

Chronic scleritis: a potential cause of intraoperative zonular dehiscence

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Dear Editor,

I am Professor Ke Yao from the Eye Center of the Second Affiliated Hospital of School of Medicine at Zhejiang University in China. I write to describe a case of chronic scleritis-induced zonular dehiscence during femtosecond laser-assisted cataract surgery (FLACS) and to highlight that chronic scleritis might be a potential risk factor for zonular defects. I would also like to emphasize some important signs of intraoperative zonular instability.

The integrity and stability of the lens zonule is crucial for a smooth cataract surgery procedure. Zonular dehiscence may affect operative procedures and lead to some severe complications. Causes of zonular weakness or dehiscence could be congenital (*e.g.*, Marfan's syndrome, familial or idiopathic ectopia lentis, homocystinuria, *etc.*), traumatic, surgical (*e.g.*, extra procedures due to dense cataract, miotic pupils, *etc.*), or secondary (*e.g.*, pseudoexfoliation, uveitis, glaucoma, high myopia, *etc.*)^[1-2]. Here, we report a case of chronic scleritis-induced zonular dehiscence during FLACS.

All procedures adhered to the tenets of Declaration of Helsinki. Written informed consent was obtained from the patients. A 64-year-old woman came to our clinic and complained of blurred vision in both eyes for 1y. She has been previously diagnosed with binocular anterior scleritis 2 years ago and had repeated episodes. The inflammation was stabilized after systemic and topical steroids therapy. Her corrected distance visual acuity (CDVA) was 20/50 for the right eye and 20/100 for the left eye. Slit lamp examination revealed posterior

subcapsular opacity of the lens with slight vascular congestion, clear corneas, and quiet anterior chambers in both eyes (Figure 1A-1D). Localized choroid pigments were visible through the scleral, suggesting regional scleral thinning and anterior scleral staphyloma. We planned to perform FLACS on her left eye. Preoperative B-scan ultrasound (Figure 1E) and optical coherence tomography (OCT; Cirrus HD, Carl Zeiss Meditec AG; Figure 1F) showed no significant abnormality. Anterior chamber flare value, measured by a laser flare meter (KOWA FM 600, Kowa), was 3.1 ± 1.6 photon counts per millisecond (pc/ms).

We used the LenSx femtosecond laser system to create a 5.0-mm capsulotomy and to obtain nuclear pre-fragmentation. The laser treatment process went uneventfully. Then, phacoemulsification was performed using a standard stop-and-chop technique with the Stellaris system (Bausch & Lomb, Rochester). After irrigation/aspiration (I/A) of the cortex, the surgeon noticed what appeared to be cortical residue in the upper temporal position, but it was actually the capsular wrinkle (Figure 2A). As the surgeon inserted the I/A needle into the anterior chamber for complete aspiration, the loose capsule bag at the 2 o'clock position was suddenly drawn into the needle. The surgeon immediately manipulated the foot pedal for reflux and then injected viscoelastic agent into the capsule bag through the side incision to attempt to restore the morphology of the capsule. Afterwards, zonular dehiscence at the 12 to 4 o'clock position (Figure 2B) was noticed. As a result, a capsular tension ring (CTR) was implanted after the capsule bag was filled with viscoelastic agent, and a three-piece foldable intraocular lens (IOL; Sensar OptiEdge AR40e, AMO Inc.) with a power of +21.0 D was implanted in the sulcus. After the viscoelastic material was removed with I/A, the corneal incision was sutured and hydrated. At the end of the surgery, the pupil of the operated eye was round, and there was no vitreous in the anterior chamber (Figure 2C). We reviewed the surgery video after surgery and noticed obvious posterior capsule folds in the upper temporal position (Figure 2D) after phacoemulsification of the nucleus, suggesting pre-existing zonular weakness or dehiscence. The postoperative period was uneventful with application of oral methylprednisolone (12 mg) once a day for a week, topical steroids (1% prednisolone acetate)

