Iris-fixated phakic IOLs have the best long-term safety record

Dermot McGrath

ADVANCES in phakic IOL materials and designs as well as improvements in surgical techniques are giving surgeons greater confidence in using phakic IOLs as a treatment option in their refractive practices, according to H Burkhard Dick MD.

Addressing a special symposium on phakic IOLs held during the XXV Congress of the ESCRS, Dr Dick told delegates that phakic IOLs are a viable option for the correction of higher refractive errors in both hyperopes and myopes and have many advantages to offer the modern refractive surgeon.

“Phakic IOLs provide very good refractive and visual results and can be easily implanted in most cases. They preserve accommodation and corneal asphericity and studies have shown that a toric iris-fixated lens may also improve contrast sensitivity,” he said.

In trying to differentiate between the phakic IOLs currently on the market, surgeons are advised to look carefully at the complications associated with each particular lens type, said Dr Dick.

“Looking at the peer-reviewed literature, most studies agreed that the optical and visual results were very satisfactory for uncorrected and best-corrected visual acuity, predictability and lines lost and gained for most types of phakic IOL. But postoperative complications are what really distinguishes the various phakic IOL models, in particular their risk of inducing glaucoma, cataract, endothelial cell loss and retinal complications,” he said.

Beginning with anterior chamber phakic IOLs, Dr Dick, chairman of the Ruhr University Eye Hospital in Bochum, Germany, said that these lenses can be broadly divided into two categories: angle-supported and iris-fixated IOLs.

He noted ongoing concern about the long-term safety of angle-supported phakic IOLs, with the recent withdrawal from the French market of Vivarte and NewLife phakic IOLs (both IO-LTECH/Carl Zeiss Meditec) and the temporary withdrawal of the ICARE lens (CorneaL). The reason cited by the French health and safety authority was the high rate of endothelial cell loss experienced by a significant number of patients two to three years after implantation.

“We have seen a great number of models of angle-supported anterior chamber phakic IOLs over the years, but none of them has survived more than three years on the market and no single FDA approval has been obtained so far. My opinion is that this implant position is not tolerated without complications,” said Dr Dick.

By contrast, he said that iris-fixated phakic IOLs such as the Verisyse/Artisan lens have proven their safety and efficacy over time with the longest follow-up of any phakic IOL and have obtained FDA approval.

He noted that iris-fixated phakic lenses are available for myopia and hyperopia and a toric version is now also available. The solid safety record and predictable outcomes obtained with these lenses is reflected in the fact that more than 5,500 iris-fixated Artisan IOLs have been implanted in Germany between 1999 and 2005, added Dr Dick.

“The advantages of the iris-fixated IOLs are that they have proven long-term results, good power ranges and we can individualise the position of the implant depending on the anatomy of the anterior segment,” he said.

Disadvantages of these IOLs include the need for a large incision, the fact that they require a slightly more demanding surgical technique and some problems with pigment dispersion.

Turning to the posterior chamber phakic IOLs, Dr Dick noted that one model – the Visian ICL (STAAR Surgical) – currently has Food and Drug Administration (FDA) approval.

The Visian ICL is a one-piece lens composed of a proprietary hydrophilic copolymer of collagen and hydroxyethylmethacrylate and can be folded for injection through a 3.0mm incision, and is also available in a toric version.

The PRL (Phakic Refractive Lens, Ciba Vision) is a foldable, silicon one-piece lens for the correction of hyperopia and myopia. Dr Dick said that some surgeons are now reluctant to implant the PRL because of reports of these lenses spontaneously dislocating into the vitreous body.

Looking at the more serious complication rate for the various phakic IOL types, Dr Dick said that a review of the published literature showed that the ICL had the highest incidence of acute glaucoma.

Acute glaucoma arises due to incomplete viscoelastic removal or pupillary block by the IOL.

“It is important to perform either preventive YAG laser iridotomy or intraoperative iridectomy when implanting a posterior chamber or iris-fixated phakic IOL, as this will avoid the problem of acute glaucoma in most instances,” he said.

For cataracts, the risk is much greater for posterior chamber versus anterior chamber IOLs, said Dr Dick. Among posterior chamber phakic IOLs, the Visian ICL has been associated most often with the IOL-related type of cataract, although he noted that different investigators using that same model have reported varying rates of cataract depending on the length of follow-up.

It has been surmised that anterior subcapsular cataract development has been less common with the Phakic Refractive Lens because that particular IOL “floats” in the aqueous humour rather than being sulcus-based.

Apart from the well-documented issue of endothelial cell loss with angle-supported phakic IOLs, Dr Dick said that other types of phakic lens are also not immune to the problem.

A three-year study of the Artisan toric iris-fixated IOL showed an annual cumulative cell loss of 1.9 per cent for the myopic group and 1.6 per cent for the hyperopic group, which is two to three times greater than physiological annual cell loss in normal eyes without surgery. The Visian ICL showed a per cent change from baseline of 8.9 per cent after three years.

Dr Dick noted that an elevated rate of endothelial cell loss typically occurs in the first year after implantation, but said that ongoing monitoring of endothelial cell loss once a year is imperative in patients with phakic IOLs to detect potential progressive cell loss at an early stage.

To increase postoperative safety after implantation of phakic IOLs, optimal preoperative evaluation and patient selection is mandatory, said Dr Dick. In this respect, he said that new imaging technologies like the Pentacam PIO Lens Simulation Module (Oculus, Wetzlar, Germany), which allow precise simulation of the postoperative position of an iris-fixated phakic IOL and the effect of ageing on the implant’s position, were a positive development.

“I think the outlook is positive overall. We have better diagnostic tools which will help us to improve our surgical outcomes and ultimately enhance patient satisfaction in the future,” he said.

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