

Phakic IOLs can improve vision and quality of life for children with amblyopia

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in Washington, DC

PHAKIC IOL implantation appears to offer a reasonable approach to the treatment of ametropic or anisometropic amblyopia in children who have failed conventional therapy with spectacles or contact lenses, according to the accumulating experiences of French ophthalmologists who presented their results at the annual ASCRS Symposium on Cataract, IOL, and Refractive Surgery.

Speaking during a session focusing on paediatric refractive surgery, Laurence C Lesueur MD, Purpan Hospital, University of Toulouse presented data from up to seven and a half years of follow-up (mean 55 months) in children implanted with the ICL (Staar) posterior chamber phakic IOL. Her series included 18 eyes of children ages 3 to 16 years old, all of whom had anisomyopic amblyopia.

She noted that the greatest benefits associated with phakic IOL implantation in these children may be measured with respect to impact on quality of life.

"We began implanting the ICL for treatment of amblyopia in 1997, first published our results in 1999, and then reported longer follow-up in 2002. Our earliest results were very encouraging, and over time anatomical outcomes have continued to be favourable and we have noted a progressive increase in functional outcome in cases operated on with moderate preoperative amblyopia. Most importantly, however, all of the parents have reported quality of life benefits for their children with regard to improved school performance, greater recreational participation, and better psychological status."

ICL outcomes

Patients had the ICL implantations between June 1997, and June 2003. The average age of the 18 children at the time of surgery was nine years, and all had failed conventional therapy with spectacles or contact lenses.

Dr Lesueur reported that in the early postoperative period, there were no acute inflammatory reactions or problems with IOP elevation. Over the longer term, the eyes have remained quiet and IOP has been stable, the ICL has maintained good centration with adequate distance between its anterior surface and the crystalline lens, and there have been no problems with posterior capsule opacification.

Mean preoperative MRSE for the 18 eyes was -12.5 D (range -8 to -18.0 D). At last follow-up, mean cycloplegic spherical equivalent refraction was +0.05 D (range, -2.5 to +2.5 D). Mean best-corrected acuity improved from 20/200 preoperatively to 20/80 postoperatively. The mean postoperative uncorrected acuity was 20/100 (range 20/50 to 20/200).

"BCVA was unchanged in one eye and one eye lost more than one line of BCVA after a traumatic retinal detachment. All other eyes in our series have improved BCVA, with more than half experiencing a gain of 2 or more lines. However, our best results occurred in cases of low-level preoperative amblyopia without strabismus," noted Dr Lesueur.

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Nine children in the series presented with strabismus prior to ICL implantation. Strabismus was present in five children postoperatively as strabismus surgery to reduce irreversible high angle deviation (>40 D) was performed at six months after ICL implantation in four children. Ten children have recovered orthotropic position, and while only two (12%) children had binocular vision preoperatively, seven children (41%) had binocular vision after surgery.

Serial axial length measurements have also been performed. While the operated eyes were longer at baseline than the non-operated eyes (mean 26.5 mm vs. 22.8 mm), there has been no significant difference between the two groups of eyes in mean myopic shift postoperatively (0.7 mm vs. 0.6 mm).

Iris-claw results

Jean-Michel Bosc MD, Clinique Sourdille, Nantes, France, reported results from implantation of the myopic or hyperopic Artisan iris-claw phakic IOL (Ophtec) in 21 eyes of 15 paediatric patients. Those children were four to 13 years old at the time of surgery and had amblyopia with high ametropia or anisometropia. Follow-up in his series averages 35

months and is 36 months or longer in 12 eyes.

Overall, their results showed the implantation surgery could be performed safely without perioperative complications and that it achieved predictable refractive outcomes. During follow-up, the implants continue to afford improved visual acuity, have been well-tolerated, and maintained good stability, although re-enclavation had to be performed in several eyes implanted with the iris claw phakic IOL after haptic dis-enclavation.

Implantations of the iris claw phakic IOL were performed between December 1999, and February 2005. Fourteen eyes received myopic implants, including six patients who underwent unilateral surgery and four patients who had bilateral implantation. The

remaining seven eyes were treated for hyperopia and represented three unilateral procedures and two bilateral implantations.

Predictable and stable

Overall, refractive results have been predictable and stable. With the exception of one patient with unilateral hyperopia who discontinued patch occlusion, implantation of the iris claw phakic IOL was consistently associated with improvements in best-corrected acuity.

