Surgical treatment of severe anterior capsular organized hard core cataract: A case report

Wang LW et al. Surgical treatment of severe anterior capsular organized hard core cataract: A case report

Abstract

BACKGROUND
Complicated cataract surgery is challenging in cataract surgery, especially in cases of hard nuclear cataract with severe anterior capsule organization. It is important to avoid the risk of surgery and improve the surgical skills of surgeons.

CASE SUMMARY
A 60-year-old man presented with severe cataract and severe visual impairment. The anterior capsule of the lens was irregularly organized and pulled to the surrounding capsule, and white porcelain organized cord and brown-black lens nucleus were clearly visible. In phacoemulsification, maintaining the anterior capsule round and intact plays a key role in a successful surgery. In this case, if the conventional capsule treatment method was used, the anterior capsule would be torn. Therefore, we adopted a segmented anterior capsule treatment method, and used a blasting method to release energy when dealing with the lens nucleus, and achieved good surgical results.

CONCLUSION
Complicated cataract surgery is challenging and requires precise skills. Operation plans should be made reasonably to predict the risk of surgery, and improve the visual quality of the patients.

**Key Words**: Complex cataract; Surgery treatment; Hard core cataract; Clinical treatment; Anterior capsular organized; Case report


**Core Tip**: This article aims to guide clinicians on the issues they should pay attention to when dealing with complex cataracts, surgical techniques.

**INTRODUCTION**

Cataract is the world's first blinding eye disease, and surgical removal is the only treatment. To safely and effectively remove the turbid lens is the main purpose of the operation. With the development of cataract surgery technology, patients’ requirements for visual quality after cataract surgery are increasing, and cataract surgery is becoming easier in some complex cataract cases. We here report a case of grade IV cataract surgery for severe organization of the anterior capsule, which provides a reference for clinical treatment of this disease.

**CASE PRESENTATION**

*Chief complaints*

A male patient presented with painless loss of vision in the right eye for 3 years.

*History of present illness*

A male patient presented with painless loss of vision in the right eye for 3 years.
**History of past illness**
He had no previous history of chronic and ocular disease, and no history of ocular trauma.

**Personal and family history**
NA

**Physical examination**
Physical examination showed a VOD manual/10 cm, VOS 0.5, 0.6=+2.00DS/-2.50DC*100°, RVD=RLP(+), RVS=0.63, non-hyperemic conjunctiva in both eyes, with transparent cornea, normal anterior chamber depth round pupil, d=3 mm, photosensitive, and the anterior capsule of the lens in the right eye was obvious, 10 to 4 points formed a dense organic film, 6 points of the organic membrane bulge, the lower capsule was stretched in the direction of the cornea and was "hilly".

**Laboratory examinations**
The Pentacam anterior segment analysis system revealed that the lens was a dense mass with strong reflection, the front surface of the lens was uneven, locally "hilly", and the posterior surface echo was unclear (Figure 2).

**Imaging examinations**
The lens was densely white and cloudy, nuclear grade IV (Figure 1), and vitreous and fundus structures were invisible. Mild opacity of the lens was seen in the left eye, with C2N1P1, mild opacity of the vitreous, positive boundary of optic disc color, c/d=0.3, and the flat retina was orange.

**FINAL DIAGNOSIS**
The patient was diagnosed with bilateral senile cataract.
TREATMENT
The patient underwent surgery. We twisted the ultrasound mode with the Centurion phacoemulsifier, adjusted the parameters before surgery, increased the energy to 80%, negative pressure to 500 mmHg, flow rate to 35 mL/min, and prepared DisCoVisc to protect the corneal endothelium. After staining the anterior capsule, it was found that the anterior capsule was closely adhered to its lower tissue, forming a dense organic barrier, the tearing capsule operation was difficult, the tearing capsule started at 3 points, the intraocular shear cut the organic tissue in the direction of the extended tear, the position of the organic tissue was deep and was difficult to cut, a small amount of viscoelastic agent was injected under the organic cord to gently provoke it, and it was cut by homeopathic shearing, and it was found that the anterior capsule was torn to the periphery. The anterior chamber was injected with viscoelastic agent again, and the tearing capsule forceps continued to tear the capsule in the vertical direction of the tear. Surgery was repeated to maintain the integrity of the capsule, maintain the anterior capsule tear capsule mouth of approximately 5.2 mm, and the tearing capsule mouth was continuous, with no further tearing. The phacoemulsification needle was placed obliquely downward, the interception-splitting method was used to split the lens nucleus into several pieces, the blasting mode was turned on and the main control fluid flow mode was turned on, the diffuse viscoelastic DisCoVisc was injected into the anterior chamber many times, the fragmented nucleus was sucked out by emulsification in stages (Figure 3). The lens cortex was completely removed by I/A, the viscoelastic agent was injected, and the intraocular lens was implanted into the capsule bag (Figure 4). No severe tearing of the anterior capsule occurred during surgery, and posterior capsule rupture and intraocular tissue damage were not observed. One day after surgery, the VOD index/10 cm, obvious corneal edema was seen in the right eye, no intraocular lens shift was noted, and mild inflammation was seen in the anterior chamber.

