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Cyclodialysis cleft formation following Yamane secondary intraocular lens implantation

Minh T. Nguyen [a], Alekya Rajanala [a], Philip P. Chen [a,*]

[a] Department of Ophthalmology, University of Washington, Seattle, WA, USA

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ABSTRACT

Purpose: To report two cases of hypotony with maculopathy related to cyclodialysis cleft after Yamane intraocular lens (IOL) implantation, and the use of localized transscleral cyclophotocoagulation (TSCPC) to successfully treat this condition.

Observation: 1. 37 year-old man with childhood BB-gun related injury in the left eye (OS) and traumatic iridodialysis and angle recession underwent pars plana vitrectomy and Yamane IOL placement for subluxed traumatic cataract OS. Postoperative hypotony [intraocular pressure (IOP) 5–6 mmHg] and maculopathy with best corrected vision acuity (BCVA) of 20/200 at 1 month postoperative prompted referral, and localized TSCPC was performed. Nine days later sudden elevation of IOP occurred, responsive to treatment, and the hypotony and maculopathy resolved. 2. 87 year-old man with prior OS retinal detachments treated with scleral buckling, pars plana vitrectomy x 2, and cataract extraction with sulcus IOL ranging from 8 to 37 years prior presented with temporal sulcus IOL haptic penetration through the iris and dense vitreous hemorrhage. He underwent pars plana vitrectomy, IOL explantation and Yamane IOL placement OS. Postoperative hypotony (IOP 1–4 mmHg) and maculopathy with evidence of cyclodialysis cleft on ultrasonography at 1 month postoperative prompted referral. The patient underwent 2 rounds of localized TSCPC; after his second treatment, IOP ranged from 9 to 14 mmHg over the next 8 months and maculopathy resolved.

Conclusion and Importance: We highlight the risk of development of cyclodialysis cleft after Yamane IOL placement in highly traumatized eyes, and the benefit of localized TSCPC in such cases for cleft closure.

1. Introduction

The Yamane scleral-fixated intraocular lens (IOL) technique addresses IOL placement in aphakic patients without capsular support.[1] We report two cases of hypotony with maculopathy due to cyclodialysis cleft formation after Yamane IOL in eyes with extensive trauma, and successful treatment with localized transscleral cyclophotocoagulation (TSCPC).

2. Findings

2.1. Case 1

A 37-year-old man had a BB gun-related injury in the left eye (OS) 25 years prior to referral for progressively worsening vision. Best-corrected visual acuity (VA) was 20/125 and the intraocular pressure (IOP) was 25 mmHg OS. Slit lamp biomicroscopy OS revealed a three clock-hour temporal iridodialysis, dense cortical cataract subluxed superonasally, and zonular loss temporally. Gonioscopy showed 3 hours of temporal iridodialysis, with angle recession elsewhere; no cyclodialysis was seen. The patient was referred and underwent 23-gauge pars plana vitrectomy, lensectomy, iridodialysis repair and Yamane IOL placement OS. At the conclusion of surgery, all sclerotomies and the corneal limbal incision for IOL placement were sutured watertight. On postoperative day 1, with VA 20/400, the IOP was 20 mmHg, but it decreased to 5 mmHg by week 1, and at month 1 the VA was 20/250, IOP was 6 mmHg, and optic disc edema and macular chorioretinal folds were apparent (Fig. 1), prompting re-referral for evaluation and management.

No conjunctival filtering bleb was seen, while the corneal incision and the conjunctiva were watertight by Seidel testing. Gonioscopy revealed an IOL haptic entering the ciliary sulcus space, visible through the remaining iridodialysis, and was otherwise unchanged from prior. An iatrogenic cyclodialysis cleft was assumed and a trial of topical atropine was initiated. Three weeks later, with VA 20/200, IOP 7

* Corresponding author. Department of Ophthalmology, University of Washington, Box 359608, 325 Ninth Ave, Seattle, WA, 98104, USA.
E-mail address: pchen@uw.edu (P.P. Chen).

