

Pupillary Block Glaucoma after Nd: YAG Capsulotomy

Lahlou Lina*, Bengebra Omar, Filali Sadouk Mohamed, Bennis Ahmed, Chraibi Fouad, Abdellaoui Meriem, Benatiya Andaloussi Idriss

Ophthalmology MD, University Hospital Hassan II, Fez, Morocco

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*Corresponding author: Lahlou Lina

Ophthalmology MD, University Hospital Hassan II, Fez, Morocco

Abstract

Case Report

A 65-year-old-woman presented following neodymium: YAG capsulotomy for posterior capsular opacification with acute glaucoma. Cataract surgery had been done with good outcomes. Cornea edema obscured detail of the anterior chamber, but the edge of the lens could be seen clearly within the pupillary space and the acute angle-closure glaucoma was due to vitreous prolapse in the anterior chamber. We believe this case demonstrates the possible complications of the Nd: YAG capsulotomy even if it is an effective tool to treat an opacified posterior capsule after cataract surgery.

Keywords: Pupil block, Secondary glaucoma, Angle-closure, YAG capsulotomy.

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INTRODUCTION

Posterior capsular opacification is the most frequent late postoperative complication following cataract surgery, and the most common cause of decreased postoperative visual acuity. It results from the proliferation and differentiation of lens epithelial cells. The rate of posterior capsular opacification ranges from 3.3 to 25% after phacoemulsification and 18 to 50% after extracapsular lens extraction [1, 14]. This rate varies depending on the type of implant used and the timelapsd after surgery. It is effectively treated with Nd-YAG Laser by creating an opening in the posterior capsule. Various complications may be associated with it, including transient intraocular pressure (IOP) elevation, implant marking, and retinal detachment. Rarer complications have been reported, such as pupil-block glaucoma, implant dislocation, corneal edema, endothelial decompensation, and endophthalmitis [2, 15]. We report a case of angle closure glaucoma due to vitreous issue through the pupil area after posterior capsulotomy with Nd:YAG laser in a pseudophakic patient with subluxation of her posterior chamber implant.

CASE REPORT

This is a 65-year-old patient with well-controlled hypertension and diabetes. She has a history of bilateral total uveitis over 20 years ago, which was successfully treated with intravenous corticosteroids without any lasting effects. In 2017, she underwent cataract surgery in her right eye with

phacoemulsification and posterior chamber implantation, which went smoothly. According to the patient, the postoperative follow-up was uneventful, and she experienced good functional recovery. About 6 months ago, she noticed a gradual decrease in visual acuity in her right eye, without any pain or redness, which led her to consult her primary care physician. The physician performed a posterior capsulotomy using Nd:YAG laser. However, the patient later presented to the emergency department with a further decline in visual acuity associated with eye pain and redness that had been ongoing for several weeks, despite topical corticosteroid and hypotensive eye drops prescribed by her doctor. Upon examination, the visual acuity in the right eye was measured at 5/10 with correction. Slit-lamp examination revealed a clear cornea and slightly reduced anterior chamber containing vitreous and a 1+ Tyndall effect. The pupillary margin appeared irregular, and the pupil area was filled with vitreous issue.

The intraocular lens (implant) was decentered temporally and mobile within the anterior vitreous, without visible capsular support nasally. The intraocular pressure was measured at 40 mmHg under quadruple therapy. Gonioscopy confirmed angle closure secondary to pupillary blockage. Fundus examination showed almost complete papillary excavation (cup-to-disc ratio = 0.9), with peripapillary atrophy and a flat macula. Anterior segment optical coherence tomography (OCT) revealed vitreous issue in the anterior chamber in contact with the corneal endothelium, consistent with a Touch syndrome. Based on the findings, the diagnosis of

pupillary block glaucoma was made. The management involved performing a peripheral iridotomy using Nd:YAG laser to alleviate pupillary blockage and reduce intraocular pressure. Due to the persistent presence of vitreous in the anterior chamber, in contact with the cornea, the patient underwent anterior vitrectomy with

explantation of the original implant and subsequent re-implantation of a three-piece intraocular lens in the sulcus. The postoperative course was favorable, with normalization of intraocular pressure and improvement in visual acuity.

