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ORIGINAL ARTICLE

Outcomes of pediatric cataract surgery with triamcinolone-assisted vitrectomy

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anterior vitrectomy;
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Purpose: To evaluate outcomes in pediatric patients undergoing lensectomy, posterior capsulotomy, and triamcinolone-assisted vitrectomy for congenital cataract.
Methods: This retrospective study included 34 patients younger than 72 months who underwent lensectomy, posterior capsulotomy, and triamcinolone-assisted vitrectomy with or without intraocular lens (IOL) implantation for cataract at the National Taiwan University Hospital from July 2006 to December 2012.
Results: Fifty-one eyes from 34 patients with cataract (unilateral in 17 patients, bilateral in 17 patients) were included. The mean age at surgery was 26.74 months (range: 2–72 months). The mean postoperative follow-up was 27.8 months (range: 6–72 months). Primary IOL implantation was performed in 25 eyes, 21 of which had the IOL implanted in the capsular bag. Fifty eyes had a central round pupil. The median logarithm of the minimum angle of resolution visual acuity was 0.3 in patients with unilateral cataract and 0.1 in those with bilateral cataract. Three eyes (5.9%) developed visual axis opacification (VAO) and required further surgery. Univariate analysis using Fisher's exact test indicated that surgery in the first 12 months of life was significantly associated with development of VAO ($p = 0.047$). The incidence of postoperative VAO was approximately 15.8% in this age group.
Conclusion: Triamcinolone-assisted vitrectomy can be used in pediatric cataract surgery without serious long-term adverse effects. While the incidence of VAO is low, it appears unavoidable in approximately one-sixth of patients who undergo surgery before 12 months of age.

Conflicts of interest: No author has a financial or proprietary interest in any material or method mentioned.

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Introduction

Childhood cataract is one of the leading causes of blindness and severe visual impairment in children, and is problematic in developing countries in terms of morbidity, economic loss, and social burden.[1] The prevalence of childhood cataract is estimated to be 1.03 per 10,000 children, and approximately 314,000 new cases are reported each year.[2] Although surgically treatable, management of cataract in children is challenging because of the increased elasticity of the ocular tissues, robust inflammatory reactions, and a more reactive vitreous face.[3,4] The rate of posterior capsular opacification following simple cataract extraction is high,[5] so combined lens extraction, posterior capsulotomy, and anterior vitrectomy are routinely performed in younger patients.[6,7] Complications, including pupil synechia, intraocular lens (IOL) decentration, and visual axis opacification (VAO), still occur despite modern surgical techniques. Appropriate vitreous management during surgery is crucial for successful pediatric cataract surgery.

Triamcinolone acetonide (TA) is a water-insoluble steroid molecule, granules of which become trapped in the gel-like structure of the vitreous upon intraocular injection and enhance visualization of the vitreous.[8] TA has been used in vitreoretinal surgery to stain the transparent vitreous, which assists surgeons in separating the posterior vitreous from the retina.[9,10] In cataract surgeries complicated by rupture of the posterior chamber, TA can be applied in the anterior chamber to render the prolapsed vitreous more visible.[11] Triamcinolone-assisted vitrectomy in pediatric cataract surgery was first described in 2009 by Shah et al.[12] In a subsequent 1-year retrospective study, use of intracameral triamcinolone in pediatric cataract surgery was associated with less inflammation of the anterior chamber, and no patients developed VAO postoperatively.[13]

In this study, we evaluated the visual outcomes of pediatric cataract surgery with triamcinolone-assisted vitrectomy and analyzed the incidence of and risk factors for complications following this technique.

