

Trifocal toric intra-ocular lens implantation in pediatric traumatic cataract

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ABSTRACT

Purpose: To present the case of a 6-year-old child who presented with a traumatic cataract and was treated with trifocal toric intra-ocular lens implantation.

Observations: The child's uncorrected distance visual acuity improved from +0.7 logMAR preoperatively to 0.00 logMAR after cataract surgery, with spectacle independence and no reported side effects

Conclusions and importance: In carefully selected pediatric patients with traumatic cataracts, trifocal toric intra-ocular lenses may offer some benefit over standard monofocal lenses

1. Introduction

Intraocular lens (IOL) implantation in selected pediatric traumatic cataract cases has been performed with good refractive and visual outcomes.¹ The most common procedure in these cases is monofocal IOL implantation, aiming for emmetropia or hyperopia (depending on patient age) with spectacle correction for residual refractive error and loss of accommodation.¹ However, toric and/or multifocal IOLs have been implanted in children in order to reduce post-operative glasses dependency.^{2–4} To our knowledge, no cases of trifocal toric IOL implantation in pediatric traumatic cataract has been reported in the literature.

1.1. Case report

A 6-year old girl presented a year after blunt trauma with hair rubber band to the right eye (OD). Best corrected visual acuity was +0.7 logMar at distance and worse than J6 at 12 inches. Slit lamp examination and ultrasound biomicroscopy showed an anterior subcapsular cataract in the visual axis (Fig. 1). Intraocular pressure (IOP) was 10 mmHg and fundus examination was possible after pupil dilation with no anomalous findings. Potential Acuity Meter (PAM) was +0.1 logMar using infrared light. Topography showed with-the-rule astigmatism of 2.17 D OD and asymmetric astigmatism of 0.55 D in the left eye (OS) (Fig. 2). Coherence Biometry (IOL Master, Carl Zeiss, Germany) was unable to be performed due to the anterior subcapsular opacity. Axial length measurement was performed using B-ultrasound (B-18, Apramed, Brazil) and exported to IOL Master software. Desired correction was emmetropia and toric marker positioning was calculated

using standard online Zeiss toric calculator (Z-Calc) for the Zeiss AT Lisa Tri Toric 939 MP (Carl Zeiss, Germany).

Routine phacoemulsification using 2.75 mm incision was performed under general anesthesia with no complications. On first post-operative day, patient was +0.3 logMar and J1 without correction and 0.00 logMar and J1 with residual refraction of −0.75 spherical diopters (SD). Her vision and refraction were stable at her 1-year post surgery visit.

2. Discussion

Intraocular lens technology is continually evolving, so the answer to the question “What would be the best possible IOL for my child?” can be challenging. Questions regarding refractive shift after IOL implantation in children due to ocular development are discussed in the literature and some attention must be paid to IOL calculation, especially in children under age 2 years.¹ Amblyopia must be carefully considered when deciding what lens to select.⁶ During childhood, neuroplasticity allows neuroadaptation and reduces photic phenomena.⁶ However, the possibility of glasses, contact lens or even laser correction for a potential residual refraction after cataract surgery in children is well established.^{7,8} The choice of toric IOL to achieve astigmatism correction in comparison to incisional techniques is more effective.^{2,4,5}

This paper shows a case of a traumatic cataract in a 6-year-old girl with considerable topographic astigmatism and no anatomic contraindications to a toric multifocal IOL implantation.

The most common cataract surgery technique in such cases is use of a monofocal IOL targeting hyperopia (depending on patient age), with a plan for spectacle correction.^{1,6,9} We chose an alternative option for our

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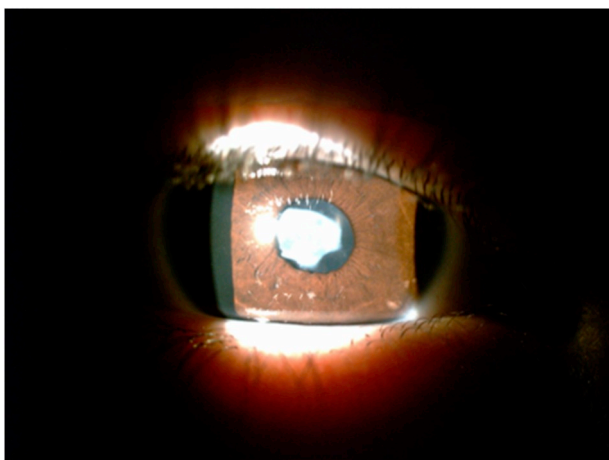


Fig. 1. Anterior biomicroscopy of the right eye with anterior subcapsular cataract.

patient, implanting a toric trifocal IOL aiming for the first positive value from emmetropia.