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mmHg, and unchanged maculopathy, the patient underwent localized diode 810 nm laser (Iridex Oculight SLx, Mountain View, CA) TSCPC in the clinic after retrobulbar anesthetic injection. Eighteen laser applications were placed over the temporal anterior sclera in 4 rows around the presumed track of the externalized IOL haptic using power of 2200–2800 mW and duration of 1500 milliseconds. Nine days later, he had severe pain OS and IOP was 50 mmHg. Glaucoma medications were initiated and tapered over time. Seven months after TSCPC his uncorrected VA was 20/30, with unmedicated IOP of 20 mmHg.

2.2. Case 2

An 87-year-old man presented with poor vision OS. His history OS included retinal detachment 37 years prior, repaired with scleral buckling and pars plana vitrectomy with placement and removal of silicone oil, cataract surgery 19 years prior, and recurrent retinal detachment 8 years prior, repaired with pars plana vitrectomy. Examination revealed a sulcus IOL OS with temporal haptic penetration through the iris and dense vitreous hemorrhage. The IOP was 9 mmHg OU. He underwent 23-gauge pars plana vitrectomy, IOL explantation, and Yamane IOL OS. At the conclusion of surgery, all sclerotomies and the corneal limbal incision for IOL placement were sutured watertight. During the first month postoperatively, hypotony maculopathy was seen with VA of counting fingers and IOP of 1–4 mm Hg (Fig. 2) prompting referral.

Anterior ultrasonography 1 month after surgery revealed a cyclodialysis cleft around the temporal haptic. No conjunctival filtration was seen and the corneal incision and the conjunctiva were watertight by Seidel testing. Balanced salt solution (BSS, Alcon, Fort Worth, TX) was injected into the anterior chamber, without bleb formation. Atropine treatment was unsuccessful. Six weeks after the Yamane procedure the patient underwent localized TSCPC over the temporal scleral site of the presumed track of the externalized haptic (25 applications over 4 rows, 2700 mW, 2500 msec) in the clinic under retrobulbar anesthesia. Two weeks after TSCPC the IOP was 2 mm Hg. Another TSCPC treatment was performed, including 13 applications temporally and an additional 25 applications nasally over the nasal track of the externalized haptic area. Three weeks after the second TSCPC procedure the IOP increased to 9 mmHg OS and remained 9–14 mmHg up to 8 months later, with minimal choroidal folds. Corneal edema limited VA to 20/400.

3. Discussion

The Yamane procedure allows sutureless intrascleral fixation of a three-piece IOL and is an alternative to anterior chamber IOL and sutured IOL techniques.[1] We describe cyclodialysis cleft formation after Yamane procedure; we believe the IOL haptic allowed aqueous to access the subciliary space and physically prevented spontaneous resolution. Because the clefts originate posterior to the angle, gonioscopy can only be used to rule out an anterior cleft; anterior ultrasonography may assist in diagnosis. Atropine treatment is likely unsuccessful because relaxation of the ciliary muscle is insufficient to overcome the stent effect of the externalized IOL haptic and appose the muscle to the sclera.

Surgical treatment options for cyclodialysis clefts include direct laser photocoagulation, transscleral diathermy, cryotherapy, intravitreal gas injection with transconjunctival cyclocryotherapy, or direct cycloplexy,[2,3] but direct (green) laser photocoagulation is not possible because of the posterior location of the cleft. In addition, all of these options risk disruption of an externalized Yamane IOL haptic, may be less accessible to many ophthalmologists, and/or must be performed in an operating room. Use of TSCPC induces localized inflammation necessary for cleft closure,[4,5] while avoiding potential disruption of the IOL haptic, and may be performed in an outpatient clinic setting.