Methods

Data were collected retrospectively from 34 patients with congenital cataract who underwent lensectomy, posterior capsulotomy, and triamcinolone-assisted anterior vitrectomy between July 2006 and December 2012. All patients were younger than 72 months at the time of treatment. All surgeries were performed by the same surgeon (THT) at the National Taiwan University Hospital, Taipei, Taiwan. The Ethics Review Committee at the National Taiwan University Hospital approved the study. Written informed consent was obtained from all guardians/caregivers. All patients underwent surgery soon after a diagnosis of cataract was confirmed. We excluded patients with a concurrent retinal or corneal abnormality and those with a systemic metabolic disorder. All patients were followed up for more than 6 months postoperatively.

The surgical technique began with a clear corneal incision at 10 o'clock. Using the two-handed-technique, a second clear corneal stab incision was then made using a microvitreoretinal blade at 2 o'clock for accommodation of a handheld irrigation instrument. After injection of 1.4% sodium hyaluronate (Healon GV; Advanced Medical Optics, Santa Ana, CA, USA), an anterior capsulotomy was performed manually using a bent 27-gauge needle and a microcapsule forceps. Hydrodissection was performed via injection of a balanced salt solution into the peripheral cortex through a 30-gauge cannula. A 20-gauge vitrector handpiece was used to remove lens material and perform the posterior capsulotomy and anterior vitrectomy. The TA was prepared as follows: 0.3 mL of TA suspension (40 mg/mL, Kenalog-40 injection; Bristol-Myers Squibb Company, Princeton, NJ, USA) was drawn into a sterile 1 mL syringe attached to a 27-gauge needle after shaking the ampoule to disperse the TA particles evenly. Next, the syringe was positioned upside down, which allowed the TA crystals to precipitate against the plunger in the lower portion of the syringe. The supernatant was then discarded from the syringe by slowly advancing the plunger to the 0.05 mL mark. Finally, the needle was discarded and sterile balanced saline solution was drawn into the syringe to the 1 mL mark. Approximately 0.1—0.2 mL of TA was injected through a clear corneal incision to stain the anterior vitreous for improved visualization prior to vitrectomy; a further injection was administered to confirm the absence of residual vitreous strands. A foldable three-piece or one-piece AcrySof IOL (MA60AC or SA60AT, respectively; Alcon, Fort Worth, TX, USA) was implanted in the capsular bag after injection of the viscoelastic material, mainly in the patients aged 2 years and older. The corneal wounds were sutured using 10-0 nylon (Alcon, Fort Worth, TX, USA).

Postoperatively, a 1% prednisolone acetate ophthalmic suspension (1%, Pred Forte; Allergan, Westport, County Mayo, Ireland) was applied hourly for 3 days, and thereafter four times daily for the following week. This was then substituted with a 0.1% betamethasone disodium phosphate ophthalmic solution (0.1%, Rinderon; Taiwan Shionoqi & Co., Ltd., Taipei, Taiwan) for 1 month. A 0.3% gentamicin ophthalmic solution (0.3%, Garamycin; Schering-Plough, Brussels, Belgium) was applied four times a day for 1 month, and an ophthalmic ointment combining a steroid and antibiotic (neomycin and polymyxin B sulfates, and dexamethasone; Maxitrol; Alcon, Fort Worth, TX, USA) was used once a day at bedtime for 1 week.

Cycloplegic refraction was performed during follow-up visits at 1 day, 1 week, 1 month, and every 3 months thereafter postoperatively, and spectacles were prescribed if necessary. Intraocular pressure (IOP) was measured using a Tono-Pen (Reichert Ophthalmic Instruments, Depew, NY, USA). VAO was evaluated under a slit lamp, and a red reflex examination was performed using a retinoscope. VAO was defined as a fibrous or proliferative cell growth that was either observed under retroillumination or led to a dull retinoscopic reflex. Examination under anesthesia was performed in patients who could not tolerate examination in the outpatient clinic.

For further analysis of the incidence and risk factors leading to complications, patients were divided into two groups based on their age at surgery, i.e., $\leq$ or $>$ 12 months. Data were collected on position of IOL implantation, pupil centration, visual acuity (if measurable) during follow-up visits, presence of increased IOP, and VAO.

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