Although predicting the degree of myopic shift for a given individual remains difficult, especially in younger patients, we could have aimed for some residual hyperopia.⁹ However, we chose to optimize

vision during the amblyogenic period using a new IOL technology, even with the possibility of myopic changes in the future. In this particular case, parents were well informed and reported that “it would be very difficult for their daughter to wear glasses or contact lens” because she was very active and had an emmetropic fellow eye.

The family understood the need for posterior YAG laser capsulotomy and likely increase/change in residual refractive error over time. The final residual refractive error of -0.75 SD was not desired, although patient and family had been very satisfied since the first post-operative day. The child has not requested or needed any optical correction so far.

3. Conclusions

This was a relatively unusual case in that though this cataract was the result of a trauma, this child did not have any coexisting ocular injuries, which are common in ocular trauma and would have precluded the use of a trifocal or toric IOL. Although the initial clinical course in this child has been encouraging, the purpose of this paper is not to advocate the use of trifocal toric lenses in children with traumatic cataracts as a standard therapy. Quite the opposite, it raises the question of when we should consider these lenses in children, how we should adjust our calculations (given that she ended up relatively myopic), and what the long terms outcomes will be. Concerns specifically about refractive shift over time, capsular contraction and potential amblyogenic effects need to be further explored. Larger studies

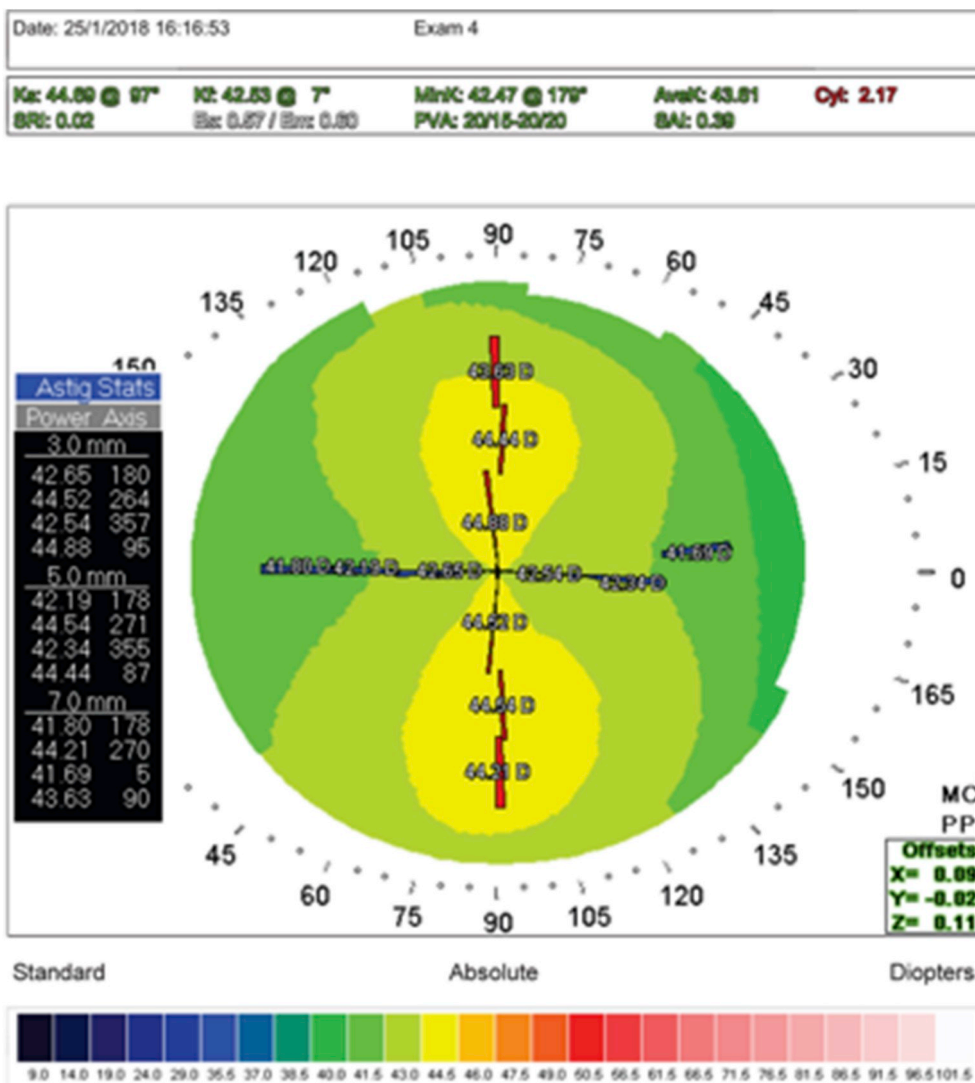


Fig. 2. Topography of the right eye showed with-the-rule astigmatism.

comparing long term outcomes of monofocal and multifocal IOL im-
plantation in children are needed.

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Patient consent

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