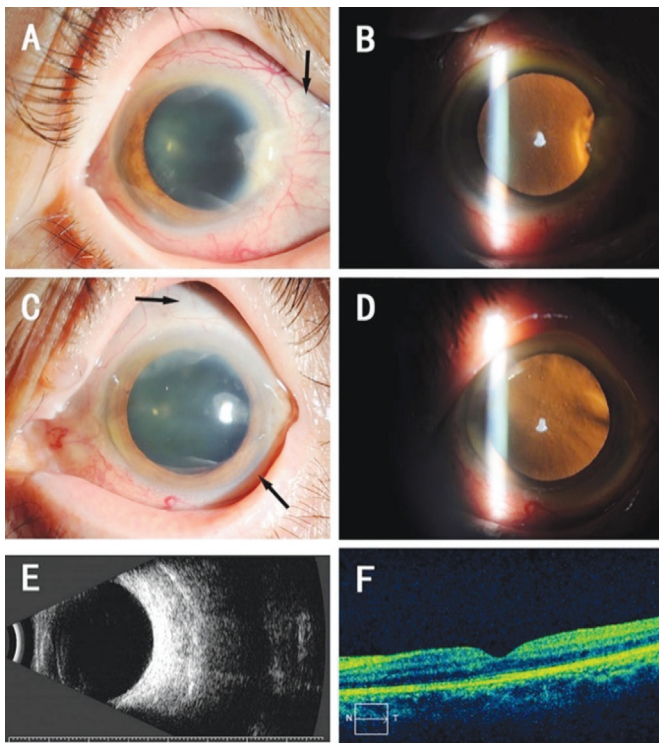


Figure 1 Preoperative examination results Slit lamp examination of the right eye (A and B) and the left eye (C and D) showed posterior subcapsular opacity of the lens with slight vascular congestion, clear corneas, and quiet anterior chambers in both eyes. Black arrows indicate local scleral thinning and anterior scleral staphyloma (A and C). Preoperative B-scan ultrasound (E) and OCT examination (F) of the left eye demonstrated no significant abnormalities.

four times daily for two weeks. One week postoperatively, the operation eye showed CDVA of 20/20 and an IOP of 12.0 mm Hg. Slit lamp examination demonstrated mild hyperemia of the sclera, a quiet anterior chamber, and a well-centered IOL (Figure 2E). We identified a wide range of sclera thinning at the superior, temporal, and nasal quadrants (Figure 2F).

Scleritis is a rare ocular inflammation characterized by cellular infiltration, destruction of collagen, and vascular remodeling in the sclera^[3]. Eyes with scleritis may develop some complications, such as anterior uveitis, intraocular hypertension, keratitis, cataract, macular edema, and so on^[3-5]. Cataract surgery is usually safe in these patients, provided that active inflammation is absent and has been in remission for at least 3mo^[4]. In this case, despite a history of anterior scleritis, the condition had been stabilized after medication, and preoperative examination suggested no surgical contraindications. Since there was no history or signs of ocular trauma nor reported systemic or ocular disease related to abnormal zonules, we were unaware of any potential risks pre-surgery.

We propose that zonular defects in this patient is associated with chronic scleritis. Since both scleritis and uveitis are immune inflammations and they may even co-exist in some

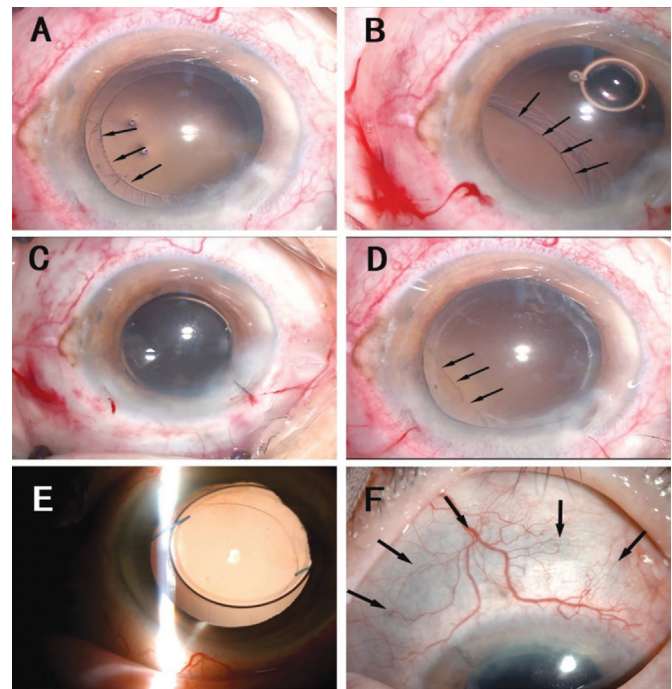


Figure 2 Surgical video screenshots and postoperative examination results Capsule wrinkles (A, black arrow) were mistakenly recognized for residual cortex during surgery. Zonular dehiscence from the 12 to 4 o'clock position (B, black arrow) was finally noticed and treated. At the end of the surgery, the pupil was round, and the IOL was well-centered (C). Retrospective study of the surgery video revealed the presence of capsule folds (D, black arrow) after phacoemulsification. Slit lamp examination of the left eye at 1wk (E) postoperatively. A wide range of scleral thinning (F, black arrow) was identified.

