obtained appropriate patient consent form. In the form the patient has given his consent for his images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity.

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