Square optic edge enhances PCO prevention

Dr Werner and colleagues at the John A Moran Eye Centre, University of Utah, Salt Lake City, US, found that both mean central and mean peripheral PCO scores were lowest in the 570C group, highest in the 570H group (standard IO L), and intermediate in the 570E group, with some PCO starting at the level of the junction in some eyes. She noted a statistically significant difference among the three groups of eyes with regard to peripheral PCO (P = 0.039).

**Barrier effect better with squared optic-haptic junctions**

Dr Werner observed that cell growth in the 570H design group caused peripheral and central PCO formation that invariably began at the optic-haptic junctions. She noted the beginnings of PCO in this group during the clinical follow-up with slit lamp examination and confirmed its presence, also in the optic-haptic junction, through both gross and histopathological analyses of the enucleated eyes. The barrier effect at the optic-haptic junctions was much more effective with the C and E versions of the lens, especially the C version, she said. 10 lenses of each type were implanted in a randomised fashion in pigmented rabbits. The investigators sacrificed the rabbits and enucleated the eyes three weeks later, and carried out posterior view analyses for PCO. They evaluated the intensity of central PCO, peripheral PCO, and scored Soemmering’s formation from 0-4. The area of Soemmering’s formation was also noted from 0-4 (number of quadrants). They validated their observations taken from the posterior view with histopathological analyses. The investigators prepared eyes for histopathological analyses by fixating them in formalin and then orienting and cutting them in a way to ensure that all the histopathological sections pass through the optic haptic junctions. They noted that the technique allowed them to maintain the overall geometry of the structures within the capsular bed.

**Ridley was right**

Dr Werner’s results clearly showed that PCO frequently began in the optic-haptic junction of the lenses lacking a sharp edge in the junction-region, and was significantly less in lenses with sharp-edges all around. “We believe the sharp edge needs to be present for 360° around the optic to be really effective. Interestingly, this design feature was already present in some IO Ls as far back as the original Ridley lens. It now can be found again in this single piece modern foldable IO L.”

Previous studies performed by Dr Werner and colleagues with the Centerflex IO L analysed other aspects that are considered important in PCO prevention. An earlier animal study investigated the single piece hydrophilic acrylic lens in comparison to the hydrophobic version. PCO prevention was similar between the two lenses. Yet another investigation compared a plus-powered bi-convex single-piece hydrophilic acrylic lens with a minus-powered bi-concave single-piece hydrophilic acrylic lens. The minus powered lens had an extra step running all around the optic for 360 degrees including the optic-haptic junctions. The results obtained with the minus-powered lens were much better in terms of PCO prevention and barrier effect, particularly when seen on the histopathological level, as expected, she said.

Liliana Werner MD, PhD
liliana.werner@hsc.utah.edu

Gross photographs (posterior view; top) and photomicrograph (bottom) of a rabbit eye from the 570H group. Cell ingrowth causing peripheral and central PCO formation appears to have started at the optic-haptic junction (black arrows). From: Werner L, Mamalis N, Pandey SK, et al. Posterior capsule opacification in rabbit eyes implanted with hydrophilic acrylic intraocular lenses with enhanced square edge. J Cataract Refract Surg 2004; 30:2403-2409.

Gross photographs (posterior view; top) and photomicrograph (bottom) of a rabbit eye from the 570C group. The edge profile of the optic-haptic junction of the lens can be seen in the histological section. The material originated from the Soemmering’s ring was blocked at the level of the extra ridge of the optic-haptic junction of this lens design (black arrow). From: Werner L, Mamalis N, Pandey SK, et al. Posterior capsule opacification in rabbit eyes implanted with hydrophilic acrylic intraocular lenses with enhanced square edge. J Cataract Refract Surg 2004; 30:2403-2409.