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Corneal descemetocele following Nd:YAG laser capsulotomy in a patient with Steven Johnson syndrome: A case report

Eleonora Corbelli [a,b,*], Federico Fantaguzzi [a,b], Lorenzo Iuliano [a,b], Karl Anders Knutsson [a,b], Francesco Bandello [a,b]

[a] School of Medicine, Vita-Salute San Raffaele University, Milan, Italy
[b] Division of Head and Neck, Ophthalmology Unit, IRCCS San Raffaele Scientific Institute, Milan, Italy

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ABSTRACT

Purpose: To report a challenging case of corneal descemetocele following Nd:YAG laser capsulotomy for posterior capsule opacification in a patient with Steven Johnson syndrome (SJS).
Observations: A single-eye 52 year-old man, with a history of Steven Johnson syndrome, presented with severe eye pain and profound vision reduction in his left eye two days after undergoing Nd:YAG laser capsulotomy using the standard Abraham contact lens. A corneal descemetocele was identified and subsequently confirmed by anterior segment optical coherence tomography. He was promptly treated with the application of a therapeutic contact lens and sustained antibiotic regimen (preservative-free fluoroquinolone drops every 4 hours for 6 weeks) until healing of the corneal epithelium. Throughout the following eight weeks AS-OCT showed favorable anatomical and functional outcomes, achieving a substantial spontaneous healing.
Conclusions and Importance: Corneal descemetocele may occur after Nd:YAG laser capsulotomy in patients with Steven Johnson syndrome. This case strengthens the critical importance of a careful preoperative assessment and meticulous postoperative management in high-risk patients, such as those with Steven Johnson syndrome, even after seemingly routine and safe ophthalmic procedures.

Steven Johnson syndrome (SJS) is a rare but severe mucocutaneous disorder characterized by a spectrum of manifestations that can affect various organs, including the eyes.[1] It is typically triggered by specific medications and its hallmark includes an extensive damage to the epidermis. Ocular complications can range from mild irritation and conjunctivitis to severe and sight-threatening conditions such as corneal ulcers, descemetocele and perforation. These conditions may manifest either concurrently or following the initiation of epidermis involvement.[2]

Neodymium YAG (Nd:YAG) laser capsulotomy is a common ophthalmic procedure to address posterior capsule opacification after cataract surgery. While generally considered safe, this technique might be occasionally complicated by increased intraocular pressure, accidental corneal or iris laser burn, intraocular lens dislocation or damage, vitreous floaters, macular edema, and retinal detachment.

Here, we present a challenging case of corneal melting and descemetocele following Nd:YAG laser capsulotomy in a patient with SJS.

A 52-year-old gentleman, with a known history of SJS, presented to our emergency department complaining of severe pain and profound vision reduction in his left eye.

The onset of SJS occurred when he was 21 years old, and ocular involvement begun at the age of 42. The patient was single-eye, owing to a complex ocular history including multiple perforating keratoplasty surgeries in his right eye for recurrent corneal infection. The left eye was not subject to any surgery except for uneventful phacoemulsification with intraocular lens implantation in 2016. He was taking only topical lubricants in both eyes, consisting of 0.2 % hyaluronic acid drops 4 to 6 times a day and dexpanthenol ointment at nighttime. He had been attending routine visits in the cornea center of our institution, about twice a year. The cornea of his left eyes has been reported always stable,

* Corresponding author. Department of Ophthalmology, Vita-Salute University, San Raffaele Scientific Institute, Via Olgettina, 6020132, Milan, Italy.
E-mail address: corbelli.eleonora hsr.it (E. Corbelli).

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with a central thinning and a few inferior peripheral subepithelial corneal opacities with irregular but intact epithelium.

He underwent, two days before presentation, Nd:YAG laser capsulotomy in his left eye for a visual impairing posterior capsular opacification. The capsulotomy was performed in our hospital by an experienced ophthalmologist using the eiss Visulas YAG II 532s device (Carl eiss Meditec AG version 2.00) and a standard capsulotomy contact lens (Abraham capsulotomy YAG laser lens) after application of topical anesthesia (oxibuprocaine 4 mg ml).

The procedure was successfully completed with 14 single-spots set to an energy of 0. mJ each. Higher energies were not required regardless the corneal opacities, as the capsular opacification was not remarkably thickened. The patient was discharged immediately thereafter, with a prescription of a topical non-steroidal anti-inflammatory (NSAID) agent (diclofenac 0.1 % bid for days).

At presentation (two days after capsulotomy), best-corrected visual acuity (BCVA) was no light perception in his right eye, whereas in the left eye, vision dropped from 20 0 (before capsulotomy) to counting fingers. In his right eye a complete corneal and conjunctival keratinization, as well as symblepharon and entropion of the upper eyelid were evident. The left eye revealed reduced fornixes, a central round shaped corneal opacity (4 mm in diameter) with significant thinning, and a 1 mm area of translucency (Fig. 1A). This translucency corresponded to a descemetocele, as confirmed by anterior segment optical coherence tomography (AS-OCT) (Fig. 1B). Anterior chamber was present and deep, while the eye was hypotonic.