Although no anterior ultrasonography was used to identify a cyclodialysis cleft in case 1, the sutured vitrectomy and limbal incision wounds would be unlikely to cause persistent leakage for an extended period postoperatively,[6,7] and no leakage was seen on examination. The IOP spike after TSCPC is typical of a closed cyclodialysis cleft; the patient was using minimal topical prednisolone (twice daily) and the inflammation seen at the time of IOP elevation was mild, so a sudden

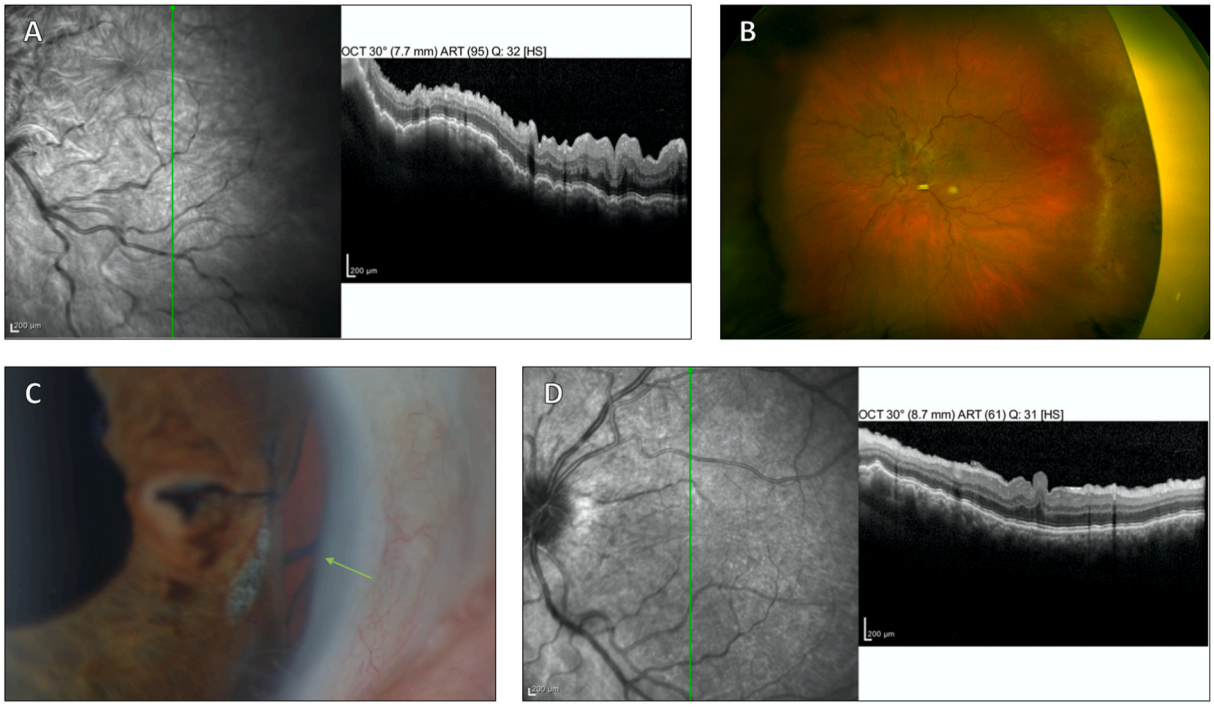

Fig. 1. A) OCT macula at postoperative month 1 after Yamane IOL reveals gross macular chorioretinal folds in the left eye. B) Optos photo of the left eye at postoperative month 1 visit shows optic disc edema and vascular tortuosity indicative of hypotony maculopathy. C) Slit lamp photo of the left eye after Yamane IOL shows temporal iridodialysis. Temporal haptic (arrow) is visible using retroillumination. D) OCT macula 3 weeks after localized TSCPC reveals improvement in chorioretinal folds.

