Clinical case report

Bilateral retinal detachment after Lasik surgical correction of myopia in a patient with Down syndrome

J. Puig, E. Estrella, A. Galán
Hospital General Universitario Vall d’Hebron, Barcelona.

Correspondence
Dr. J. Puig
Diagnóstico y Terapéutica Ocular
Tuset, 23-25, 3º 3ª
08006 Barcelona
Spain

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Abstract

A child with Down syndrome and severe hypoacusia was referred to us. After a complete ophthalmological examination we detected bilateral high myopia and esotropia. Because of his difficulty wearing glasses or contact lenses, we decided to perform bilateral surgery with the Lasik procedure to correct his high myopia. The postoperative result remained very satisfactory during some years, but then his uncorrected visual acuity decreased again because of a bilateral retinal detachment and a unilateral cataract. He underwent bilateral vitrectomy and unilateral lensectomy, and after that his uncorrected visual acuity improved again.

Indications, results and complications of pediatric refractive surgery are analyzed.

Keywords: Ametropia, Down syndrome, Refractive surgery, Retinal detachment.

Introduction

Errors of refraction are more prevalent in children with Down Syndrome (DS) than in the general population. Among patients with DS, hypermetropia is the most frequent type of ametropia; still, myopia occurs at a higher rate than among other children [1]. Like the general population, children with DS tend to undergo changes in refraction through childhood and adolescence. With few exceptions, this makes them unsuitable candidates for refractive surgery, since no existing procedure can halt the progression of refractive error.

The case presented here involves a patient with DS who underwent refractive surgery on both eyes; there follows a discussion of indications for surgery, benefits obtained and complications over time.

Clinical findings

Patient is a 12-year-old boy with DS, severe bilateral hearing loss and severe psychomotor retardation. He first came to our eye clinic at age 3, with a prior diagnosis of bilateral myopia (6.00 diopters D) and congenitally absent lacrimal punctum of the left eye (LE). Because of his defective mental development, his family could not get him to wear his glasses; this, along with his severe hearing loss, significantly cut him off from his environment.

Though visual acuity could not be measured because the patient was largely uncooperative, 10º constant endotropia of the LE at near vision was substantiated. After applying atropine drops for two days, refraction was measured at 4.00D astigmatism and 15.00D myopia in the right eye (RE), and 17.00D myopia in the LE, with no vitreous or retinal pathology apart from those related to the patient’s myopia magna. Glasses with full optical correction were prescribed once again, although the family had a lot of trouble getting him to wear the glasses for the reasons stated above.

Over the three following years, refractive error gradually increased to 1.00D astigmatism and 22.00D myopia in the RE, and 1.00D of astigmatism and 23.00D myopia in the LE.

Despite constant struggling, the family could not get the child to wear his glasses; he would remove them as...
soon as they were put on. Fitting contact lenses might have been an alternative, but this was ruled out because adequate hygiene and oversight would have been impossible.

As the boy was becoming increasingly cut off from his environment, the decision was reached to propose refractive surgery as a definitive treatment for his ametropia. Family members were therefore informed about this option, with an emphasis on the chance that refractive error might increase over time, considering the patient’s age. However, surgery would make a difference in that progression would start at the refraction values obtained with surgery, allowing the child to develop better. Thus, the aim of surgery was to minimize the ametropia in order to achieve useful vision without optical correction.

The patient therefore underwent Excimer laser in situ keratomileusis of the RE at age 7. The outcome was felt to be satisfactory in terms of the behavioral change noted by the child’s parents, with a considerable increase in his connection to the world and significantly improved attitude and behavior both at home and at school. The procedure was therefore repeated on the LE one year later. In both cases, surgery was performed under general anesthesia, using sedation without intubation, given the patient’s special condition.

A few weeks after the last procedure, patient’s visual acuity (VA), measured using Teller Acuity Cards, was 20/160-20/190 in both eyes, although patient was less than cooperative. Refraction with atropine showed 3.00D myopia in the RE and 2.00D myopia in the LE. In the extrinsic ocular motility, a 10º constant esotropia of the RE was observed at the close vision.

