Anterior chamber OCT device quantifies risk of phakic IOL-related pigment dispersion syndrome

Dermot McGrath in Paris

A NEW diagnostic test using anterior chamber optical coherence tomography (AC OCT) can help to reduce the risk of pigment dispersion syndrome arising from the implantation of certain phakic intraocular lenses, according to a French ophthalmologist.

Addressing the XXII Congress of the ESICRS, Georges Baikoff MD said that pigment dispersion is one of the primary complications associated with implantation of a phakic IOL, especially in hyperopic patients.

“In our clinical experience with the Artisan/Verisyse lens (AMO Inc), we observed very few cases of pigment dispersion in our series of myopes but quite a high percentage in our hyperopic patients. There are very few clear explanations for this in the published literature. The only real guidelines are that we have been advised to avoid implanting Artisan/Verisyse lenses in hyperopic patients or with irises that are described as ‘too convex’,” said Dr Baikoff, Georges Baikoff MD, Clinique Monticelli, Marseilles, France.

Yet, as Dr Baikoff notes, there is no clear definition of what constitutes ‘too convex’ an iris and the data for anterior chamber depth safety is also variable depending on which author you consult.

In his study of 273 Artisan IOLs implanted between 1999 and 2003, Dr Baikoff said that pigment dispersion syndrome was observed in just 0.7% of myopes compared to 5.9% of hyperopes.

**Crystalline lens rise**

The proposition of Dr Baikoff and his collaborators is to define a new safety distance, which he terms the “crystalline lens rise”. This rise is a measure of the distance between the line from angle to angle, which is a fixed point in the anterior chamber, and the anterior pole of the crystalline lens. He explained that the measurement is performed on the median of the diameter of the anterior chamber, which is a stable reference point for the eye over time.

The newly developed AC-OCT system (Visante, Carl Zeiss Meditech) allows clinicians to obtain high-resolution cross-section images of the anterior segment from which the crystalline lens rise can be calculated with ease, said Dr Baikoff.

He said that based on the results of his study, implanting an eye that has a crystalline lens rise of over 600µm appears to be extremely risky.

“All of the patients with pigment dispersion syndrome had a very high crystalline lens rise and we believe that this is a compelling means of determining the risk factor. When we analysed the data, eight out of nine eyes with pigment dispersion syndrome were found to be over the 600 µm threshold,” he said.

Dr Baikoff said that incorporating the crystalline lens rise test into the standard preoperative examination for potential Artisan/Verisyse IOL candidates would help to reduce the “unacceptably high” complication figure of 6% for pigment dispersion syndrome in his study, implanting an eye that has a crystalline lens rise of over 600µm appears to be extremely risky.

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**Growth of crystalline lens**

Another important point to consider, noted Dr Baikoff, is that the crystalline lens grows over time – by about 20 µm annually and that this has obvious implications for the long-term viability of the IOL.

“We calculated that there is a forward shift of the anterior pole of the crystalline lens by 20 µm per year. This means that if you introduce an Artisan/Verisyse lens with a crystalline lens rise of 400 µm there will be a safety distance of 200 µm, but within 10 years this safety distance will disappear because of the thickening of the crystalline lens and because of the forward shift of the anterior pole of the lens.”

He said that this information would help surgeons to better define the limits of their IOL surgery and to forewarn the patient that the lens may have to be explanted at some future date.

“If the surgeon knows the crystalline lens rise at a certain time point, he or she will be able to define a safety deadline and predict that the lens will have to be removed within a certain number of years,” he said.

Summing up, Dr Baikoff said that the latest study confirmed his belief that the AC-OCT device will become indispensable for the preoperative assessment of phakic refractive IOL patients in the near future.

The newly developed AC-OCT device helps us to quantify the risk and to inform our patients of the likelihood of their implant developing problems at some point in the future.”

**NEW SAFETY CRITERIA**

- **The Crystalline Lens Rise**

  **Crystalline lens rise**

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  **Pigment dispersion in eye implanted with Artisan lens**