In Rome

**Phakic IOLs: pearls, pitfalls and prospects discussed in ESCRS symposium**

Dermot McGrath

**Advances in phakic IOL materials and design concepts together with improvements in surgical techniques are giving surgeons renewed confidence in using phakic IOLs as a treatment option in their refractive practices, according to Joseph Colin MD.**

Addressing a special symposium devoted to phakic IOL implantation during the 9th Winter Refractive Surgery meeting of the ESCRS, Dr Colin said that phakic lenses have many advantages to offer the modern refractive surgeon.

“Phakic IOLs provide very good refractive and visual results, they can be easily implanted in most cases and they can correct myopia, hyperopia, astigmatism and may help patients with presbyopia.”  

Joseph Colin MD

Dr Colin noted that while phakic IOLs had initially courted controversy, because of potential damage to intraocular tissue, advances in design and biocompatible materials have helped to address such concerns in recent years.

Anatomical or functional complications with phakic IOLs can arise due to unintended contact between the implant and the cornea, the angle or the crystalline lens, noted Dr Colin, citing as an example the damage caused to the endothelium by the first generation of anterior chamber IOLs. He said that pupil ovalisation was a key concern with the second generation of phakic anterior chamber IOLs, while cataract remains a worry with posterior chamber phakic IOLs. Other potential complications include issues of correct sizing, centration, endothelium damage, and iris tolerance. Visual symptoms such as haloes, glare or night vision difficulties may also pose problems for patients.

“These different side effects are related to factors such as the centration of the IOL, and size of the pupil, deformation of the pupil, the size of the optic, IOL design or the refractive index of the IOL material – all these parameters may induce some visual side effects,” he said.

Dr Colin said that new designs, foldable materials, better knowledge of complications and improved technologies such as wavefront sensing would help to overcome some of the known limitations of current refractive IOLs in the future. However, he stressed that it was important to remember that implanting lenses constituted a fully-fledged intraocular procedure and should be treated accordingly.

“In most cases, such IOLs must not be implanted in eyes with an anterior chamber depth of less than 3.0 mm, we must look carefully at the iridocorneal angle, and assess the status of the crystalline lens. For patients with low ametropias we must always discuss the risk-benefit ratio and we must always tell the patients everything that we know about the long-term tolerances of these lenses,” he said.

While all the current phakic IOLs provide good results with few serious complications, Dr Colin said that there was still debate about the best location, lens design and biomaterial for long-term success with phakic IOLs. He also warned that all phakic IOLs would need to be removed when the bi-phakic eye develops a cataract, usually 10 to 15 years earlier than the emmetropic eye.

Although some have speculated phakic IOLs may one day become the treatment of choice for all refractive surgery patients, Dr Colin said that for the foreseeable future they will most likely continue to represent a niche market “addressing a low- to mid single-digit percentage of the vision correction population consisting of high myopes and high hyperopes.”
Making the right choice

The factors to be weighed in determining a particular choice of phakic IOL were discussed by Emanuel Rosen MD, who said it was important to remember that there was no “one size fits all” approach to phakic IOLs.

“It is a refractive procedure, so a small incision without refractive effect is very appealing with the latest foldable posterior chamber IOLs.” Emanuel Rosen MD

“One phakic implant does not suit everybody. I believe that if you are a patient and you are going to have a phakic implant you are better going to a surgeon who does many rather than to a surgeon who does few. As surgeons we therefore have to decide what is the minimum number of phakic implants that we should be doing, because expertise comes with experience,” he said.

Dr Rosen said that even before selecting the IOL type, surgeons should be asking themselves if this is really the correct refractive choice. He noted that factors such as the age of the patient, the range of alternative treatments available, and the extent to which the patient is informed about the various treatment options should all be taken into consideration.

Rigorous preoperative assessments are critical to obtaining consistently good outcomes, noted Dr Rosen.

“It is very important for both the surgeon and the patient to decide what the aim is and whether we are going to indulge in presbyopic treatment. We have to know all the various aspects of refractive surgery assessment and I would particularly stress the importance of pupillometry and the issue of the patient’s adaptation to a new visual scene,” he said.

Incision size is also important in achieving the desired visual outcome, he added. “It is a refractive procedure, so a small incision without refractive effect is very appealing with the latest foldable posterior chamber IOLs. For anterior chamber IOLs and Artisan-type lenses, you need a large incision unless you are using a lens such as the foldable Artiflex. The incision will affect the refractive result because it will influence the rehabilitation with sutures and refractive changes in healing. On the other hand, if the eye has a significant astigmatism then you can use the incision to correct or attempt to correct the astigmatism,” he said.

Dr Rosen said that his own preference has been to concentrate mainly on posterior chamber lenses and, in particular, the ICL phakic IOL (Staar).

“Our expectations with this lens have been fulfilled over the past eight years. It has performed extremely well; the surgery is straightforward and it has a small incision. They are also invisible in the eye which is something that patients really appreciate,” he said.