Over the following years, no significant change was found in visual acuity, refraction, extrinsic ocular motility or eye examinations.

At one regular check-up at age 12, the family reported a general decrease (which they attributed to loss of vision) in the child’s everyday activities, and a leucocoria in the RE. Examination found 20/380 binocular VA (Teller Acuity Cards), a complete cataract in the RE precluding visual inspection of the fundus, and inferior retinal detachment in the LE. A B-mode ultrasound showed complete detachment of the RE’s retina, the cause of the cataract; this led to further surgical treatment. Trans pars plana vitrectomy was performed for the retinal detachments, using laser and 5000 cs. silicone oil in each eye; pars plana lensectomy was performed on the RE to remove the cataract. No intraocular lens was implanted because it was felt that the risk of major complications was high in a child who would not permit adequate examination under a slit lamp. There were no complications after surgery, and subsequent examinations found the retina to be attached 360º.

Since the patient is barely cooperative, his actual visual acuity has yet to be objectively determined. However, his parents report no difference between his present adaptive status (walking, spatial orientation, play, etc.) and his status just before undergoing Lasik bilateral refractive surgery. It should be pointed out that the patient’s binocular vision currently rests on his LE alone, since there is a considerable difference in residual refractive error because the RE lens was surgically extracted with no intraocular replacement, as the LE is closest to emetropia at present. As was the case before refractive surgery, it is impossible to get this child to get used to contact lenses or glasses of any sort; furthermore, they might not be easily tolerated because of the considerable anisometropia. As a result, no correction was prescribed for the more ametropic eye (RE), in order to «save» it against the hypothetical chance that the LE might lose visual acuity in the future.

**Discussion**

Ophthalmologists currently face an open internal debate concerning the potential indications for refractive surgery in pediatric patients [2, 3, 4].

Briefly, some of the major *a priori* arguments against surgery for pediatric patients are the following:

- Refractive instability is practically a constant at this stage in life, and no refractive procedure can correct this.
- Instability also applies to several parameters of eye anatomy, which leads some authors to contraindicate intraocular refractive procedures for these patients.
- Deep general anesthesia may be required according to patient age; this makes the case against surgery stronger than it is for adults, and makes centering difficult in photoablation procedures (Lasik or PRK).
- There is a lack of experience regarding potential post-surgical complications specific to this group of patients. Some authors have described corneal opacities and considerable postoperative complaints after refractive surgery on pediatric patients [5].

Nevertheless, there is a growing number of authors who feel that some children may benefit from this kind of procedure, as long as they are properly selected [6, 7, 8]. Since 1995, several authors have reported their experience with refractive surgery on pediatric patients, with considerable variation in indications and outcomes [2-9].

Among the reasons given for using this kind of procedure on children, we highlight the following:

- It is useful for correcting conditions associated to refractive errors which cannot be treated, for whatever reason, using contact lenses or glasses:
cases of severe anisometropia with associated amblyopia [6, 7, 9], accommodative strabismus, etc.

- It improves high-order optical aberrations.
- Potential improvement of binocular vision.

One possible indication for refractive surgery at this age is the one that applied in this case: addressing refractive errors that are untreatable by conventional means (glasses or contact lenses) in order to improve uncorrected visual acuity.

This is especially useful in patients with severe hearing loss or severe cognitive disability, whose connection to the outside world may deteriorate even further. Thus, an initially untreatable refractive problem can be partly or totally treated, with benefits outweighing the above-described potential contraindications.

In this particular case, the patient’s quality of life improved spectacularly by performing Lasik surgery on both eyes, as the impossibility of correcting ametropia optically posed a serious problem. In time, however, the boy required surgery for bilateral retinal detachment, which had led to an evident regression in his quality of life. At present, opinions concerning the influence of corneal refractive surgery on retinal disorders are widely divergent. Some authors believe there is a link, while others state that retinal detachment following surgery is due to myopic retinopathy, rather than the surgery as such.

Still, we feel that refractive surgery is a valid option when all other optical corrections for refractive error have been ruled out, since ametropia significantly contributes to evident maladaptation.

References