Iris epithelium detachment – An uncommon complication of Nd:YAG laser capsulotomy

Thomas Stax Jakobsen *,1, Musa Yasin Kaya 1, Jesper Østergaard Hjortdal, Anders Ramlov Ivarsen

Department of Ophthalmology, Aarhus University Hospital, DK-8200, Aarhus N, Denmark

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ABSTRACT

Purpose: To report a case of iris epithelium detachment following Nd:YAG laser capsulotomy.

Observations: We describe the case of an 81 year old woman who developed hyphema and detachment of the iris epithelium following standard Nd:YAG laser capsulotomy. The detachment was readily visualized using anterior segment OCT. The hyphema was managed with topical atropine and steroids. The detachment itself was left untreated.

Conclusions and importance: No persisting subjective complaints or effect on visual function were noted. To our knowledge, this complication represents a novel observation.

1. Introduction

Posterior capsule opacification (PCO) is a common delayed complication of cataract surgery with opacification of the posterior capsule due to migration and proliferation of lens epithelial cells. Incidences ranging up to about 50% have been described and depend on patient-related factors as well as surgical technique and intraocular lens (IOL) design.1 Neodymium:Yttrium–Aluminum–Garnet (Nd:YAG) laser capsulotomy as treatment for PCO was introduced by Daniele Aron-Rosa in 1979.2 In general, the procedure is safe and effective, but a number of complications involving the posterior and anterior segment have been observed.3–5 IOL damage, transient inflammation, or elevation of intraocular pressure (IOP) are relatively common. Severe complications are rare and include cystoid macular edema, IOL luxation, and aqueous misdirection or pupillary block with subsequent glaucomatous damage to the optic nerve head.5

We report a further rare complication of Nd:YAG laser capsulotomy with detachment of the iris epithelium and associated hyphema.

2. Case report

An 81 year old woman with a medical history of arterial hypertension, atrial fibrillation, hypercholesterolemia, and gout managed appropriately including anticoagulant therapy with warfarin was referred for Neodymium:Yttrium–Aluminum–Garnet (Nd:YAG) laser capsulotomy in the right eye. Bilateral cataract surgery with implantation of TECNIS one-piece IOLs (ZCB00) had been performed five years earlier. Surgery had been uncomplicated without iris manipulation and the postoperative course was unremarkable with only mild and transient inflammation. Subsequent Nd:YAG laser capsulotomy in the left eye two years earlier had been uncomplicated. Laser retinopexy for a retinal tear had been performed in the right eye twelve years before cataract surgery. Visual acuity for the right eye was 12/20 before treatment and slit-lamp examination was unremarkable except moderate posterior capsule opacification. The procedure was performed by one of our consultants with the use of 21 applications totaling 35.7 mJ in a cruciate pattern and no immediate complications were observed.

The days following capsulotomy she experienced an increasing number of floaters and developed ocular discomfort, which led to evaluation in our emergency clinic. She presented with hand movements for the right eye. IOP was elevated to 25 mmHg and increased following dilatation to 42 mmHg. Slit-lamp examination revealed a moderate hyphema that partly obscured deeper ocular structures. Ultrasound B-scan demonstrated retinal apposition. Blood pressure was normal 101/67 mmHg. INR was moderately elevated to 3.8, which lead to temporary cessation of anti-coagulant therapy. The hyphema was managed with topical steroids and atropine. The increase in IOP was managed with the topical anti-hypertensives apraclonidine, brinzolamide, and timolol.

* Corresponding author. Department of Ophthalmology, Aarhus University Hospital, Palle Juul-Jensens Blvd. 99, DK-8200, Aarhus N, Denmark.
E-mail addresses: thomasstaxjakobsen@gmail.com (T.S. Jakobsen), musa_kaya@msn.com (M.Y. Kaya).
1 These authors contributed equally to this work (dual first authorship).

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The hyphema had almost resolved at follow-up four days later. The IOL was found in situ, but conspicuous transillumination defects of the iris were noticed (Fig. 1A). Surprisingly, following dilatation the iris epithelium with an attached blood clot was observed in the pupillary space (Fig. 1B). Fundoscopy was unremarkable. Anterior segment optical coherence tomography (AS-OCT) readily revealed the detached posterior epithelium involving the central part of its temporal half (Fig. 2). Ultrasound biomicroscopy did not show additional anterior segment pathology.

Following the dissolution of the blood clot the detached epithelium curled up at the pupillary border, and the patient did not report any subjective complaints. At final follow-up, her best corrected visual acuity was 25/20 in the right eye and untreated IOP was normal.

3. Discussion

We report a case of hyphema and detachment of the posterior iris epithelium following standard Neodymium:Yttrium-Aluminum-Garnet (Nd:YAG) laser capsulotomy. The detachment is a specific injury to the iris in which the epithelium that covers the posterior surface of the iris is separated from the rest of the iris. Hyphema has been described as a rare complication of capsulotomy occurring at site of irido-capsular adhesions and without direct iris trauma, but we have not been able to identify other reports of iris epithelium detachments following capsulotomy. A single case report has described total detachment of the iris epithelium following combined pars plana vitrectomy and cataract extraction with pupillary membrane formation and severe posterior synechiae. It was suggested that the combination of posterior synechiae and traction of the pupillary dilator muscle on the iris stroma induced by mydriatic drops led to the separation of the iris stroma from the posterior pigment epithelium.

The exact mechanism of the detachment in the current case is uncertain. No adverse events were observed during the procedure and no pre-existing iris pathology was evident or suggested by past ocular history. No membrane formation or posterior synechiae were observed during follow up. However, pre-existing irido-capsular adhesions cannot be excluded and may have played a role in the partial detachment and bleeding along with elevated INR (3,8).

The iris is lined posteriorly by the double-layered iris epithelium continuous with the ciliary body epithelium. The posterior layer is heavily pigmented, while the myoepithelial anterior layer contains the dilator muscle. The hyperreflective properties of the pigmented epithelium allows it to be easily visualized with anterior segment imaging using ultrasound biomicroscopy and AS-OCT as illustrated (Fig. 2).

In summary, we present the partial detachment of the iris epithelium following standard Nd:YAG laser capsulotomy and its visualization with AS-OCT. The patient had no persisting complaints at the final follow-up and the condition was of no lasting consequence for her visual function. To our knowledge, this complication represents a novel observation.
Patient consent

The patient consented to publication of the case orally. This report does not contain any personal information that could lead to the identification of the patient.

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Authorship

All authors attest that they meet the current ICMJE criteria for Authorship.

Declaration of competing interest

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