Delayed intracapsular hematoma after use of iris retractor hooks

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Introduction: To the author’s knowledge, this is the first reported case of a delayed intracapsular hematoma after complex femtosecond laser–assisted cataract surgery (FLACS) and the use of iris retractor hooks for intraoperative floppy-iris syndrome. It is important that cataract surgeons be aware of this association.

Patient and Clinical Findings: An 83-year-old man underwent FLACS with astigmatic keratotomy and intraocular lens implantation. Iris retractor hooks were used to counter intraoperative miosis. Hyphema, corneal edema, and subconjunctival hemorrhage were observed on postoperative day (POD) 1. The patient returned on POD 3 with further decrease in vision due to Descemet folds, advanced corneal edema, layered hyphema, and a dense intracapsular hematoma.

Diagnosis, Intervention, and Outcomes: Minimal improvement of the hematoma occurred through 4 weeks, at which time the hematoma was drained with Nd:YAG laser posterior capsulotomy. The hematoma reabsorbed within 1 month with full recovery of vision.

Conclusions: The iris retractor hooks in the setting of complex FLACS likely caused postoperative bleeding with accumulation of blood within the capsule. Nd:YAG laser posterior capsulotomy is an effective treatment option for nonclearing intracapsular hematoma.

Intraocular hemorrhages may result from trauma or systemic diseases or may occur spontaneously. Patients undergoing cataract surgery are at risk for postoperative bleeding, which may include endocapsular hemorrhage, suprachoroidal hemorrhage, and intracameral hemorrhage. Six cases of endocapsular hemorrhage after extracapsular cataract extraction and posterior chamber intraocular lens (PC IOL) insertion have been reported, while the incidence rates of suprachoroidal hemorrhage after extracapsular cataract extraction and phacoemulsification were reported to be 0.13% and 0.03%, respectively.

Intraoperative floppy-iris syndrome (IFIS) during phacoemulsification produces several surgical challenges that include an undulating, flaccid iris stroma, iris prolapse, and progressive miosis. Inadequately controlled IFIS may result in iris prolapse and intracameral hemorrhage during phacoemulsification, in addition to long-term complications such as macular edema, macular detachment, pupil deformity, and secondary loss of vision.

Adequate pupil dilation is imperative for successful phacoemulsification surgery, and eyes with excessive miosis can usually be managed by pupil expansion devices or iris retractor hooks. Compared with iris retraction hooks, pupil expansion devices do not require additional limbal incisions, are typically easier to insert and remove, and require less operating time. Iris retractor hooks, on contrary, are more cost-effective and possess a better safety profile in eyes with shallow anterior chambers.

The postoperative adverse effects of iris retractor hooks are not well-documented, and we could find no cases in the literature of intraocular hemorrhages after their use. In this report, we describe the first case of a postoperative intracapsular hematoma after the use of iris retractor hooks during a complex femtosecond laser–assisted cataract surgery (FLACS).

Patient Consent Statement
The patient gave written consent for publication of his images and case data.

CASE REPORT
An 83-year-old man was examined in the ophthalmology department for decreased vision due to cataracts. His medical history included positive test results for hyperlipidemia, hyperglycemia, asymptomatic coronary artery disease, prostate cancer, allergic rhinitis, and osteopenia. He had never taken anticoagulants, antiplatelet agents, or alpha-1 blockers and was not on any other medications known to induce ocular bleeding. He had undergone a bilateral upper lid blepharoplasty with ptosis repair.
Slitlamp and fundus examinations revealed dry eyes, visually significant nuclear sclerotic cataracts, and macular drusen. The patient’s left crystalline lens was 5.65 mm thick, and the anterior chamber depth measured 2.27 mm. The patient underwent FLACS with astigmatic keratotomy and implantation of a PC IOL. Several attempts were required to dock the femtosecond laser to the patient’s deep-set eye, which likely contributed to IFIS-related miosis. Phenylephrine 1% and ketorolac 0.3% (OMIDRIA, Omeros Corp.) was added to the irrigating solution to control IFIS and maintain mydriasis, but iris retractor hooks were eventually needed to manage the small pupil. No intraocular bleeding occurred during the surgery (Figure 1, A). A suture was placed in the temporal incision to prevent prolapse of the floppy iris, and the eye was shielded at the completion of surgery. The pupil remained reactive to light and accommodation postoperatively.

