• Letter to the Editor •

A case report of different surgical methods for the treatment of retinitis pigmentosa complicated by capsular contraction syndrome after cataract surgery

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Dear Editor,

Retinitis pigmentosa (RP) is a group of inherited retinal diseases characterized by progressive degeneration of rod and cone photoreceptors. In addition to retinal changes such as optic disc pallor, retinal vascular were attenuated, the bone spicule-like pigment clumping, cataracts are the most common ocular complication of RP[1-2]. Posterior subcapsular cataract is the most common morphological type in RP patients and accounts for about 41%-53% of cases. Phacoemulsification surgery can improve vision in patients with RP, but some postoperative complications, such as capsular contraction syndrome (CCS), can impair vision again. The incidence of anterior capsule contraction and intraocular lens (IOL) dislocation in patients with RP after phacoemulsification is higher than that in healthy eyes[3]. Here, we report a rare case of an RP patient with CCS-induced dislocation of the IOL in both eyes after cataract surgery and summarize the therapeutic effects of different surgical methods on the dislocation of the IOL in both eyes caused by CCS. The study design is shown in Figure 1.

The study was conducted in accordance with the principles of the Declaration of Helsinki. The informed consent was obtained from the subjects.

A 41-year-old male patient visited Tongji Hospital Affiliated to Tongji University on 18 February 2022 due to progressive blurring of vision after bilateral cataract surgery for 2mo. Past history: the patient underwent "binocular cataract phacoemulsification united IOLs implantation" in 2021. A 2.4 mm corneal incision was made, followed by circular continuous capsulorhexis, cross-groove phacoemulsification, and folded spherical IOLs was implanted in the capsule. Intraoperative IOL was centered, and the operation was successful with no intraoperative complications, and postoperative inflammation was mild in both eyes. Ophthalmological examination: the best corrected visual acuity (BCVA) of the right eye was 0.2, and the BCVA of the left eye was 0.12. The corneas of both eyes were transparent. The anterior chamber was clear, and the depth was normal. The pupils were round, about 3 mm, and a light reflex was present. The IOLs of both eyes were dislocated and curled, and the capsule was mechanically contracted (Figure 2A and 2C). The right eye was heavier, and in the fundus of both eyes, the optic disc was pallor, the retinal blood vessels were attenuated, the bone spicule-like pigment clumping, and the retina was no retinal hole and detachment (Figure 3A and 3C). Intraocular pressure: 16 mm Hg for right eye, 18 mm Hg for left eye. Auxiliary examination: anterior segment optical coherence tomography (OCT) examination was performed before the surgery, revealing capsular retraction in both eyes (Figure 4A and 4C). Meanwhile, the IOLs displacement was observed by B-ultrasound examination (Figure 5A and 5C). In the past, there was a history of high myopia and RP in both eyes.

After admission, the left eye was treated with Neodymium: yttrium aluminum garnet (Nd:YAG) laser incision. Laser was performed at 3:00, 6:00, 9:00, and 12:00 respectively, with 3 laser points at each point (laser power level: 2.0 mJ, total laser points: 12), and the capsular opening was enlarged, but the IOL could not be deployed and repositioned (Figure 2D). After local anaesthesia, "left eye anterior vitrectomy united IOL repositioning" was performed. A 2.2 mm corneal incision was made on the top of the shrunken anterior capsule, and the capsule was severely constricted, so the capsule could not be separated and the IOL could not be unfolded or repositioned. The IOL was adjusted to the ciliary sulcus, and we make

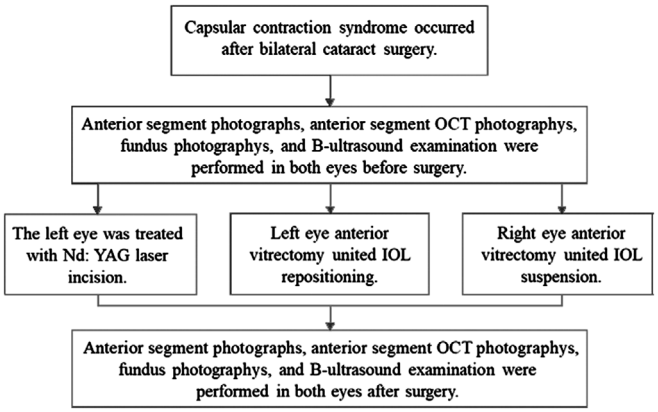

Figure 1 Study design flow chart.