"The refractive outcomes in these eyes are excellent, just as they are in adults, and spherical equivalent has remained stable over time, even in the high myopes. The most remarkable impact of this surgery has been seen in the children's improvements in daily activities, especially at school and in sport. Quality of life benefits have been noted in all of our patients, but they have been particularly marked for the children with bilateral myopia who were relatively younger at the time of surgery and had higher refractive errors," Dr Bosc reported

He stressed that it is also important to realise that the goal of the surgery is not only to correct refraction, as amblyopia treatment remains a critical

component. In unilateral cases, patients must continue patch occlusion therapy and are prescribed glasses as necessary to achieve the best correction.

In Dr Bosc's series, mean spherical equivalent for the myopes was -12.41 D preoperatively, improving to -0.14 D at 30 months. For the hyperopes, mean spherical equivalent was reduced from an average of +7.75 D to +0.96 D.

Unilateral myopes, whose mean preoperative spherical equivalent was -8.02 D, gained an average of three lines. With their higher average preoperative myopia (-15.67 D), the bilateral myopes benefited with an average six-line gain in best-corrected acuity.

Mean spherical equivalent for the three unilateral hyperopes was +6.71 D preoperatively and they had an average 1.3 line gain in best-corrected acuity. The bilateral hyperopes had a mean spherical equivalent of +8.13 D and gained an average of two lines in best-corrected acuity.

Dis-enclavation increases endothelial cell loss

Safety has been good, although haptic dis-enclavation occurred in five eyes and haptic re-fixation was performed preventatively in two eyes. While mean endothelial cell loss for the entire series of 21 eyes is 3.4% after 30 months, in eyes where dis-enclavation occurred, endothelial cell loss averages 11.8%. It ranged up to 21% in one eye of a child who waited three days before presenting for evaluation.

"All of the dis-enclavations have been secondary to ocular trauma and they consistently present with pain, redness, and vision fluctuation. With re-fixation, visual results are good and endothelial cell counts stabilise. However, the potential for this complication is thoroughly discussed with parents so that they understand its risks, warning signs, and the critical importance of early treatment," Dr Bosc said.

He added that compared with adults, children are at greater risk for lens dis-enclavation because they are more prone to eye rubbing and ocular trauma.

"To maximise the security of the iris fixation and minimise the potential for dis-enclavation, we are now performing enclavation using a thicker fold of iris tissue," Dr Bosc said.

Pros of phakic IOLs

Dr Lesueur and Dr Bosc acknowledge that LASIK and PRK have been performed with good

functional results to manage children with severe anisometropic amblyopia who are contact lens intolerant. However, they both believe that phakic IOL implantation has certain advantages over excimer laser refractive surgery.

"Whereas phakic IOL implantation is reversible, excimer laser ablation results in definitive modifications of the cornea, and the corneal healing process is not yet well-characterised in the young eye. Moreover, IOL implantation allows for safer correction of higher levels of ametropia, and does not require patient cooperation intraoperatively as do PRK or LASIK," Dr Lesueur said.

However, patient cooperation remains a consideration for selecting candidates for implantation with the iris claw phakic IOL since specular microscopy to monitor endothelial cell density is a critical feature of follow-up, Dr Bosc noted.

Cataract Concern

Dr Lesueur deems the ICL a good choice for paediatric phakic IOL implantation because it can be implanted through a small, 3.5 mm incision and avoids problems with endothelial cell loss. However, while no cases of cataract formation have occurred in her paediatric patient series so far, she recognises that the potential for crystalline lens opacification is a major concern associated with this posterior chamber phakic IOL.

"Nevertheless, in these special cases of high unilateral myopia, our primary objective is to win the race against anisometropia. If secondary crystalline lens opacification occurs, cataract surgery with pseudophakic IOL implantation can be performed to restore good vision," she said.

Since a foldable version of the iris claw implant is not yet available, it requires implantation through a 5.2 mm or 6.2 mm incision. However, relative to other phakic IOLs, Dr Bosc believes it is the most logical choice since with its iris fixation it has the advantage of maintaining good positional stability independent of ocular growth or changes in sulcus or angle size. In addition, it has a long and excellent track record in adults.

"The iris claw phakic IOL has been shown to be safe and effective in older eyes for twenty years," Dr Bosc said.

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