

Haptic fracture and dislocation of polyimide intraocular lens after neodymium:YAG laser capsulotomy

A case report

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Abstract

Rationale: We report a case of haptic fracture of polyimide intraocular lens (IOL) and its dislocation after neodymium:YAG (Nd:YAG) laser capsulotomy. To the best of our knowledge, this is the first report of both the fracture and dislocation of the IOL after laser posterior capsulotomy.

Patient concerns: A 78-year-old male was referred to our clinic with a history of decreased visual acuity after Nd:YAG laser posterior capsulotomy in the right eye. A dislocated IOL was observed on slit lamp examination.

Diagnosis: On slit-lamp examination, dislocated IOL with intact anterior capsulorrhexis margin was observed in the right eye.

Interventions: We removed the dislocated IOL and fixed a 3-piece IOL (Acrysof MN60AC, Alcon Laboratories, Inc) in the ciliary sulcus under retrobulbar anesthesia.

Outcomes: After the operation, the observed uncorrected distance visual acuity (UCVA) was 20/20 and the measured intraocular pressure (IOP) was 18 mmHg; the IOL was fixed in the ciliary sulcus.

Lessons: Three-piece, silicone-polyimide haptics in IOLs can get fractured after Nd:YAG laser capsulotomy. Thus, it is suggested that sufficient haptic dilation should be ensured while performing Nd:YAG laser capsulotomy in patients with polyimide haptics. Moreover, a small-sized capsulotomy is likely to be helpful in such patients.

Abbreviations: IOL = intraocular lens, IOP = intraocular pressure, Nd:YAG = neodymium: YAG, PMMA = poly methyl methacrylate, UCVA = uncorrected distance visual acuity.

Keywords: haptic fracture, intraocular lens dislocation, intraocular lens removal, Nd:YAG laser capsulotomy, polyimide intraocular lens haptic

1. Introduction

The STAAR 3-piece, silicone-polyimide intraocular lens (IOL) (AQ2003 V, STAAR Surgical Co., Monrovia, CA) is a biconvex optic lens with 10-degree angled C-loop haptics. Polyimide is known for its thermal stability and excellent mechanical and

electronic properties.^[1,2] It is designated as a safe material for implantable devices.^[3] However, some studies have reported spontaneous blockage in polyimide haptics.^[4,5] Neodymium: YAG (Nd:YAG) laser posterior capsulotomy is the standard procedure for treatment of posterior capsular opacity.^[6] However, IOL dislocation can occur after the Nd:YAG laser posterior capsulotomy.^[7] In this study, we report a case of haptic fracture of polyimide IOL and IOL dislocation after Nd:YAG laser capsulotomy. We believe that the case reported by us is the first to present both the fracture and the polyimide haptic IOL dislocation after the Nd:YAG laser treatment.

2. Case presentation

A 79-year-old Korean male with complaints of sudden decrease in visual acuity in the right eye was referred to our clinic. He did not present any remarkable medical history except hypertension. Phacoemulsification with capsular bag implantation of a posterior chamber IOL (AQ2003 V, STAAR Surgical Co., Monrovia, CA) was performed in both his eyes, about 10 years ago in a local clinic. Subsequently, Nd:YAG laser posterior capsulotomy was performed in the right eye at a local clinic. On ocular examination, the uncorrected distance visual acuity (UCVA) was 20/400 for the right eye and 20/20 for the left eye. The best-corrected distance visual acuity (BCVA) was 20/20

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JSK and MJK contributed equally to this work.

We have obtained written informed consent from the patient in this case report.

The authors have no conflicts of interest to disclose

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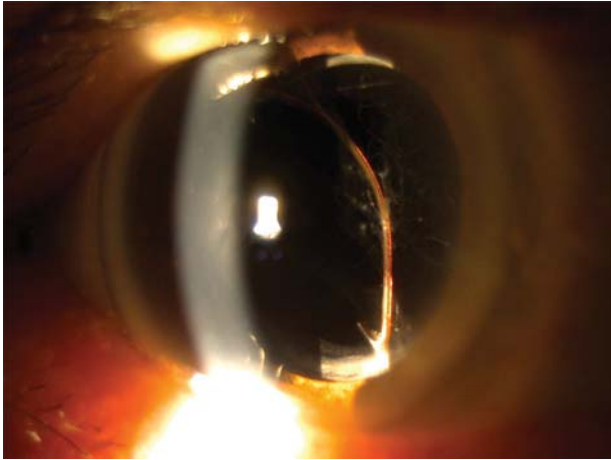


Figure 1. Anterior segment photographs at patient's first visit. Dislocated IOL was observed in the right eye. IOL=intraocular lens.

(x-10.00 Dsph) for the right eye and 20/20 for the left eye. Intraocular pressure (IOP) was 11 mmHg as measured by noncontact tonometer in the right eye. On slit-lamp examination, the cornea and conjunctiva were unremarkable, and there was no evidence of neovascularization in the iris, while dislocated IOL with intact anterior capsulorrhexis margin was observed in the right eye (Fig. 1). We removed the dislocated IOL and fixed a 3-piece IOL (Acrysof MN60AC, Alcon Laboratories, Inc) in the ciliary sulcus under retrobulbar anesthesia. During the dislocated IOL removal operation, a fractured distal haptic was observed (Fig. 2), and a proximal haptic was broken when held with a pair of smooth forceps (Fig. 3). After the operation, the observed UCVA was 20/20 and the measured IOP was 18 mmHg; the IOL was fixed in the ciliary sulcus. The extracted polyimide haptic was fractured in vitro with 13 shots of 5.5 mJ energy (Fig. 4). Patient has provided informed consent for publication of the case

