Distortions of Iris and Anterior Lens Capsule OCT Images by ICRS

Intracorneal ring segments (ICRS) have been used in patients with keratoconus for slowing keratoconic progression and delaying keratoplasty. However, we experienced anterior optical coherence tomography (OCT) image distortion of the iris in patients with ICRS insertion by chance.

Some femtosecond laser cataract surgery systems use OCT images of the cornea, anterior lens capsule, and nucleus for reference. The ICRS and any other corneal implants or opacification may interfere with the OCT imaging and femtosecond laser disruption.

We reviewed anterior segment OCT images of patients with ICRS (Intacs; Addition Technology, Sunnyvale, CA) insertion, analyzing the patterns of the iris and anterior lens capsule image distortion behind the ICRS (Figure 1), the number of discontinuity lines in the iris, and whether the iris segments showed a ‘horizontal flip’ (ie, the iris segment is flipped horizontally along the vertical axis by ICRS). We investigated the forward or backward movement of the iris segment, thickening or thinning of the iris segment, the horizontal position of discontinuity lines, and the image distortion of the anterior lens capsule in the OCT images. The movement of the capsule segments was measured by Image J software (version 1.38x; Wayne Rasband National Institutes of Health, Bethesda, MD).

Sixty-six eyes of 54 patients were included in this study. Mean age was 25.1 ± 9.2 years. Thirty-five patients were men and 19 were women. There were two sections for two ICRS in one OCT image. Therefore, we investigated a total of 132 sections.

The number of discontinuity lines of the iris was usually two (94%). When the ICRS was thin, there was only one or no discontinuous line (6%). Horizontal flip of the iris segments was uncertain in 70% and definite when the iris was transected near the pupil margin (22%, definite flip) (Figure 2A) or when the ICRS was thin (8%, no definite flip). The iris segments appeared to either move backward slightly (61%) (Figure 2B), not show any movement (23%), or move backward significantly (2%). The iris segment thickened (35%) (Figure 2C) or did not change (42%). In some cases,
thinning (3%) or remarkable thickening (5%) was observed. Discontinuity lines of the iris segment were located on the inner side rather than on ICRS insertion sites. However, discontinuous horizontal movements were not observed. Among the 15 eyes of 14 patients scanned after pupil dilatation, discontinuity lines of the anterior lens capsule were observed in 18 sections (60%) (Figure 2D). Mean movement of the capsule segments was 38 ± 36 μm (minimum = 0 μm, maximum = 139 μm).

Hosik Hwang, MD, MS
Young Sik Yoo, MD
Chang Won Park, MS
Choun-Ki Joo, MD, PhD
Catholic University of Korea
Seoul, Korea

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REFERENCES

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