Change in Visual Quality Following Surgery in a Case of Anterior Lenticonus Without Syndromic Association

To the Editor:

We describe a 28-year-old man who presented to us with complaints of progressive diminution of vision in both eyes for 2 years. The uncorrected distance visual acuity was 20/200 in both eyes, improving to 20/80 with pinhole. Near vision was N18 in both eyes. Retinoscopy was irregular with an oil-droplet reflex on distant direct ophthalmoscopy. Dilated slit-lamp examination showed anterior lenticonus in both eyes (Figures 1A-1B). Fundus examination was within normal limits. With a clinical suspicion of Alport’s syndrome, a history of renal insufficiency, hematuria, or hearing deficit was ruled out.1

Figures 1C-1D show the spectral domain anterior segment optical coherence tomography (Casia SS-1000; Tomey, Nagoya, Japan) of both eyes. Ray-tracing aberrometry (iTrace; Tracey Technologies, Houston, TX) showed total higher order aberrations of 2.963 µm in the right eye and 1.689 µm in the left eye. Figures 1E-1F show that both higher and lower order aberrations of the cornea were within normal limits in both eyes. There was a significant increase in internal defocus (3.522 µm in the right eye and 3.215 µm in the left eye), which contributed to the patient’s large refractive error. Spherical aberration was also high (1.309 µm in the right eye and 1.231 µm in the left eye). Both vertical and horizontal coma was abnormal in the right eye (0.149 and 0.417 µm, respectively).

A detailed assessment of preoperative visual quality metrics for the entire eye is shown in Figure 2. Modulation transfer function curve (Figure 2B) was flat preoperatively for both eyes, suggesting poor contrast sensitivity for both higher and lower spatial frequencies (area under the curve: 2.81 for the right eye and 2.88 for the left eye). Strehl’s ratio (Figure 2C) was 0.00141 in the right eye and 0.00192 in the left eye. Snellen’s simulated E charting for visual acuity of 20/30 showed gross distortions in both eyes.

![Figure 1. A case of anterior lenticous without any syndromic association. (1A-1B) Dilated slit-lamp photograph of anterior lenticonus in both the right and left eyes. (1C-1D) Spectral domain anterior segment optical coherence tomography images of anterior lenticonus. (1E-1F) Ray tracing aberrometry for both the eyes showing normal corneal aberrations and increased defocus and spherical aberration in internal optics and entire eye.](image-url)
Based on the patient’s symptoms and our clinical examination, we decided to proceed with clear lens extraction and intraocular lens implantation after obtaining informed consent. Continuous curvilinear capsulorhexis was initiated using a 26-gauge cystitome. Initiation of the rhexis was difficult due to the rigidity of the capsule and its firm adherence to the anterior lens fibers (Video, available in the online version of this article). Rhexis was completed using a microhexitis forceps. Clear lens aspiration was completed and a monofocal aspheric intraocular lens implant (Alcon SN60WF; Alcon Laboratories, Inc., Fort Worth, TX) was placed in the bag.

Six weeks after the procedure, the patient had an uncorrected distance visual acuity of 20/20 in both eyes. A repeat ray tracing aberrometry showed a significant decrease in total higher order aberrations, defocus, and spherical aberration in both eyes for internal optics and the entire eye (Figures 2A-2B). Area under the curve for modulation transfer function and Strehl’s ratio improved (Figures 2C-2F). Simulated Snellen visual acuity chart also showed substantial improvement (Figures 2G-2H).

To the best of our knowledge, dynamic changes in the aberration profile and visual quality metrics in cases of anterior lenticonus have not been described so far. There was also a significant improvement in visual acuity and the quality. Thus, aberrometry is a great adjunctive imaging technique for objective assessment and better management of anterior lenticonus.

**REFERENCES**


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