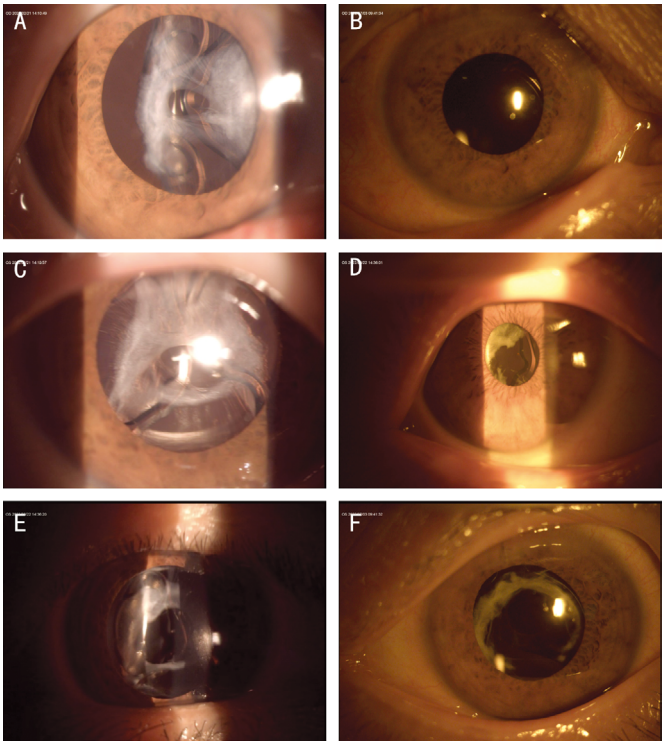

Figure 2 Anterior segment photographs of the patient before and after surgery Right eye before (A) and after (B) IOL suspension; Left eye before (C) and after (D) Nd:YAG laser operation; Left eye before (E) and after (F) IOL adjustment operation. IOL: Intraocular lens; Nd:YAG: Neodymium:yttrium aluminum garnet.

a 3.5-mm single-channel tunnel incision behind the corneal edge at 5:00 position. A 25-gauge vitrectomy system was used to remove the posterior capsule with cloudy pupil area and the anterior vitrectomy. The IOL was observed to be placed in the ciliary sulcus position without deviation. Under staged local anaesthesia, “Right eye anterior vitrectomy united IOL suspension” was performed. During the operation, the anterior capsule was shrunk and the IOL was curled up into the capsule. Then a 2.2-mm corneal incision was made above the cornea, and the shrinking anterior capsule was cut open. The capsule was severely constricted, and it was impossible to separate the capsule and reset the IOL. During the reduction process, it was found that the tear of the lower anterior capsule exceeded the

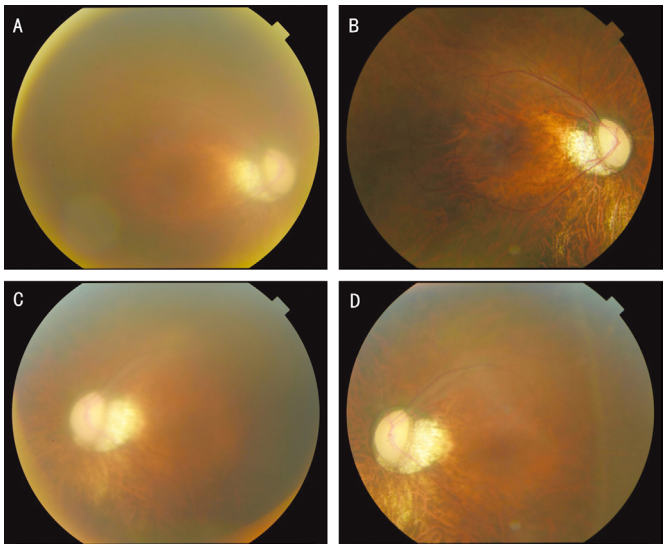

Figure 3 Fundus photographs of the patient before and after surgery Right eye before (A) and after (B) surgery; Left eye before (C) and after (D) surgery.

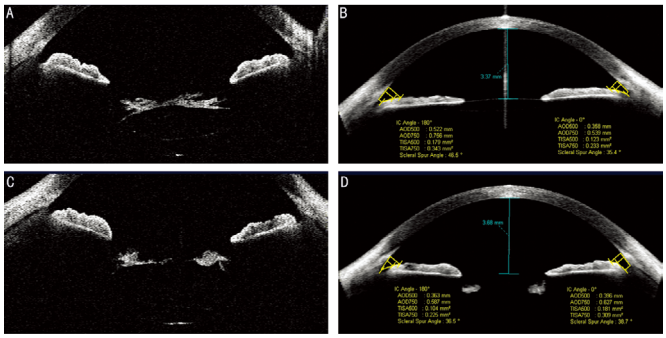

Figure 4 Anterior segment OCT photographs of the patient before and after surgery Right eye before (A) and after (B) surgery; Left eye before (C) and after (D) surgery. OCT: Optical coherence tomography.

