Femtosecond laser-assisted cataract surgery in Alport's syndrome - A case report

Manas Nath, Prasanth Gireesh

Alport's syndrome with anterior lenticonus poses significant challenges during capsulorhexis with high chances of peripheral extension. We report a case of 23-year-old lady with Alport's syndrome with anterior lenticonus in the left eye that underwent successful femtosecond laser-assisted cataract surgery (FLACS). The anterior lenticonus was eccentric nasally; hence, the FLACS capsulotomy was positioned slightly nasally so that the capsulotomy margin was outside the cone base. The distance vision improved from 6/24 to 6/6 at one-month follow-up. In summary, FLACS improved the safety of cataract surgery in an eye with anterior lenticonus and yielded excellent visual outcomes.

Key words: Anterior lenticonus, cataract surgery, femtosecond laser

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Alport's syndrome is a multisystemic disease characterized by progressive renal dysfunction, sensorineural hearing loss, and ophthalmic manifestations including anterior and posterior lenticonus, early cataract, and crystalline deposits in the retina.[1,2] Anterior lenticonus poses a significant challenge during capsulorhexis with high chances of peripheral rhexis extension. Femtosecond laser-assisted cataract surgery (FLACS) is an excellent tool to perform a precise and round capsulorhexis,[3,4] especially in difficult cases where chances of rhexis extension are high. We report a case of anterior lenticonus with clear lens in a patient with Alport's syndrome, which was successfully operated using FLACS.

Case Report

A 23-year-old lady, a known case of Alport's syndrome with renal dysfunction and hearing loss since childhood, presented to us with gradually progressive diminution of vision in both eyes for two years. Three out of five siblings including her

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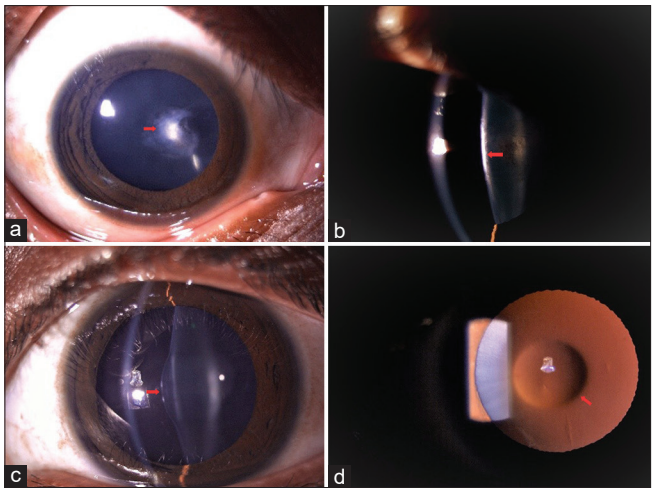

Figure 1: Slit lamp images. (a) Right eye: Anterior subcapsular cataract (arrow); diffuse illumination. (b) Right eye: Anterior subcapsular cataract (arrow); optical section. (c) Left eye: Anterior lenticonus (arrow); optical section. (d) Left eye: Anterior lenticonus showing oil drop appearance (arrow) in retroillumination

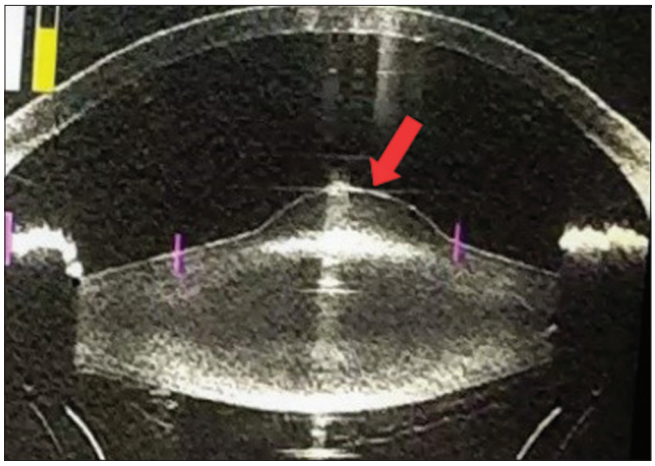

Figure 3: LenSx ASOCT showing anterior lenticonus (arrow)

