Capsular Tension Ring for Hypotony Maculopathy Secondary to Traumatic Cyclodialysis Cleft: A Case Report

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Dear Editor,

Cyclodialysis cleft is a rare phenomenon that forms when insertion of the ciliary muscle longitudinal fiber detach from the scleral spur, resulting in an secondary pathway for aqueous humor drainage(1). This leads to chronic ocular hypotony causing complications such as hypotonic maculopathy, shallow anterior chamber, optic disc edema, and possibly permanent visual loss(1).

Cyclodialysis clefts should be closed to prevent further complications. Numerous techniques have been proposed for non-medical management of cyclodialysis clefts including laser photocoagulation, direct cyclopexy, pneumocyclopexy, vitrectomy, and capsular tension ring (CTR) tamponade(1). In this case report, we describe a successful management of hypotony maculopathy secondary to traumatic cyclodialysis cleft with CTR tamponade at a phakic eye. This study was approved by the Institutional Review Board of Gangnam Severance Hospital, Yonsei University (Seoul, Korea) (IRB No. 3-2023-0291).

A 43-year-old male presented to our hospital with a failure of medical treatment at local clinic, with unresolved low visual acuity (VA). He was struck with a rock in his left eye while using a lawn mower. His affected eye was phakic and VA and best corrected visual acuity (BCVA) were 20/133 and 20/22.5 in Snellen chart, respectively.

Wide-field fundus photograph showed numerous chorioretinal folds and blurred fundus margin in the left eye (Fig. 1a). Anterior chamber depth was 2.522mm in his left eye. Left IOP showed 6mmHg while right IOP showed 12mmHg. Anterior segment optical coherence tomography (AS-OCT) confirmed ciliary muscle detachment in the left eye, with the cleft from 7 to 12 o’clock position (Fig. 1b). Ultrasound biomicroscopy (UBM) revealed choroidal effusion at the same location (Fig. 1c). Retinal imaging in OCT showed wrinkling of chorioretinal folds with thickened retinal nerve fiber layer (Fig. 1d). We concluded that cyclodialysis cleft caused ocular hypotony which resulted in chorioretinal folds and visual impairment. The patient was managed further medically with cyclopentolate eye drops but his vision did not improve. Due to the worsening visual impairment even with medical management and clear structural abnormalities, surgery was planned.

Under local anaesthesia using proparacaine, superior clear corneal tunnel incision was performed. RingJect 12/10 CTR (Ophtec, Groningen NL) was positioned at the ciliary sulcus (Fig. 1e). By positioning a CTR with an overall diameter of 12mm at an eye with a 12mm white-to-white and 11.54mm angle-to-angle, the CTR was able to compress against the detached ciliary body and provide mechanical tamponade to close the cyclodialysis cleft (Fig 1f). After checking the position of CTR, corneal incision was closed with corneal hydration.
One week after the CTR placement, VA improved to 20/40 with resolved chorioretinal fold wrinkling on wide-field fundus photograph (Fig. 1g). 1 month after surgery, IOP increased to 14mmHg and BCVA improved to 20/20, with an anterior chamber depth of 2.992mm. Retinal OCT images demonstrated resolved wrinkling of chorioretinal folds and normal chorioretinal anatomy (Fig. 1h). 4 months after surgery, his left eye VA improved to 20/20 and AS-OCT images showed completely resealed cyclodialysis clefts (Fig. 1i).

Contrary to other proposed ways of treating cyclodialysis clefts, CTR tamponade is beneficial in many aspects. As CTR can cover almost 360° and provide adequate pressure, it can be used to close large cyclodialysis clefts and multiple concurrent clefts. As cyclodialysis clefts can cause anterior chamber narrowing, the cleft often becomes hard to visualize. With the use of CTR, these hard-to-visualize small clefts would also be repaired. Also, they are minimally invasive and easy to use. Results are also promising. One report comparing modified CTR and direct cyclopecty showed modified CTR groups experienced significant BCVA improvement whereas direct cyclopecty group did not demonstrate such improvement. CTR insertion in 20 patients with both cyclodialysis and zonular dialysis was reported to be successful and safe. Although CTR insertion lacks long-term follow-up data, evidence is pointing towards its efficacy and safety. Our case of CTR usage in traumatic cyclodialysis cleft patient with hypotony maculopathy furthers the evidence of this. Also, as CTR usage for cyclodialysis cleft closure at a phakic eye is rarely reported, our report supports that the use of CTR for cyclodialysis cleft closure can be both safe and efficient at a phakic eye.

**Funding/Support:**
This work was supported by the Basic Science Research Program through the National Research Foundation of Korea (NRF- 2019R1I1A1A01061721), the Research Grant from Gangnam Severance Hospital (D-2023-0012), and by a new faculty research seed money grant of Yonsei University College of Medicine for 2023 (2023-32-0059). The funding organization had no role in the design or conduct of this research.

**Conflict of Interest Statement:**
The authors declare that they have no conflict of interest.
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Figure 1.
(a) Preoperative wide-field fundus photograph showing wrinkling of chorioretinal folds. (b) Preoperative anterior segment OCT image showing detachment of ciliary muscle (arrow) with choroidal effusion (asterisk). (c) Preoperative UBM images showing choroidal effusion (asterisk). (d) Preoperative OCT images with retinal wrinkling. (e, f) Illustration of CTR insertion surgical process. (g, h) Postoperative wide-field fundus photograph and retinal OCT images showing resolved wrinkling of chorioretinal folds. (i) Postoperative anterior segment OCT image four months after surgery showing closed cyclodialysis cleft.