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Case report

A simple lens-sparing technique to treat hypotonic maculopathy secondary to large cyclodialysis

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ABSTRACT

Purpose: Hypotonic maculopathy secondary to cyclodialysis often persists and causes irreversible visual loss despite a variety of treatments proposed. The purpose of this study is to report two cases with persistent hypotonic maculopathy due to a large cyclodialysis cleft treated with a simple, lens-sparing technique of external drainage, diathermy, and suturing under the placement of an infusion cannula.

Observations: Both patients had sustained blunt trauma to one eye, causing persisting hypotonic maculopathy. One eye was phakic. The ciliary body was totally detached with a large cyclodialysis cleft. After half-thickness scleral flaps were made and a 25-gauge infusion cannula was placed at the pars plana, external drainage was performed. Transscleral diathermy and interrupted suturing also were done.

Results: In both cases, the ciliary detachment promptly improved and the intraocular pressure normalized after transient elevation for a few days. No adverse events were observed.

Conclusions and importance: We successfully treated two cases with hypotonic maculopathy by a simple technique with an infusion cannula. This procedure is simple, immediately effective, less invasive, and applicable to all cases including phakic eyes.

1. Introduction

Hypotonic maculopathy can develop secondary to cyclodialysis in eyes with blunt ocular trauma and intraocular surgeries. An external force disrupts the circumferential insertion of the meridional ciliary muscle fibers into the scleral spur causing a cyclodialysis cleft.[1] When a ciliary detachment occurs due to abnormal aqueous humor outflow to the suprachoroidal space through a cleft, subsequent hypotony leads to choroidal detachment, retinal vascular tortuosity, and retinal folds, and in more severe and persistent cases, hypotonic maculopathy and optic disc edema.

In cases refractory to medical management, laser photocoagulation, transscleral diathermy, cryotherapy, direct cyclopexy and other suture-based techniques, sulcus fixation of the intraocular lens, scleral buckling, and vitrectomy have been performed.[2–7] However, with less invasive procedures, the success rate is lower. In addition, invasive techniques may result in vitreous hemorrhages and expulsive hemorrhages. We report a new, less invasive technique to reattach the ciliary body by placement of an infusion cannula at the pars plana and external drainage of the suprachoroidal fluid.

2. Findings

Case 1: A 45-year-old man sustained blunt trauma to his left eye playing baseball and was referred to a private clinic. Subsequently, hyphema and commotio retinae were observed. After hyphema resolution, hypotonic maculopathy was seen. Systemic prednisolone and topical cycloplegic eye drops (atropine) were ineffective after 1 month, and he presented to our hospital. The best-corrected visual acuity (BCVA) of the left eye was 20/40. Large cyclodialysis with a 270-degree cleft, total ciliary detachment, chorioretinal folds, tortuous retinal vessels, and optic disc edema were observed (Fig. 1). Since the lens was intact, long-bite transscleral suturing without a scleral flap was performed at each quadrant with an absorbable monofilament suture (6–0 PDS, Ethicon, Johnson & Johnson, Tokyo, Japan). Postoperatively, anterior-segment optical coherence tomography showed less suprachoroidal fluid but persistent hypotony with no BCVA improvement. Ciliary detachment relapsed 2 months after the first surgery with suture biodegradation. A second surgery was scheduled.

Case 2: A 51-year-old man was referred to our hospital for a chronic traumatic cyclodialysis in his right eye. He sustained blunt trauma when hit with a baseball and subsequent traumatic cataract 16 months