had Alport's syndrome with the other two siblings having passed away in their third decades due to renal failure. Her best corrected distance visual acuity was 6/12 in the right eye and 6/24 in the left eye. Slit lamp biomicroscopy revealed anterior subcapsular cataract in the right eye [Fig. 1a and b] and anterior lenticonus in the left eye [Fig. 1c and d]. The remaining ophthalmic evaluation including a dilated fundus examination was essentially normal. Significant higher order aberrations attributable to the crystalline lens were recorded preoperatively using the iTrace aberrometry system in the left eye [Fig. 2a and b]. Routine preoperative workup revealed a high blood urea (50 mg%) and marginally elevated serum creatinine levels (1.19 mg%) and urine analysis showed protein traces and 5–10 RBCs/HPF. Biometry using the IOL Master 700 (Carl Zeiss Meditec, Inc., Dublin, CA, USA) revealed an axial length of 22.85 mm and steep *K* reading of 45.8D @ 132° and flat *K* of 45.51 D @ 42° in the left eye.

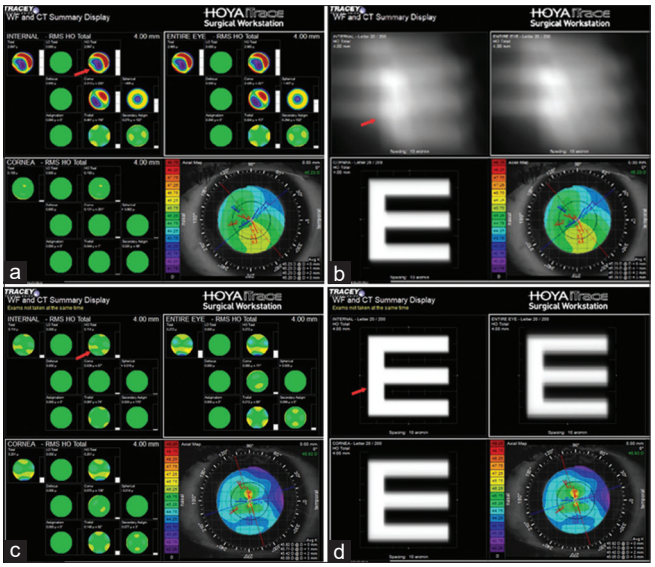

Figure 2: iTrace aberrometry. (a) Left eye (Pre-op): Aberrometry showing increased higher order aberration arising from internal optics (arrow). (b) Left eye (Pre-op): Blurred E-chart arising from internal optics (arrow). (c) Left eye (Post-op): Showing reduced higher order aberration from internal optics (arrow). (d) Left eye (Post-op): Normal E-chart arising internal optics (arrow)