Complications vary according to IOL type

In trying to differentiate between the phakic IOLs now on the market, surgeons would be advised to look carefully at the complications associated with each particular lens type, advised Professor Thomas Kohnen MD.

“If you look just at the visual outcomes, efficacy, safety, stability and predictability, nearly all phakic IOLs perform very well — it is the complications arising from their unique design features and their position in the eye that separate them,” said Dr Kohnen.

Dr Kohnen said that there was a growing consensus that white-to-white safety distances for phakic IOLs should be supported, iris-fixated fixated lenses achieved the best centration and posterior chamber safety distances for phakic IOLs should be supported.

New imaging technologies shed light on anterior chamber

The role of new imaging technologies in exploring the anatomical composition of the anterior segment and determining correct safety distances for phakic IOLs was discussed by Georges Baikoff MD.

Over the past two years, Dr Baikoff has been using a prototype anterior chamber optical coherence tomography device (Visante AC-OCT, Carl Zeiss Meditec) to examine eyes implanted with angle-supported, iris-fixated and posterior chamber phakic IOLs. Based on the information obtained in those evaluations, Dr Baikoff suggested a need for reassessing some existing inclusion/exclusion criteria.

“If you look just at the visual outcomes, efficacy, safety, stability and predictability, nearly all phakic IOLs perform very well — it is the complications arising from their unique design features and their position in the eye that separate them.” Thomas Kohnen MD
Phakic refractive IOL patients as necessary for preoperative assessment of near future this equipment will be as giving surgeons a non-contact means of of useful data for the anterior chamber.

Performance of phakic IOLs reviewed at two-year follow-up

Dermot McGrath
in Rome

PHAKIC IOLs will command an ever-growing share of the refractive surgery market in the future, but surgeons must not lose sight of their primary responsibility to ensure the safety and efficacy of these implants in healthy eyes, according to Scipione Rossi MD.

Dr Rossi was speaking during a special symposium on phakic IOLs held during the 9th Winter Refractive Surgery Meeting. His own presentation was focused on a two-year follow-up of seven different models of phakic IOL that had been implanted during a live surgery session at the ESCRS meeting in Rome in 2003.

Dr Rossi noted that the study had been designed as much as possible to ensure a fair and objective comparison between the postoperative outcomes of the different lenses. All IOLs were implanted by experienced surgeons and patient selection criteria were closely matched for each IOL type. “This allows us to perform something close to a ‘pure’ evaluation of the actual IOL. We can examine not only the respective UCVA, BCVA, endothelial cell counts and so forth, but also factors such as lens positioning and complications without worrying unduly about the influence of the actual surgery itself,” said Dr Rossi.

Seven lenses for seven patients

In 2003, five female and two male patients were implanted with one of seven different phakic IOLs: an anterior chamber angle-fixed lens such as ICARE, GBR/Vivarte or Phakic 6, an anterior chamber iris-fixed lens such as Verisyse/Artisan or Artiflex, or a posterior chamber IOL such as the ICL or the PRL.

Reviewing the two-year follow-up results of each IOL, Dr Rossi commented that overall the results had been very good in terms of safety, efficacy and stability.

The Artiflex IOL, implanted by Camille Budo MD, recorded the best refractive outcome of all the IOLs, although the GBR/Vivarte, the PRL, and the Phakic 6 also performed to an extremely high standard, remarked Dr Rossi.

In terms of complications, Dr Rossi said that there were two cases of pupil ovalisation in patients implanted with the Vivarte and the Phakic 6 lenses. “It is interesting to note that this problem occurred with two lenses which are angle-fixed, but in these patients the issue is not very serious because their BCVA and overall refractive outcomes were very good,” he said.

More seriously, Dr Rossi noted two cases of lens opacities associated with the ICL and the ICARE implants. He said that careful examination of the video of the surgery involving the ICL implantation led him to conclude that it was the lens itself and not the surgery that was responsible for the cataract formation. In the case of the ICARE, however, he said that it was possible that the surgical procedure itself could have played a role in the formation of the cataract.

Demand for phakic IOLs likely to grow

Dr Rossi said that phakic IOLs would continue to command an increasing share of the refractive market in the future.

“The anatomy of the eye, corneal thickness, pupil size and so forth, imposes limits on the amounts of refractive correction that can be obtained by reshaping the cornea. For these patients, phakic IOLs are perhaps the only alternative. And the population eligible for these procedures is growing as both surgeons and patients become more aware of the benefits offered by such procedures.”

Dr Rossi reflected that IOLs have been implanted in Europe for over 15 years now. “The initial results were not promising although thankfully improvement in surgical techniques and devices have reduced complications. We now have a lot of studies showing a significant percentage of patients achieving uncorrected vision of 20/40 or better with phakic IOLs.”

Over the past decade, an estimated 150,000 refractive IOLs have been implanted in Europe, said Dr Rossi, a figure that is projected to increase significantly in the near future.

“In 2003 alone, there were an estimated 32,000 phakic IOLs implanted in Europe and the projection for 2008 is around 100,000 per year,” he said.