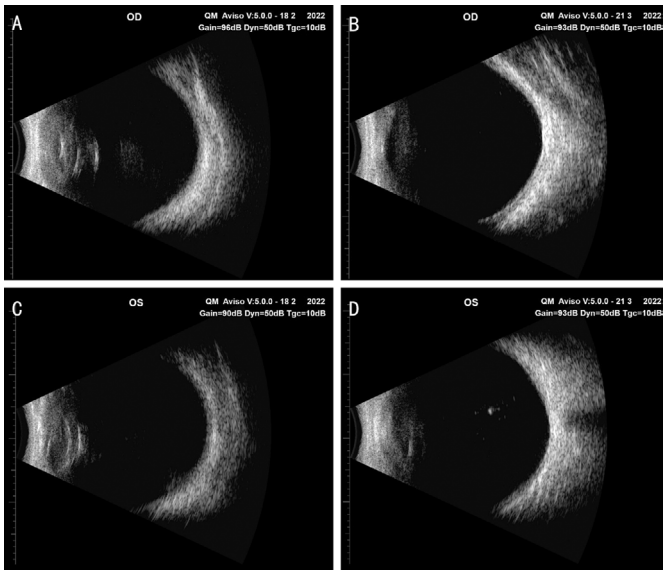

Figure 5 B-ultrasound image of the patient before and after surgery Right eye before (A) and after (B) surgery; Left eye before (C) and after (D) surgery.

equatorial part of IOL. Then we made a three-channel tunnel incision 3.5 mm behind the corneal edge at 2:00, 10:00, and

5:00, respectively. The original IOL was sutured and fixed to the posterior chamber with 9-0 non-absorbable sutures. The loops of the IOL were sutured 2 mm behind the limbus at 11:00 and 5:00, respectively. The mechanized degenerated capsule and anterior segment vitreous were excised with a 25-gauge vitrectomy system, and the corneal incision was closed with 10-0 sutures. The inflammatory reaction was mild after vitrectomy in both eyes. Levofloxacin eye drops and tobramycin dexamethasone eye drops were used to prevent infection, and tobicaramine eye drops were used to relieve congestion in both eyes. One month after the operation, the BCVA of the right eye was 0.2, the BCVA of the left eye was 0.15. The corneas of both eyes were transparent. The anterior chamber was clear, and the depth was normal. The pupils were round, about 3 mm, and a light reflex was present. The IOL position of both eyes was positive (Figure 2B and 2F), the optic disc was pallor, the retinal blood vessels were attenuated, the bone spicule-like pigment clumping, and the retina was no retinal hole and detachment (Figure 4B and 4D). Intraocular pressure: 13 mm Hg for right eye, 16 mm Hg for left eye. Auxiliary examination: the patient was reexamined by bilateral anterior segment OCT after surgery, and the results of bilateral anterior segment OCT were normal (Figure 3B and 3D). At the same time, bilateral B-ultrasound examination was performed, and the position of the IOL in both eyes was normal (Figure 5B and 5D).

CCS is a complication that occurs after phacoemulsification and is associated with surgical trauma, stimulation of IOL material, postoperative inflammation, damage to the blood-aqueous barrier and blood-retinal barrier and an inappropriate diameter and eccentricity of the continuous annular capsulorhexis[4]. These above factors lead to the proliferation and differentiation of lens epithelial cells (LECs) under the anterior capsular membrane into fibroblasts, and the LECs begin to accumulate under the capsular opening and surrounding capsular membrane, forming a thick fibrous annular membrane and causing the anterior capsular to contract centripetal. Subsequently, the anterior capsular opening area and the equatorial diameter decrease, resulting in visual disturbances, glare, refractive changes and IOL tilting and offsetting[5]. Therefore, LECs may be the main factor that induces CCS under the condition of correct continuous annular capsulorhexis.

RP is a risk factor for non-traumatic IOL dislocation. RP with cataracts is often accompanied by suspensory ligament laxity, and the capsule shrinks relatively quickly after cataract surgery in patients with RP. Therefore, RP patients are prone to CCS after cataract surgery, causing IOL displacement[6-7].

To avoid the occurrence of CCS after cataract phacoemulsification, attention should be paid to prevention. The specifications of the continuous circular capsulorhexis operation include the following. The intraoperative procedure should begin with the larger corneal limbus incision before the sac incision and the smaller corneal limbus incision, posterior capsule before polishing. Clear the LECs, and then, implant the IOL at the centre. Use 10-0 nylon sutures for suturing the corneal limbus incision to help maintain the stability of the anterior chamber[8-9]. For high-risk groups, an active anti-inflammatory will reduce inflammation after surgery. Select an appropriate IOL and use a tension ring if necessary to avoid the occurrence of CCS. In addition, for younger patients with RP combined with cataracts, posterior capsular opacity occurs more rapidly. Patients should be followed up closely after surgery to detect the occurrence and shrinkage of capsular fibrosis in time[10]. Nd:YAG laser and surgery are the main treatments for CCS. However, in some cases that are severe or not suitable for laser treatment, surgery is the only option. In this case report, we performed anterior vitrectomy combined with IOL suspension in the right eye and anterior vitrectomy combined with IOL positioning in the left, respectively, and the surgical results were good. The appropriate method should be selected according to the local characteristics of CCS, or the combination of the two surgical methods. At present, there is no case report of simultaneous CCS in both eyes and simultaneous use of anterior vitrectomy combined with IOL suspension and anterior vitrectomy combined with IOL positioning. In conclusion, if Nd: YAG laser operation cannot effectively solve the symptoms of CCS, “anterior vitrectomy united IOL suspension” or “anterior vitrectomy united IOL positioning” can be considered for the treatment of CCS. This case report can provide a reference for clinical treatment of patients with simultaneous CCS in both eyes.

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