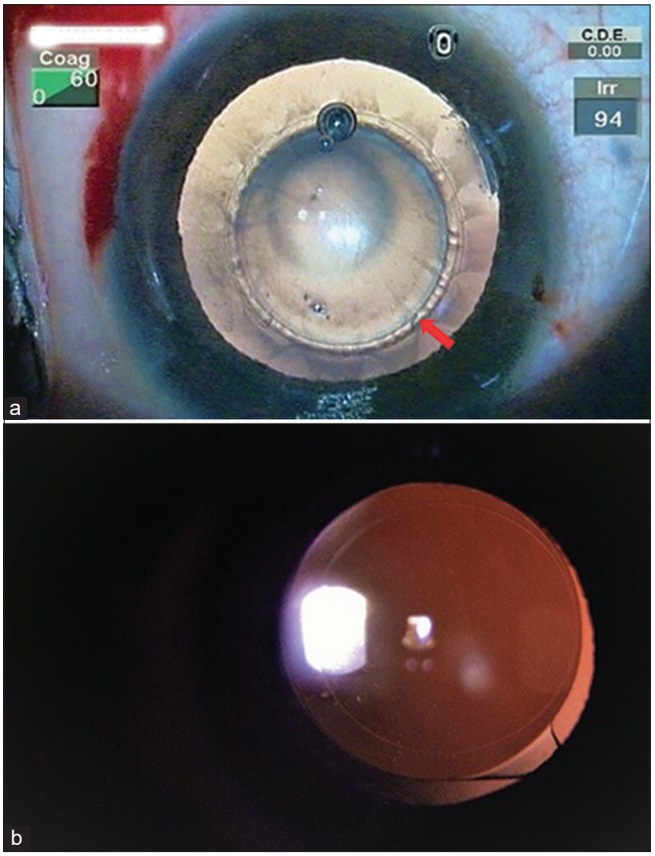

Figure 4: Intraoperative and postoperative images. (a) Free floating lens capsule (arrow) noted intraoperatively. (b) Single-piece IOL (intraocular lens) in the bag at one month postoperative day

Patient was taken up for FLACS in the left eye after obtaining an informed consent. The lenticonus was confirmed using the anterior segment optical coherence tomography (ASOCT) [Fig. 3] provided by the LenSx© laser system (Alcon Laboratories) and the SoftFit™interface (Alcon Laboratories) was used for docking under topical anesthesia. The anterior lenticonus was eccentric nasally; hence, the FLACS capsulotomy was positioned slightly nasally so that the capsulotomy margin was outside the cone base. A capsulotomy diameter of 4.9 mm was created using the femtosecond laser using an energy setting of 7 μJ, tangential spot separation of 4 μ, and layer separation of 3 μ. Lens fragmentation was not performed in view of a clear lens. A primary 3 planner incision of 2.8 mm was fashioned along with two arcuate incisions at 113° and 293° using the same femtosecond laser energy settings. During phacoemulsification, a free-floating lens capsule [Fig. 4a] was seen and clear lens extraction was performed uneventfully using the Centurion system (Alcon Laboratories) followed by implantation of a single-piece hydrophobic intraocular lens (Acrisof SA60AT) in the bag. Postoperative uncorrected vision was 20/20 at one-month follow-up with reduced higher order aberrations [Fig. 2c and d] and a well-centered intraocular lens [Fig. 4b].

Discussion

We performed FLACS in this case due to the large and eccentric anterior lenticonus that would have posed serious challenges during manual capsulorhexis with a possible peripheral run out. FLACS has been shown to be equally efficacious compared to phacoemulsification alone in large clinical trials; however, its cost effectiveness has been questioned.[3] FLACS also has a higher learning curve, especially for non-LASIK (laser-assisted in situ keratomileusis) surgeons not used to the femtoplatform.[5,6] However, in tough situations such as lenticonus, it definitely improves surgical safety with more predictable outcomes as seen with our case. Previously, FLACS in anterior lenticonus has been reported only twice.[7,8] The magnitude of lenticonus in our patient appears to be far larger than those of the previous cases. The eccentricity of the Conus was also a unique feature of our case that added to the surgical challenge. Finally, our patient had appreciable lenticonus in only one eye whereas most reports on Alport's syndrome report bilateral symmetrical lenticonus.[2] Additionally, the family history along with lenticonus suggests autosomal recessive inheritance, though we were unable to carry out appropriate genetic testing.[2]

In conclusion, we believe that FLACS improves the surgical safety and leads to better outcomes while performing cataract surgery in eyes with anterior lenticonus and should be considered as first line of management if economic constraints permit.

Authors contribution

All authors have contributed equally in all aspects of data collection and manuscript writing. The paper was presented as E-poster in the AIOC 2019 but has never been submitted to another journal before.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form, the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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Nil.

Conflicts of interest

There are no conflicts of interest.

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