patients, similar zonular pathologies, such as the development of zonulolysis in uveitis^[6], might also be seen in scleritis cases. Scleral thinning and staphyloma caused by collagen destruction usually suggest a long-term destruction brought by intraocular inflammation that might indicate zonular damage. In addition, the anterior staphyloma may exert mechanical traction on the zonules, thereby affecting zonular stability. Thus, for cataract patients with a history of scleritis, careful preoperative examination is needed to evaluate scleritis condition and the involvement of the zonule, the ciliary body, and the choroid. Preoperative ultrasound biomicroscopy (UBM) is recommended as a valuable investigation to rule out any zonular dehiscence in such patients. Nevertheless, even if related clinical signs are not observed preoperatively, the surgeon should always be aware of the possibility of zonular abnormalities among such patients and proceed with caution during intraocular manipulations.

The incidence of zonular dehiscence during cataract surgery ranges from 0.46% to 0.86%^[7]. Timely recognition of zonular instability and appropriate modification in technique are essential for optimal surgical outcomes. McAlister and

Ahmed^[8] introduced anterior capsular snap as a sign of intraoperative anterior zonules dehiscence. In this patient, obvious posterior capsule folds appeared at the upper temporal position after phacoemulsification (Figure 2D). When the entire cortex was aspirated, the wrinkled capsule of the previously mentioned position (Figure 2A) was mistaken for cortical residual by the surgeon. Theoretically, when the anterior chamber collapses by the time the surgeons withdraw the needle at the end of phacoemulsification or I/A procedure, the lens capsule moved to the cornea should be flat if the zonular tension in each direction is normal. Therefore, we believe that localized capsule wrinkles or folds at any of these stages should be identified as important signs of zonular weakness or dehiscence.

Once zonular dehiscence is noticed, several methods can be used to minimize IOP fluctuation and maintain zonular stability, including using a high-viscosity ophthalmic viscosurgical device (OVD), lowering the bottle height and slowing down the aspiration rate. For localized zonular dehiscence, IOL implantation in the capsular bag with a stabilizing CTR may be possible. In this case, viscoelastic agent was immediately injected through the side incision into the capsular bag to reduce anterior chamber fluctuations that might cause further zonular damage. Considering that the zonular dehiscence range was close to 4 o'clock hours, we placed the IOL in the ciliary sulcus after implanting the CTR for better stability.

We concluded that chronic scleritis may be a risk factor for zonular defects. For cataract patients with a history of scleritis, detailed preoperative ocular examination is needed to identify

clinical signs for better evaluation of surgical risks. We also suggest that surgeons be vigilant in monitoring intraoperative capsular folds or wrinkles to detect zonular dehiscence as early as possible.

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REFERENCES

- 1 Por YM, Lavin MJ. Techniques of intraocular lens suspension in the absence of capsular/zonular support. *Surv Ophthalmol* 2005;50(5):429-462.
- 2 Holt DG, Young J, Stagg B, Ambati BK. Anterior chamber intraocular lens, sutured posterior chamber intraocular lens, or glued intraocular lens: where do we stand? *Curr Opin Ophthalmol* 2012;23(1):62-67.
- 3 Yang P, Ye Z, Tang J, Du L, Zhou Q, Qi J, Liang L, Wu L, Wang C, Xu M, Tian Y, Kijlstra A. Clinical features and complications of scleritis in Chinese patients. *Ocul Immunol Inflamm* 2018;26(3):387-396.
- 4 Okhravi N, Odufuwa B, McCluskey P, Lightman S. Scleritis. *Surv Ophthalmol* 2005;50(4):351-363.
- 5 Wieringa WG, Wieringa JE, ten Dam-van Loon NH, Los LI. Visual outcome, treatment results, and prognostic factors in patients with scleritis. *Ophthalmology* 2013;120(2):379-386.
- 6 Agrawal R, Murthy S, Ganesh SK, Phaik CS, Sangwan V, Biswas J. Cataract surgery in uveitis. *Int J Inflamm* 2012;2012:548453.
- 7 Dryjski O, Awidi A, Daoud YJ. Femtosecond laser-assisted cataract surgery in patients with zonular weakness. *Am J Ophthalmol Case Rep* 2019;15:100483.
- 8 McAlister CN, Ahmed IIK. Anterior capsular snap: new sign of zonular dehiscence and instability. *J Cataract Refract Surg* 2014;40(10):1740-1742.