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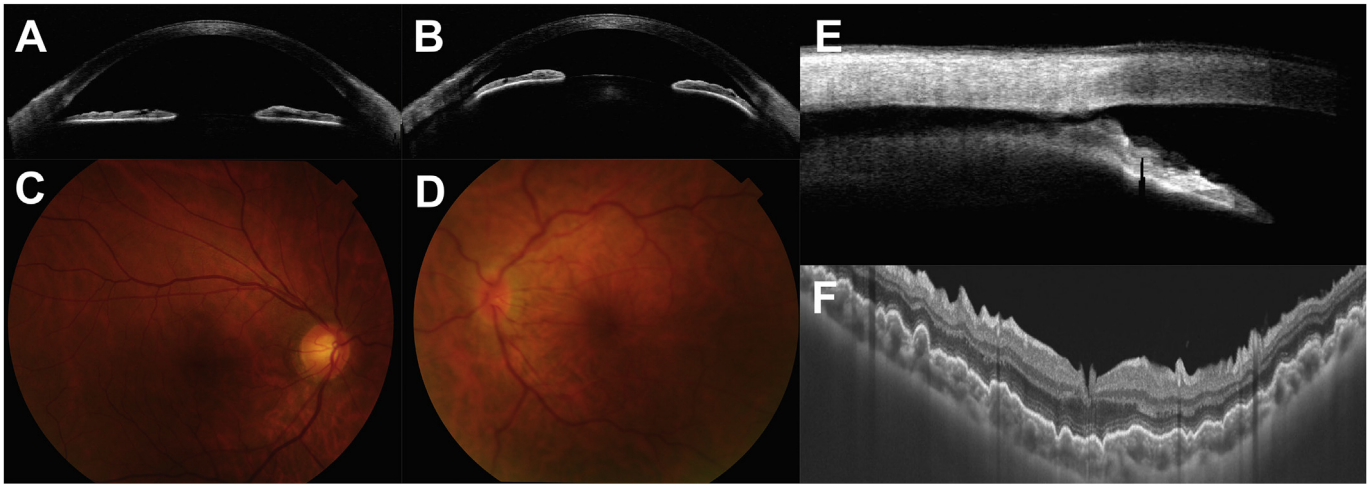

Fig. 1. Eyes of the first case at the first visit. Images of optical coherence tomography of the right eye (A) and the left eye (B,E,F) and fundus photographs of the right eye (C) and the left eye (D) depicted that the anterior chamber of the left eye was shallow and a cyclodialysis cleft and ciliary body detachment were observed, accompanying tortuosity of retinal vessels and choroidal folds.

previously. Fourteen months later, cataract surgery with a capsular tension ring was performed because of cataract progression with subluxation, causing postoperative hypotonic maculopathy refractory to medical treatment. Upon presentation to our hospital, the BCVA was 20/60. Cyclodialysis with a 90- to 120-degree cleft at the upper side, total ciliary detachment, chorioretinal folds, and tortuous retinal vessels were detected. A surgery was planned.

Surgical procedures for both cases (Fig. 2): The conjunctiva was dissected, and a 2x4-mm half-thickness scleral flap 2 mm posterior to the limbus was made at all quadrants in case 1 and at the upper quadrants in case 2. Before placing a 25-gauge infusion cannula, the intraocular pressure (IOP) was increased by intravitreal injection of balanced salt solution (BSS PLUS® intraocular irrigating solution kit; Alcon, Tokyo, Japan) with a 30-gauge needle. Then perpendicular one-step insertion of 25-gauge trocar-cannula at the pars plana was performed to avoid suprachoroidal irrigation. After placing a 25-gauge infusion cannula and increasing the IOP to 60 mmHg, external drainage of the suprachoroidal fluid was undertaken by radial scleral incision at