The visual acuity on postoperative day (POD) 1 was hand motions, and the slitlamp examination showed a hyphema, corneal edema, and subconjunctival hemorrhage. The protective shield had been removed in the office, and the patient was instructed to wear it while sleeping in a supine position during the following 2 weeks. On POD 2, the patient called complaining of discomfort and progressively declining vision in the operative eye to bare hand motions acuity. The patient had been compliant in following all postoperative procedures and reported no postoperative trauma or strenuous activity. The examination on POD 3 revealed hand motion vision (with subjective worsening throughout the day), unchanged subconjunctival hemorrhage, significant corneal edema, a layered hyphema, and an intracapsular hematoma (Figure 1, B). The intraocular pressure (IOP) measured 15 mm Hg. A B-scan ultrasound showed no abnormalities in the posterior segment. The IOP fluctuated between 9 mm Hg and 22 mm Hg during the next 2 weeks, the intracapsular hematoma remained stable, and the vision was unchanged (Figure 1, C). An optical coherence tomography scan showed an intracapsular hematoma between the posterior surface of the IOL and the posterior capsule (Figure 2).

Nd:YAG laser posterior capsulotomy was performed on POD 37. The intracapsular hematoma resolved 1 week later, Descemet folds and corneal edema had improved, and corrected distance visual acuity measured 20/25 (Figure 3, A). One month later, hyphema, corneal edema, and Descemet folds had resolved completely, the IOP measured 13 mm Hg, and the corrected distance visual acuity remained 20/25 (Figure 3, B).

**DISCUSSION**

We reported a delayed intracapsular hematoma after the use of iris retractor hooks in a patient undergoing complex FLACS. We believed that bleeding was caused by stretching of the iris by the retractor hooks in an eye with IFIS. We posited that blood from the iris leaked into the capsular bag, where it became sequestered behind the IOL and was shielded from the aqueous humor fluidics in the anterior chamber. Supine positioning of the patient during the early postoperative period and during sleep may have preferentially directed the blood through gravity into the capsular bag.

Docking of the femtosecond laser interface required several attempts because of the patient’s deep-set eye. This probably did not cause the intracapsular hematoma because repeated suction on the ocular surface more likely leads to suprachoroidal and subconjunctival hemorrhages rather than hyphemas, but we believe that the docking difficulties caused the subconjunctival hemorrhage and contributed to miosis, which led to the need for iris retractor hooks.9–11 The risk for postoperative complications was further increased by the dense nuclear sclerotic cataract and the shallow anterior chamber.

Previously reported intracapsular hematomas have been successfully treated by Nd:YAG laser posterior capsulotomy, vitrectomy, and anterior chamber washouts.12–14

One study documented 2 cases of intracapsular hematomas after combined phacoemulsification and gonioscopy-assisted...
transluminal trabeculotomy, one of which was treated with Nd:YAG laser posterior capsulotomy and the other with anterior vitrectomy.\(^\text{12}\) Nd:YAG laser posterior capsulotomy was able to resolve an intracapsular hematoma in a patient with advanced pseudoexfoliative glaucoma.\(^\text{13}\) After considering the surgical options, we chose to drain the hematoma with Nd:YAG laser posterior capsulotomy, the least invasive technique.

Use of the femtosecond laser and iris hooks in the setting of IFIS in addition to the supine positioning of the patient probably contributed to the development of the postoperative hemorrhage and intracapsular hematoma. We were unable to find previously reported cases of intracapsular hematomas associated with the use of iris retractor hooks or after complex FLACS, but cataract surgeons should be aware of this association. To prevent pupillary miosis associated with FLACS, the routine preoperative administration of nonsteroidal anti-inflammatory drugs and intraoperative use of phenylephrine 1% and ketorolac 0.3% added to the irrigating solution could be considered.

**WHAT WAS KNOWN**
- Patients with preexisting conditions, such as small pupils, diabetes, pseudoexfoliation syndrome, use of medication (such as alpha-1 blockers) known to cause IFIS, and deep-set eyes, should be informed of their risks prior to FLACS.
- Small preoperative pupils and IFIS increase the risk for progressive intraoperative miosis, which may require the use of pupil expansion devices or iris retractor hooks. This can be associated with bleeding.

**WHAT THIS PAPER ADDS**
- Postoperative intracapsular hematoma can occur after the use of iris retractor hooks in the setting of complex FLACS.
- Nd:YAG laser posterior capsulotomy is an effective way to drain slowly resolving postoperative intracapsular hematomas.

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**Disclosures:** None reported.

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