

Novel technique for traumatic cyclodialysis repair with phacoemulsification and Cionni's ring implantation

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A 17-years-old boy presented with cataract, 360° choroidal effusion and disc oedema secondary to chronic hypotony. Gonioscopy and AS-OCT revealed 2 clock hours of cyclodialysis in the superonasal quadrant. The case was successively managed with phacoemulsification with foldable IOL in the bag and Cionni's ring sutured in the superonasal quadrant. Post surgery, the BCVA improved from counting finger 1 meter to 20/40. IOP returned to normal and there was resolution of choroidal effusion and fundus signs. The case highlights the use of Cionni's ring in management of small cyclodialysis cleft by providing internal compression.

Key words: Cionni's ring, Cyclodialysis cleft, phacoemulsification

Cyclodialysis cleft results from focal detachment of longitudinal ciliary muscle fibers from scleral spur.^[1] This results in abnormal shunting of aqueous into supra-choroidal space, enhancing absorption and subsequent decrease in aqueous production leading to hypotony.^[2] The most common cause of cyclodialysis is trauma.^[1]

Diagnosis is usually made by direct visualization on gonioscopy and confirmed by ultrasound biomicroscopy (UBM) or anterior segment optical coherence tomography (AS-OCT).

Various management techniques have been proposed, which include laser trans-corneal photocoagulation; trans-scleral cyclo-photocoagulation; ciliochoroidal argon laser endo-photocoagulation; cryotherapy; diathermy; trans-limbal and trans-scleral suture fixation; direct cyclophexy; anterior scleral buckling; and combined vitrectomy, cryotherapy, and gas tamponade.^[3-7]

We report a case of traumatic cyclodialysis cleft with chronic hypotony and cataract that was managed by phacoemulsification and posterior chamber IOL implantation in the bag with Cionni's ring to repair the cleft.

Case Report

A 17-years-old boy presented with diminution of vision for 10 days in left eye following blunt trauma. At presentation, best corrected visual acuity (BCVA) was 4/60 (20/300). Anterior chamber was shallow with iris sphincter tear at 11, 12, and 7 o'clock with traumatic mydriasis. Intraocular pressure (IOP) was 4 mm of Hg by Goldmann Applanation Tonometry (GAT). Gonioscopy [Fig. 1a] and AS-OCT [Fig. 1b]^[1,2] confirmed a cyclodialysis cleft of approximately 2 clock hours extent in the superonasal quadrant. The adjacent iris had convex configuration. On fundus examination, there was sub-macular haemorrhage of approximately 2 disc diameters with choroidal rupture temporal to fovea [Fig. 1c and d]. Patient underwent pneumatic displacement with 0.3 cc of 100% Perfluoro propane gas (C3F8) intravitreal injection.

On post operative day 1, localized inferior serous choroidal detachment was noticed which progressed to 360° [Fig. 1e]^[1,2] over a period of 1 month follow up. Patient was conservatively managed with topical steroids, cycloplegics and short course of oral steroids. The extent of choroidal detachment reduced but there was persistent 360° choroidal effusion with disc oedema, macular star fold, vascular tortuosity, and IOP remained in the range of 4–8 mm of Hg.

The patient was advised surgery for cyclodialysis cleft however was lost to follow up for 3 months. He came back with persistent hypotony with further deterioration in BCVA from 20/200 to finger counting at 1 meter due to cataract progression.

We planned to perform phacoemulsification with Cionni's ring implantation.

Surgical steps [Video 1]

After peribulbar anesthesia, a partial thickness scleral flap [Fig. 2a] was made in nasal quadrant at location of cyclodialysis cleft. After performing a standard phacoemulsification [Fig. 2b-d], a 12.5 mm length, Cionni type CTR with 1 eyelet [Fig. 2e and f] was inserted into the bag. Cionni's Ring was sutured to sclera 1 mm posterior to limbus with the 10-0 polypropylene suture in the superonasal quadrant [Fig. 2g]. Foldable single piece IOL with optic diameter of 6 mm was then implanted in the bag [Fig. 2h].

Postoperatively, a short course oral and topical steroids along with topical antibiotics and cycloplegics was given

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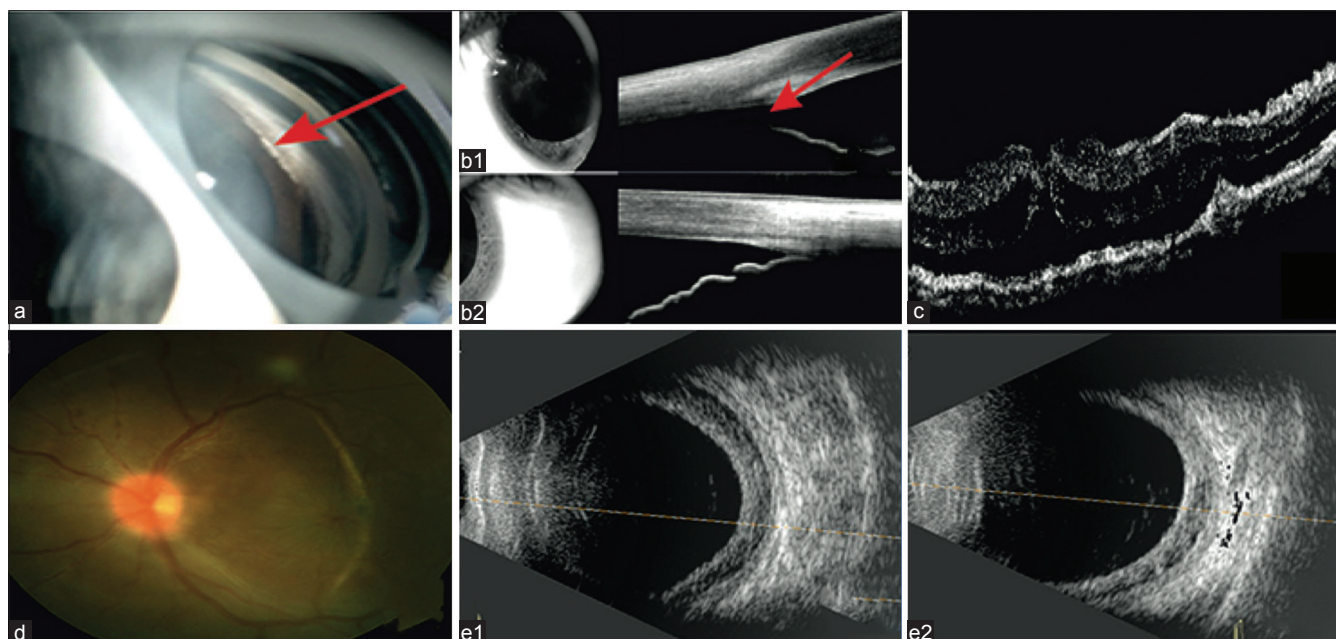