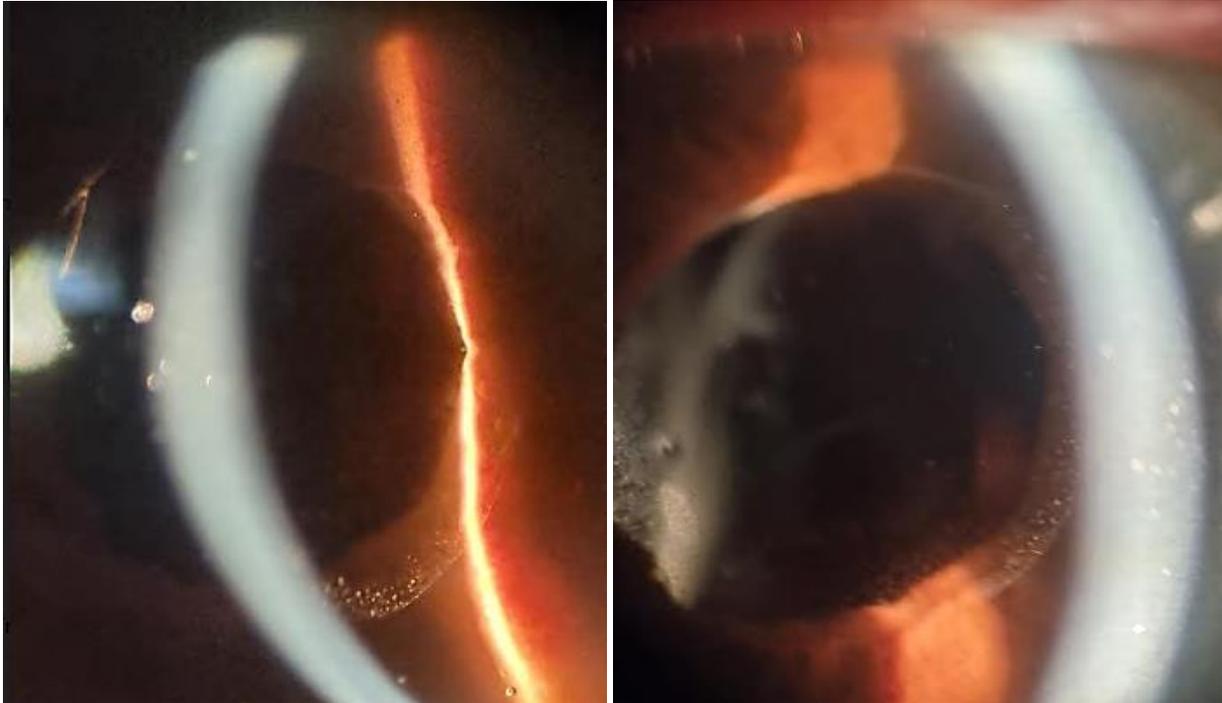


Figure 1: Slitlamp photograph showing prolapsed vitreous into the anterior chamber close to the corneal endothelium after Nd :YAG capsulotomy



Figure 2: Slitlamp photograph showing the IOL subluxation after Nd :YAG capsulotomy