Diclofenac drops were promptly discontinued. A therapeutic contact lens was immediately applied (Bausch & Lomb, Rochester, NY, USA base curve .6 mm, diameter 14.2 mm, diopter 0.00 D) and preservative-free fluoroquinolone 5 mg ml eye drops every 4 hours were prescribed. Follow-up appointments were initially scheduled every two days and then at decreasing intervals to evaluate the corneal integrity and monitor the healing progress. The same fluroquinolone dosage was maintained for six weeks, as soon as the epithelium was found healed and stable. The antibiotic regimen was hence discontinued, and surface steroid drops (dexamethasone 0.1 % once a day) were introduced.

Throughout the following eight weeks, the cornea showed a gradual reconstitution, with progressive thickening (Fig. 1C and D) until a compact structure was achieved, as confirmed by AS-OCT (Fig. 1E and F). Two months later, the central cornea increased transparency and BCVA improved to 20 100.

Nd:YAG laser capsulotomy is a remarkably common and safe procedure. However, as with any medical intervention, it is not completely free of potential complications. Out of these, corneal perforation is exceptionally uncommon and, to our current knowledge, only two documented case reports have been reported.[3,4]

Turkcu et al. described a corneal perforation during Nd:YAG laser capsulotomy.[3] In this case, the procedure was conducted by a resident physician, and the anterior chamber began to collapse during the practice, suggesting that the perforation may have been caused by an operator's focusing error. In our case the procedure was conducted by an experienced ophthalmologist and the perforation did not occur immediately. For this reason, we are inclined to exclude the possibility of a focusing error by the operator.

Khreish et al. reported a case of corneal perforation in a patient with systemic scleroderma two weeks after laser capsulotomy.[4] This case shares some similarities with ours. First, there is an underlying predisposing condition in both cases. Systemic scleroderma is an autoimmune connective tissue d

relationship between the dose and type of NSAIDs, the duration of treatment, and the induction of corneal melting remains unclear. This condition can manifest as early as within three days of initiating therapy or as late as several months afterward. In our case, the perforation occurred alarmingly soon after only four drops over two days, emphasizing the need for careful consideration regarding the actual pathogenetic role.

In our report, the use of topical anesthesia and the capsulotomy contact lens introduce additional variables. The proximity of the lens to the cornea may have indeed influenced its integrity during the early post-operative period. It must be also considered that the corneal scarring can jeopardize the adequate laser focus, so that even an experienced operator may be inadvertently hitting the cornea with the laser beam. Additional risk factors that should be reported are a thickened posterior capsule opacity (requiring higher-than-usual laser power) or a shallow anterior chamber. We disclose that none of the latter were present in our case, as the anterior chamber was found normal, and the posterior capsule opacity was not remarkably thickened. Additionally, corneal opacities were all peripherally distributed.

In hindsight, we believe a few precautionary measures may have reduced the chance of developing this complication. First, we could avoid using the Abraham capsulotomy lens. Despite reducing the energy required for capsulotomy and enhancing stability, particularly in uncooperative patients, it might have spared the use of anesthetic drops and direct corneal contact. Owing to severe photophobia, our case unavoidably required its use. Second, to minimize the risk of corneal melting, we could have avoided NSAIDs. It cannot be however ruled out that using corticosteroids (instead of NSAIDs) or a complete absence of therapy might have prevented this complication. Lastly, conducting an AS-OCT immediately before the procedure might have identified critical areas of reduced corneal thickness. Our patient underwent an AS-OCT examination days prior to the procedure, revealing a minimum corneal thickness of 2 µm. Consequently, the risk of perforation was believed low.

With special regard to the use of therapeutic contact lenses, we consider whether the corneal healing process of such severe and complicated cases might be enhanced using Hyper-Contact Lenses, that are novel drug-repository contact lenses with a special shape acting as a buffer from the eyelid and allowing for better healing.[21,22]

In conclusion, our case presents a unique situation, as it is the first documented case of a patient with SJS experiencing corneal descemetocele and perforation two days after Nd:YAG laser capsulotomy. The etiopathogenesis in our patient is thought to be multifactorial. Determining which, among the capsulotomy technique itself, the use of a contact lens, SJS, or post-operative therapy played the predominant role is challenging. However, this case serves as a valuable reminder of the potential ocular complications that can arise in patients with corneal vulnerability, like those with SJS, even after seemingly routine and safe ophthalmic procedures.

This case serves as a valuable reminder of the potential corneal melting and descemetocele that can arise in patients with Steven Johnson Syndrome after Nd:YAG laser capsulotomy. It emphasizes the importance of considering individual patient-related risk factors to avoid this complication.

Consent to publish this case report has been obtained from the patient in writing form. This report does not contain any personal identifying information.

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

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- The Authors do not have any proprietary interest on this case and have no financial relationships to disclose
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- Informed consent was given for medical records utilization

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None.

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