3. Discussion

Several types of IOLs are available with different designs and constituent materials. IOL designs vary in optic-edge shape and

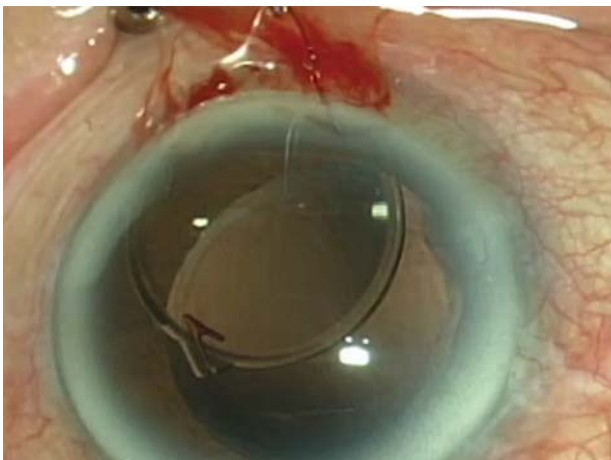


Figure 2. Intra-operative photographs showing fractured polyimide distal haptic.



Figure 3. Fractured haptic of the polyimide intraocular lens after extraction.

the material and design of the haptic.^[8] As a supporting element, the haptic plays an important role to minimize decentration or dislocation of IOL. Single-piece IOL designs are used more often than the 3-piece IOL.^[9] Three-piece IOLs have rigid haptics that are mostly composed of poly methyl methacrylate (PMMA).^[9] However, a variety of other materials are also used for haptic, such as polyimide, polyamide, polypropylene, and polyvinylidene fluoride.^[4]

Polyimide has a characteristic orange/yellow color and is known for its thermal stability and excellent mechanical and electronic properties.^[1,2] It is designated as a safe material for implantable devices.^[3] Thus, IOL with polyimide haptic has advantages of flexibility and excellent heat resistance in comparison to the other IOLs with PMMA haptics.^[5] However, Stallings et al have reported 2 cases of spontaneous polyimide haptic breakage, where the scanning electron microscopy revealed no signs of degradation on the loop surface.^[4] Kang

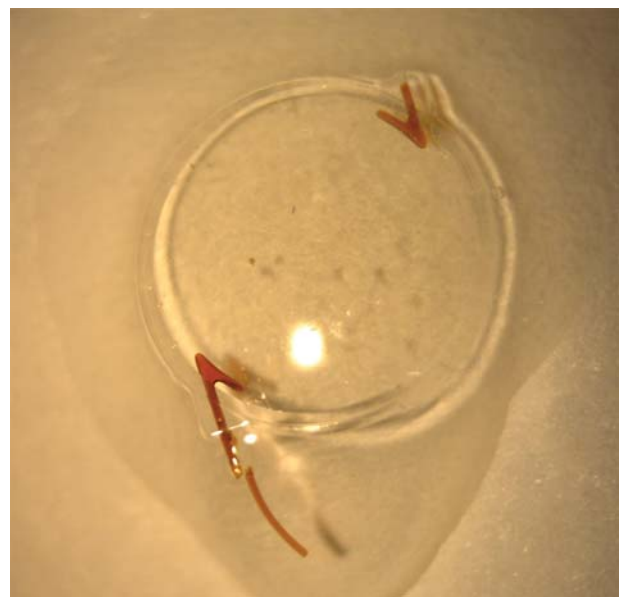


Figure 4. Fractured haptic of the polyimide intraocular lens after in vitro neodymium:YAG laser treatment.

et al have also described a case of spontaneous fracture of polyimide haptic.^[5]

There are several reports of IOL dislocation after Nd:YAG laser capsulotomy. Levy et al have reported 2 cases of hydrogel lens displacement to vitreous after the Nd:YAG laser capsulotomy.^[10] Framme et al and Gonzalez et al have reported cases with PMMA IOL displacement, and plate-haptic silicone IOL displacement, respectively.^[11,12] Nghiem-Buffet et al report a case of IOL dislocation with a 3 piece PMMA haptic fracture after Nd:YAG laser treatment.^[13] Kocak et al have reported that it is easier to fracture hydrophilic acrylic and PMMA haptics than hydrophobic acrylic and polyvinylidene fluoride haptics by the in vitro Nd:YAG laser treatment.^[14] PMMA haptic was fractured with average 112.66 ± 52.27 shots of 6.55 ± 1.25 mJ energy.^[14] Therefore, we also tested the extracted polyimide haptic under the Nd:YAG laser in vitro and the haptic was fractured with 13 shots of 5.5 mJ energy. The results revealed that the extracted polyimide haptic required lower energy and lesser number of laser shots to create a fracture than those required for the PMMA haptics.

To the best of our knowledge, this is the first study to report both the haptic fracture and the IOL dislocation after Nd:YAG laser treatment in 3-piece, polyimide-silicone haptic of IOL. In conclusion, we report that the 3-piece polyimide-silicone haptics of IOL can be fractured during the Nd:YAG laser capsulotomy. Thus, it is suggested to ensure enough haptic dilation while performing the Nd:YAG laser capsulotomy in patients with polyimide haptics. Moreover, IOL damage while performing the laser treatment should be avoided, and a small sized capsulotomy should be preferred for such patients.

Author contributions

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