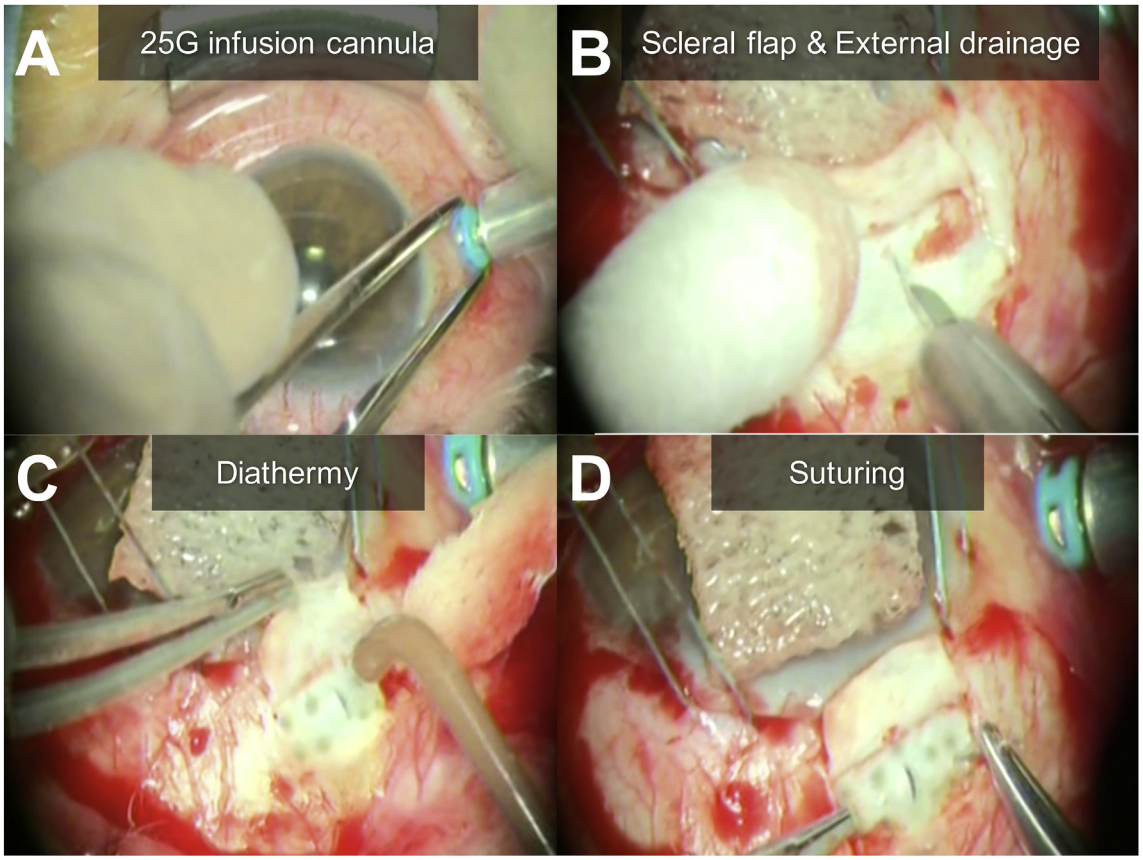

Fig. 2. Surgical procedure. A. 25G infusion cannula was placed to increase the intraocular pressure and enhance the external drainage. B. External drainage was performed at the scleral flap base. C. Diathermy was carried out. D. An interrupted suture was placed.

the scleral flap base. Outflow of viscous suprachoroidal fluid and resultant uveal reattachment were confirmed visually through the scleral incision. Ciliary body cautery and an interrupted suture with 8–0 Vicryl or 10–0 nylon were performed at the bottom to reinforce the ciliary reattachment, followed by replacement of the flap with 8–0 Vicryl. The same procedure was performed for all scleral flaps. The infusion cannula was removed and conjunctiva was replaced with 8–0 Vicryl.

In case 1, the ciliary body was reattached fully on day 1 and the IOP normalized after 3 days of transient elevation. The BCVA recovered to 20/20 3 months after the second surgery. In case 2, the ciliary body was reattached fully and the IOP normalized on day 1. On day 5, the IOP increased temporarily to 27 mmHg and normalized again on day 6. The BCVA improved to 20/16.

3. Discussion

The main surgical approaches to refractory cases with a large cyclodialysis cleft involve direct cyclopexy. However, the larger the cyclodialysis cleft, the more invasive the creation of the scleral flaps is and the higher the hypotony-associated risks of vitreous hemorrhage and expulsive hemorrhage. Gas tamponade with/without vitrectomy, scleral buckling with cryotherapy, and suture fixation of an intraocular lens or a capsular tension ring are unsuitable for phakic eyes. In contrast, our procedure is applicable to phakic eyes. In our technique, external drainage of suprachoroidal fluid with placement of an infusion cannula may play a main role in ciliary body reattachment. In case 2, although only two quadrants had ciliary body cautery and an interrupted suture, the ciliary body reattached immediately. We confirmed that persistent suprachoroidal fluid was viscous like subretinal fluid in eyes with a long-standing retinal detachment. We speculated that condensed, viscous fluid may counteract fluid absorption driven by choroidal oncotic pressure and interfere with ciliary body reattachment, possibly causing failure of other surgeries. Inversely, once the ciliary body is reattached and the IOP normalizes, the choroidal oncotic pressure and normal or high IOP may maintain ciliary body attachment independent of the width of the cyclodialysis cleft (Fig. 3). In case 2, although cyclodialysis should have developed in the blunt trauma, subsequent hypotony occurred 14 months later (after cataract surgery). This may support our hypothesis. The mechanism may be similar to that for retinal attachment in eyes with retinal tear without vitreous traction. Furthermore, it may be beneficial that external drainage can be combined with other procedures such as vitrectomy and scleral buckling. It may remain to be elucidated how many quadrants should be treated in association with the width and location of a cyclodialysis cleft and whether ciliary body cautery and an interrupted suture may be omitted.

