Intraocular Lens Subluxation following Micropulse Transscleral Cyclophotocoagulation

Basma Alqaseer, Muneera Abunajma

Abstract:
We present a case of intraocular lens (IOL) subluxation following micropulse transscleral cyclophotocoagulation (MP-TSCPC) procedure for glaucoma that is resistant to medical therapy. A 71-year-old male presented to his routine glaucoma follow-up appointment and was found to have medically uncontrolled intraocular pressure (IOP) in the right eye. Throughout his visits, the IOP ranged between 26 and 35 mmHg. The IOL was in position without the presence of pseudoexfoliation, and the cup–disc ratio was 0.8 in the right eye. The patient was treated with MP-TSCPC and no immediate complaints or complications were noted post-procedure. However, 5 weeks postoperatively, he presented with IOL subluxation. MP-TSCPC is becoming a popular choice of treatment in lowering IOP. To the best of our knowledge, IOL subluxation has not been reported as a complication. Since the procedure is relatively new, further long-term research is warranted to determine the possible effects and complications.

Keywords: Complication, cyclophotocoagulation, glaucoma, lens subluxation, micropulse

INTRODUCTION

Glaucoma is one of the leading causes of irreversible blindness worldwide.[1,2] The increase in intraocular pressure (IOP) results in death of retinal ganglion cells, and ultimately loss of the optic nerve fibers.[3] It is managed by reducing the IOP, either by increasing the outflow or decreasing the inflow of aqueous humor.[1,4] Options include include medical therapy, surgical intervention, and laser procedures.[5]

Traditional transscleral cyclophotocoagulation (TSCPC) is a type of cyclodestructive procedure that uses nonselective continuous-wave diode laser. It targets the ciliary body, resulting in the reduction of aqueous humor production, and ultimately reduction of the IOP. Despite its effectiveness in most types of glaucoma, it is reserved for refractory glaucoma. This is because nonselective and continuous targeting features are associated with collateral damage and increased risk of morbidity.[1,4] Complications include hypotony, phthisis bulbi, pupillary distortion, hyphema, scleral perforation, and lens subluxation.[7-10]

A more recent procedure however, known as micropulse TSCPC (MP-TSCPC), has a more selective targeting feature and delivers repetitive pulses of energy. This is associated with less collateral damage and hence less complications.[1,4] Only a few complications were reported in studies, these include scleral thinning and prolonged anterior-chamber inflammation.[6]

We present a case of intraocular lens (IOL) subluxation following MP-TSCPC procedure for open angle glaucoma resistant to medical therapy.

CASE REPORT

A 71-year-old male presented to the eye clinic for glaucoma follow-up. The patient was diagnosed with glaucoma 24 years ago, compliant with his treatment and regularly attends follow-up appointments. Medical therapy for both eyes (BE) included brinzolamide/timolol and brimonidine tartrate. A variety of different eye drops were previously prescribed during the course of his management; however,
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the patient could not tolerate their side effects. The only ocular intervention undergone was phacoemulsification with posterior-chamber IOL implantation for BE. No history of diabetes mellitus, pseudoexfoliation syndrome or ocular trauma was reported.

On examination, the visual acuity was 20/25 in BE, and the IOP was 26 mmHg in the right eye (RE) and 16 mmHg in the left eye (LE). The patient was pseudophakic with a posterior-chamber IOL in stable position in BE and had no pseudoexfoliation. A flat retina and a cup disc ratio (CDR) of 0.8 in the RE and 0.5 in the LE were noted.

Despite compliance with medical therapy, the IOP in the RE measured between 26 mmHg and 35 mmHg. Considering the persistently raised IOP and advanced CDR in the RE, MP-TSCPC procedure was performed.

During the procedure, the patient received a peribulbar block (1500 I/U of hyaluronidase diluted in 50 ml of 2% lignocaine) and sedation. The IQ810 Iridex Laser settings were programmed with the standard: power – 2000 mW, micropulse “on” time – 0.5 ms, micropulse “off” time – 1.1 ms, and duty cycle – 31.3%. The laser probe was applied in a sliding motion across the superior and inferior hemispheres. The 3 and 9 o’clock areas were avoided to prevent damage to the ciliary neovascular structures. The laser was administered over 360° with 60 s in the superior and 60 s in the inferior hemisphere (total duration total duration of). No blood or pigment was noted during the procedure.

The first day following the procedure, the RE visual acuity was 20/40 and the IOP was 10 mmHg. The anterior-segment examination of the RE was relatively unremarkable; quiet conjunctiva, clear cornea, deep and quiet anterior chamber, mid-dilated pupil and the IOL was in stable position. One week following the procedure, there were no complaints and the IOP was 13 mmHg without any notable changes on examination. However, 5 weeks following the procedure, the patient was complaining of seeing a “shadow” in the RE. On examination, IOL subluxation and a persistent mid-dilated pupil were noted [Figure 1].

In addition to the anti-glaucoma medications, the patient was started on pilocarpine eye drops two times a day for the RE. After nearly 2 weeks, the patient improved without any complaints, despite the subluxated IOL.

**Discussion**

MP-TSCPC is becoming a more popular choice of treatment, owing to its more predictable effect in lowering IOP and having fewer ocular complications, when compared to traditional TSCPC. This overall profile of efficacy and fewer ocular complications makes this a reasonable early choice of treatment in glaucoma. The mechanism behind the MP-TSCPC is administration of repetitive, short pulses of energy with rest intervals, involving “on” and “off” cycles. During the “on” cycle, energy builds up within the targeted pigmented tissues until it reaches the coagulative threshold. The nonpigmented tissues are spared and cooled off during the “off” cycle. This ultimately minimizes collateral tissue damage that is seen in traditional TSCPC.

Only a few recognized complications of MP-TSCPC were recorded to the best of our knowledge. These include prolonged anterior-chamber inflammation and scleral thinning. Lens subluxation is a complication of traditional TSCPC and was documented in two case reports. A case report suggested that laser-induced zonular and ciliary body damage resulted in zonular dialysis and subsequently lens subluxation.

However, to the best of our knowledge, lens subluxation has not been reported as a complication of MP-TSCPC. Zonular dialysis and subsequent posterior-chamber IOL subluxation may have occurred due to laser-induced damage to the zonules and ciliary processes. MP-TSCPC is a fairly new procedure. There are only a limited number of studies regarding the use of MP-TSCPC and lacking studies in evaluating long-term efficacy and complications.

In conclusion, MP-TSCPC is becoming a popular choice of treatment in lowering IOP. However, since the procedure is relatively new, there is limited research available on its complications and long-term efficacy. Therefore, patients should be informed of the possibility of lens subluxation.
as a complication of the procedure, as well as secondary complications of lens subluxation.

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**Conflicts of interest**
There are no conflicts of interest.

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