Dr Rossi noted that American surgeons were watching developments in Europe very closely. “First of all they are very interested in the results we are achieving with phakic IOLs and they are also keen to pick up some tricks and tips for implanting these IOLs themselves as the refractive market there expands beyond laser only treatments,” he said.

European surgeons thus have a major opportunity and responsibility to develop the full potential of the phakic IOL market, said Dr Rossi. Better materials allied to better surgery would help improve results, raise standards and instil confidence in the procedure, he suggested.

“We have not yet attained the highest standards but we're getting closer. So let's be confident in opting for refractive IOLs when the anatomical characteristics of the eye impose this procedure,” he said.

s.rossi@idi.it

“We have to remember that the anterior pole of the crystalline lens will move by about 20 microns per year.”

Georges Baikoff MD

“It is also vital to take into account the forward movement of the crystalline lens that occurs due to age-related thickening and with accommodation.

“We have to remember that the anterior pole of the crystalline lens will move by about 20 microns per year. This means that if you introduce a phakic lens in a 20-year-old patient, by the time that patient is 60, the crystalline lens anterior pole will have moved by 1.0 mm. That's one third of the diameter of the anterior chamber and underlines why we have to warn patients that the lens won't be for life,” he said.

The Visante OCT

The Visante OCT

The Visante OCT

The Visante OCT

Dr Rossi reflected that IOLs have been implanted in Europe for over 15 years now. “The initial results were not promising although thankfully improvement in surgical techniques and devices have reduced complications. We now have a lot of studies showing a significant percentage of patients achieving uncorrected vision of 20/40 or better with phakic IOLs.”

Over the past decade, an estimated 150,000 refractive IOLs have been implanted in Europe, said Dr Rossi, a figure that is projected to increase significantly in the near future.

“In 2003 alone, there were an estimated 32,000 phakic IOLs implanted in Europe and the projection for 2008 is around 100,000 per year,” he said.

Dr Rossi noted that American surgeons were watching developments in Europe very closely. “First of all they are very interested in the results we are achieving with phakic IOLs and they are also keen to pick up some tricks and tips for implanting these IOLs themselves as the refractive market there expands beyond laser only treatments,” he said.

European surgeons thus have a major opportunity and responsibility to develop the full potential of the phakic IOL market, said Dr Rossi. Better materials allied to better surgery would help improve results, raise standards and instil confidence in the procedure, he suggested.

“We have not yet attained the highest standards but we're getting closer. So let's be confident in opting for refractive IOLs when the anatomical characteristics of the eye impose this procedure,” he said.

s.rossi@idi.it

“We have to remember that the anterior pole of the crystalline lens will move by about 20 microns per year.”

Georges Baikoff MD

“It is also vital to take into account the forward movement of the crystalline lens that occurs due to age-related thickening and with accommodation.

“We have to remember that the anterior pole of the crystalline lens will move by about 20 microns per year. This means that if you introduce a phakic lens in a 20-year-old patient, by the time that patient is 60, the crystalline lens anterior pole will have moved by 1.0 mm. That's one third of the diameter of the anterior chamber and underlines why we have to warn patients that the lens won't be for life,” he said.

The Visante OCT

The Visante OCT

The Visante OCT

Dr Rossi reflected that IOLs have been implanted in Europe for over 15 years now. “The initial results were not promising although thankfully improvement in surgical techniques and devices have reduced complications. We now have a lot of studies showing a significant percentage of patients achieving uncorrected vision of 20/40 or better with phakic IOLs.”

Over the past decade, an estimated 150,000 refractive IOLs have been implanted in Europe, said Dr Rossi, a figure that is projected to increase significantly in the near future.

“In 2003 alone, there were an estimated 32,000 phakic IOLs implanted in Europe and the projection for 2008 is around 100,000 per year,” he said.

Dr Rossi noted that American surgeons were watching developments in Europe very closely. “First of all they are very interested in the results we are achieving with phakic IOLs and they are also keen to pick up some tricks and tips for implanting these IOLs themselves as the refractive market there expands beyond laser only treatments,” he said.

European surgeons thus have a major opportunity and responsibility to develop the full potential of the phakic IOL market, said Dr Rossi. Better materials allied to better surgery would help improve results, raise standards and instil confidence in the procedure, he suggested.

“We have not yet attained the highest standards but we're getting closer. So let's be confident in opting for refractive IOLs when the anatomical characteristics of the eye impose this procedure,” he said.

s.rossi@idi.it

“We have to remember that the anterior pole of the crystalline lens will move by about 20 microns per year.”

Georges Baikoff MD

“It is also vital to take into account the forward movement of the crystalline lens that occurs due to age-related thickening and with accommodation.

“We have to remember that the anterior pole of the crystalline lens will move by about 20 microns per year. This means that if you introduce a phakic lens in a 20-year-old patient, by the time that patient is 60, the crystalline lens anterior pole will have moved by 1.0 mm. That's one third of the diameter of the anterior chamber and underlines why we have to warn patients that the lens won't be for life,” he said.

The Visante OCT

The Visante OCT