OUTCOME AND FOLLOW-UP
One week after surgery, VOD was 0.8, right corneal edema was absorbed, intraocular lens position was good, and a clean surface was noted. No abnormalities were observed in the fundus and the patient was satisfied with the outcome.

**DISCUSSION**

Phacoemulsification cataract removal is a mature and advanced cataract surgery and the main treatment method for cataracts\(^1\). The surgical method involves inserting a phacoemulsification needle using a small incision in the cornea or sclera to crush the turbid lens into fragments, and then suck out the fragments with the help of a suction perfusion system, while maintaining anterior chamber filling, and finally implant an intraocular lens, which can be performed under epianesthesia, which has the advantages of a small incision, small surgical astigmatism, fast recovery, and few complications\(^2\). The surgical method of using ultrasound energy to emulsify the turbid lens nucleus and cortex, and then aspirate it while preserving the posterior capsule of the lens is an important means of treating hard nuclear cataracts\(^3\). However, overripe hard core cataract removal surgery is extremely difficult and risky, and is prone to intraoperative complications such as tearing the capsule, posterior capsule rupture and lens nucleus falling into the vitreous cavity, etc., and when accompanied by severe organization of the anterior capsule and unclear echo of the posterior capsular membrane, the surgical difficulty increases, and there are few available clinical studies on this technique. The continuous circumferential tearing of the anterior capsule centered on the anterior capsule is the key to the success of phacoemulsification of cataracts, and the pressure exerted by the continuous circumferential tearing capsule during water separation, phacoemulsification, irrigation and aspiration, and intraocular lens implantation is distributed along the smooth capsule margin, and radial tearing does not usually occur\(^4\). After anterior capsule staining, the shape and distribution of the organic cord can be found easily, and capsule shears can be used with manual tearing\(^5\). It is not easy to use capsular scissors to cut the mechanized cord, it is necessary to ensure that the capsule is in a certain size range to maintain a continuous premise to cut the mechanized cable. As
the position of the main incision is fixed, placing the intraocular scissors in the different points of the required direction is difficult, resulting in the inability to accurately cut each point of the mechanized cable, and it is possible after the start of the continuous annular tearing sac, close to the position of the organized cord, to inject a small amount of viscoelastic material under the cord to upturn or fill it to the required range of the intraocular shear, and cut it homeopathically to ensure the continuity of the anterior capsule. Secondly, phacoemulsification of the hard core cataract is quite critical, and an improper technique can lead to serious damage of the corneal endothelium or even decompensation. Dispersion viscoelastic agent is a low viscosity material with a low molecular weight and short molecular chain, which has good adhesion to intraocular structures and surgical instruments⁶⁰, and can be applied in fractional applications during surgery to fully protect the corneal endothelium, form a protective barrier in the anterior chamber, and reduce stimulation of the corneal endothelium by ultrasound energy and the nuclear mass. The interception-splitting method combined with blasting ultrasonic mode is used to send the small nucleus to the tip of the phacoemulsification needle to suck it out, and the blasting mode reduces the time of ultrasonic release, and there is no energy release at intervals to reduce tissue damage. In addition, as indicated in the literature, the air pocket energy around the needle is low in the blasting mode, which can quickly block the needle and increase the vacuum negative pressure to the maximum, which improves the efficiency of phacoemulsification and follow-up of the nuclear mass, and reduces the occurrence of postoperative corneal edema while improving efficiency⁷⁷.

**CONCLUSION**
In summary, severe anterior capsular organized hard core cataract is a rare disorder, the surgical treatment is complicated, and the incidence of capsular tear is high. Attention should be paid to surgical skills, protecting the capsule and corneal endothelium, improving the quality of surgery, and reducing patient pain.