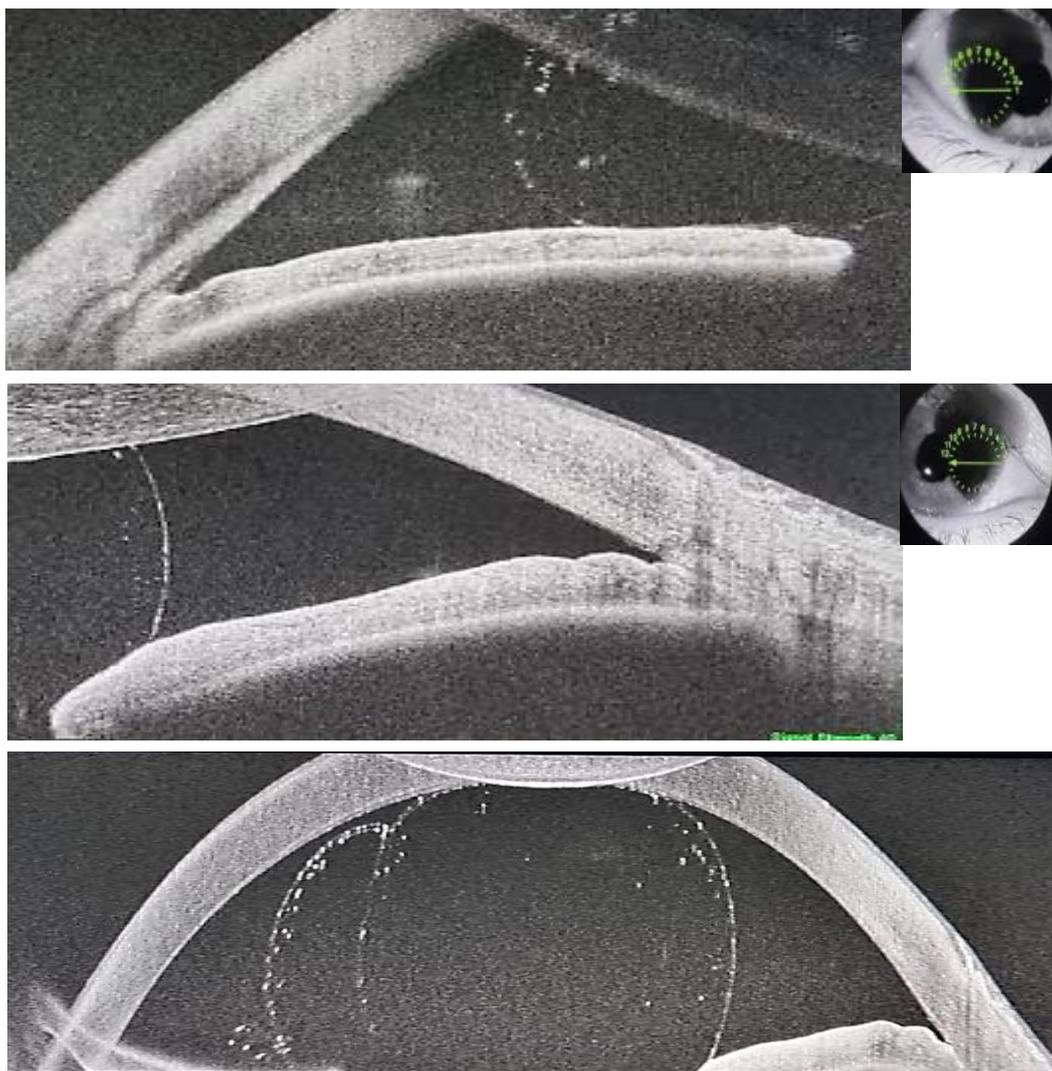


Figure 3: Anterior segment optical coherence tomography showing vitreous in the anterior chamber without clear space between the corneal endothelium and vitreous

DISCUSSION

Posterior capsular opacification occurs in 25% of patients within 5 years following cataract surgery. This complication can be treated with Nd:YAG laser capsulotomy. Transient intraocular pressure (IOP) elevation after laser treatment may be due to the presence of inflammatory cells in the trabeculum or capsular debris, prostaglandin release, or pupillary blockage. Hypertony is more common in aphakic patients or those with anterior chamber intraocular lenses (IOLs), patients exposed to high laser energy or undergoing large capsulotomies. One possible complication of Nd:YAG laser capsulotomy is the rupture of the anterior hyaloid with vitreous issue into the pupil area. The high energy produced by the Nd:YAG laser causes anterior hyaloid rupture in 33% of cases, leading to instantaneous vitreous liquefaction and its passage into the anterior chamber [2]. This can result in acute angle-closure glaucoma. Latest cataract surgery techniques with IOL implantation into an intact posterior capsular bag explains why there are very few recent reported cases. An intact capsular bag and an implanted IOL both act as

barriers between the anterior and the posterior segments [3]. Multiple cases of glaucoma following anterior hyaloid rupture have been described. The first case involved a patient with an anterior chamber IOL with close iris apposition and a non-patent peripheral iridotomy [4, 5].