4. Conclusions

This technique may be considered first because it is safe and effective even for a large cyclodialysis cleft, applicable even to phakic eyes, and possible can be combined with other surgeries.

Patient consent

Consent to publish the case report was not obtained. This report does not contain any personal information that could lead to the identification of the patient.

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Conflicts of interest

The following authors have no financial disclosures: (MK, TY, YO).

Authorship

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

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Appendix A. Supplementary data

Supplementary data related to this article can be found at http://dx.doi.org/10.1016/j.ajoc.2018.04.022.

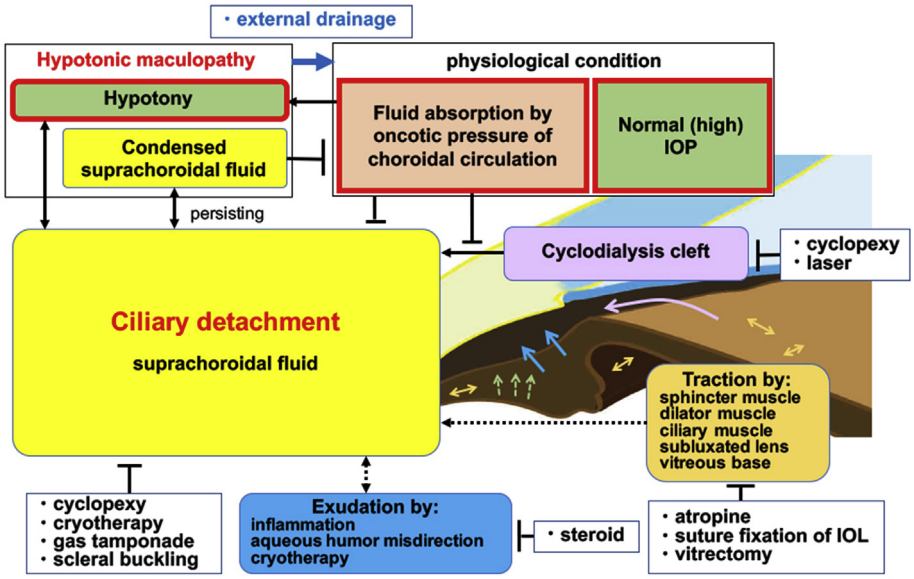

Fig. 3. The pathology of hypotonic maculopathy and treatment modalities. A new technique may be effective to return the eye to physiologic conditions. IOP: intraocular pressure, IOL: intraocular lens.

References

1. Ormerod LD, Baerveldt G, Sunalp MA, Riekhof FT. Management of the hypotonous cyclodialysis cleft. *Ophthalmology.* 1991;98(9):1384–1393.
2. Ioannidis AS, Barton K. Cyclodialysis cleft: causes and repair. *Curr Opin Ophthalmol.* 2010;21(2):150–154.
3. Rabinowitz M, Khator P, Shah CP, Ichhpujani P, Spirn MJ, Moster MR. Direct cyclopexy with a posterior infusion cannula. *Ophthalmic Surg Laser Imag.* 2011;42(2):175–176.
4. Shentu X, Zhu Y, Tang Y. Closure of a persistent cyclodialysis cleft using the haptics of a normal-sized intraocular lens. *Case Rep.* 2011. ;2011http://dx.doi.org/10.1136/bcr.07.2011.4555 (nov01 1):bcr0720114555-bcr0720114555.
5. Trikha S, Turnbull A, Agrawal S, Amerasinghe N, Kirwan J. Management challenges arising from a traumatic 360 degree cyclodialysis cleft. *Clin Ophthalmol.* 2012;6(1):257–260.
6. Chadha N, Lamba T, Belyea DA, Merchant KY. Indirect cyclopexy for treatment of a chronic traumatic cyclodialysis cleft with hypotony. *Clin Ophthalmol.* 2014;8:591–594.
7. Pinheiro-Costa J, Benevides Melo A, Carneiro AM, Falcao-Reis F. Cyclodialysis cleft treatment using a minimally invasive technique. *Case Rep Ophthalmol.* 2015;6(1):66–70.