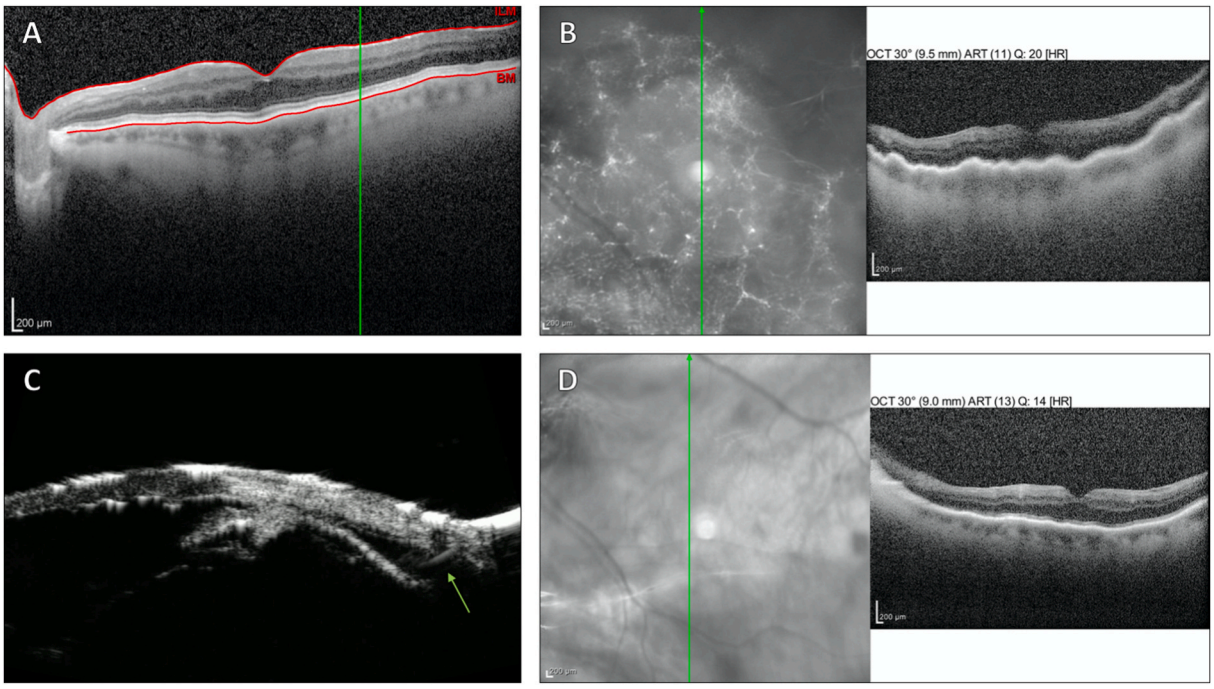

Fig. 2. A) OCT macula of the left eye 2 years prior to pars plana vitrectomy, IOL explantation, and Yamane scleral-fixated IOL placement, shows mild choroidal folds with IOP of 9 mmHg at baseline. B) OCT macula of the left eye at postoperative month 1 reveals gross chorioretinal folds through the fovea. C) Ultrasound biomicroscopy of the left eye at postoperative month 1 shows cyclodialysis cleft from 12 to 2 o'clock, with temporal haptic visible in the suprachoroidal space (green arrow). D) OCT macula of the left eye at postoperative month 6 (4 months after the second TSCPC procedure) showing improvement in chorioretinal folds, similar to pre-Yamane procedure. (For interpretation of the references to colour in this figure legend, the reader is referred to the Web version of this article.)

symptomatic steroid response or severe inflammation are not likely causes for the IOP rise.

Notably, Mishra et al.[8] recently reported use of cyclocryotherapy to repair cyclodialysis clefts which occurred following Yamane IOL placement in two eyes with a history of trauma, though no details of treatment were described; in conjunction with our series, it appears that highly traumatized eyes may be at higher risk for this complication after Yamane IOL placement, perhaps because of disruption of normal anatomy.

4. Conclusions

In conclusion, the Yamane technique for sutureless scleral-fixated secondary IOL implantation may result in subsequent cyclodialysis cleft formation in highly traumatized eyes. Treatment with localized TSCPC was successful in both of our patients though repeated treatment may be necessary because the track of the cleft may be occult and more difficult to localize.

Patient consent

Per University of Washington Institutional Review Board – Human Subjects Division policy, case reports of up to 3 patients do not require individual patient consent.

Author contributions

All authors contributed to this manuscript equally.

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