The second case was an aphakic patient who experienced vitreous issue and subsequent pupillary block glaucoma after Nd:YAG laser capsulotomy [6, 5]. Peripheral iridotomy was performed in both cases to relieve pupillary blockage. The third case was a patient implanted with a posterior chamber IOL, in whom capsulotomy led to vitreous issue behind the iris, resulting in iris bulging and angle closure. Peripheral iridotomy once again reduced intraocular pressure [5]. There was also the case of a 22-year-old woman with uveitis. She underwent cataract surgery in her right eye and was left aphakic. She presented a elevated intraocular pressure following a Nd:YAG capsulotomy with vitreous prolapsing through the pupil. She was treated with preservative-free latanoprost and cyclodiol

laser treatment and her IOP has remained well controlled [3]. Nd:YAG laser capsulotomy can also lead to IOL subluxation due to fusion of the anterior and posterior capsules. It was unfortunately the case for our patient. One such case has been reported, which required peripheral iridotomy to lower intraocular pressure and subsequent corneal grafting due to endothelial decompensation [7, 1]. A similar case have been described on a 73 year-old woman presented with pupil block glaucoma following Nd-YAG capsulotomy for posterior capsule opacification in the context of previous partial IOL subluxation [8].

Again, the treatment with peripheral iridotomy and topical hypotonizing therapy resolved the symptomatology. In our case, the patient developed angle-closure glaucoma following IOL subluxation of a posterior chamber implant and subsequent vitropupillary block. Our main concern was the uncontrolled intraocular pressure despite maximum hypotensive treatment for several weeks and the increased risk of endothelial decompensation. Although intraocular pressure improved after iridotomy, anterior vitrectomy was necessary to reduce the risk of subsequent endothelial decompensation. And a 3 piece IOL in the sulcus replaced the subluxated one. The capsulotomy had more likely extended beyond the IOL rim, allowing vitreous to prolapse forward [8]. Anterior segment optical coherence tomography (OCT) is an effective imaging tool for diagnosing and managing anterior segment pathologies [9]. It was crucial in managing the previously described cases, providing detailed images with better spatial resolution. In our patient, it was useful in confirming the presence of vitreous in the anterior chamber and monitoring its status during treatment. It is generally accepted that a posterior chamber implant acts as an effective barrier against vitreous issue into the anterior chamber, as long as the capsulotomy diameter is smaller than the IOL optic. Parameters such as larger capsulotomy size, higher laser power, or posterior focus could explain anterior hyaloid rupture after capsulotomy. [10] Therefore, it is recommended to perform a smaller capsulotomy with the minimum energy required to minimize debris dispersion and hypertony. In patients with dense posterior capsules, glaucoma, or pre-existing angle involvement, some authors recommend performing peripheral iridotomy before YAG laser treatment.

Precautions can also be taken during surgery to reduce the occurrence of postoperative posterior capsular opacification and the need for laser treatment. A study demonstrated that creating a smaller capsulorhexis (4.5 to 5 mm) resulted in less capsular opacification compared to rhexis of 6 or 7 mm [11]. Thorough washing of peripheral lens masses is advised. Using square-edged implants delays the occurrence of posterior capsular opacification by exerting stronger pressure on the capsule, creating a barrier against cellular migration. The angulation of the haptics can also help press the posterior

surface of the implant against the capsule, keeping it under tension. Finally, the choice of material can influence posterior capsular opacification. Acrylic hydrophobic IOLs are preferred over polymethylmethacrylate, which is less effective [12]. We have documented a case of pupillary block glaucoma after Nd :YAG capsulotomy on a pseudophakic patient with history of idiopathic uveitis, illustrating vitreous prolapse using anterior OCT . This case highlights one of the many complications of Nd :YAG capsulotomy. Infact, although the Nd:YAG laser is an effective tool in treating posterior capsular opacification following cataract surgery, there are a number of complications to be aware of such as transient hypertony, implant pigmentation, retinal detachment, implant displacement, anterior hyaloid rupture, corneal edema, endothelial decompensation, and endophthalmitis [13]. Performing peripheral iridotomy with Nd:YAG laser in these patients is advised.

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