Figure 1: (a and b1) Gonioscopy, AS-OCT nasal angle shows cyclodialysis cleft, (b2) AS-OCT normal temporal angle, (c) OCT shows retinochoroidal folds, (d) disc oedema, macular star folds and dilated veins, (e1 and e2) B-Scan showing choroidal effusion

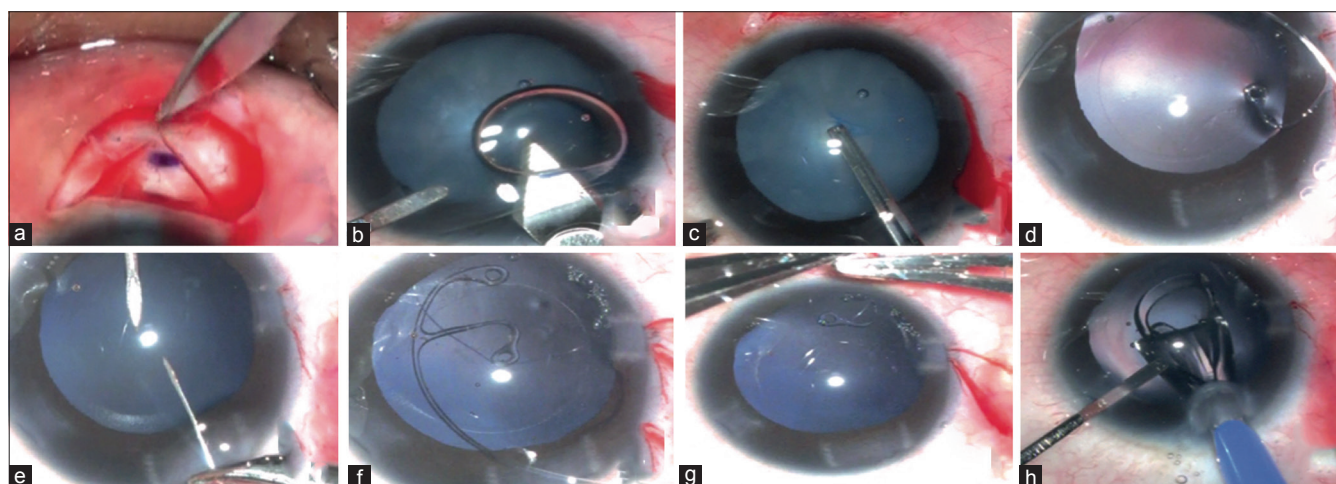


Figure 2: (a) Triangular partial thickness scleral flap in nasal quadrant, (b and c) Standard phacoemulsification, (d) Modified Cionni's ring with single eyelet, (e) Docking of 10-0 polypropylene suture needle, (f) Cionni's ring implantation in the bag, (g) eyelet scleral fixation in the nasal quadrant, (h) Foldable IOL implantation in the bag

for 1 month. Patient had an IOP spike on 10th postoperative day, which was managed with topical antiglaucoma medications.

At 2 months follow up BCVA improved to 20/40 and the IOP recorded was 14 mm of Hg without any anti glaucoma medication. Gonioscopy showed presence of angle recession in nasal quadrant [Fig. 3a]. There was resolution of fundus signs and choroidal effusion [Fig. 3b-f].

Discussion

A persistent cyclodialysis cleft results in chronic ocular hypotony which causes choroidal effusion, cataract, hypotony maculopathy, decreased visual acuity, and eventually phthisis bulbi.^[7]

Internal apposition of ciliary body to scleral spur in cases with cyclodialysis have been reported in past. Mardelli *et al.*^[8] used a 13.5 mm large diameter posterior chamber IOL inserted into the ciliary sulcus. Similarly, Malandrini *et al.*^[9] implanted a single-piece PMMA IOL, using the tension of the haptics to mechanically push the ciliary body onto the cyclodialysis cleft; however, they cautioned for potential long-term risk of this technique. Yuen *et al.*^[10] used a 13 mm Morcher type 1L CTR capsular tension ring insertion into the ciliary sulcus with two point scleral fixation to repair a 360-degree traumatic cyclodialysis cleft following blunt trauma.

In our case since the cleft was small we decided to implant modified Cionni's ring with single eyelet in the bag with scleral fixation in the quadrant of cyclodialysis.

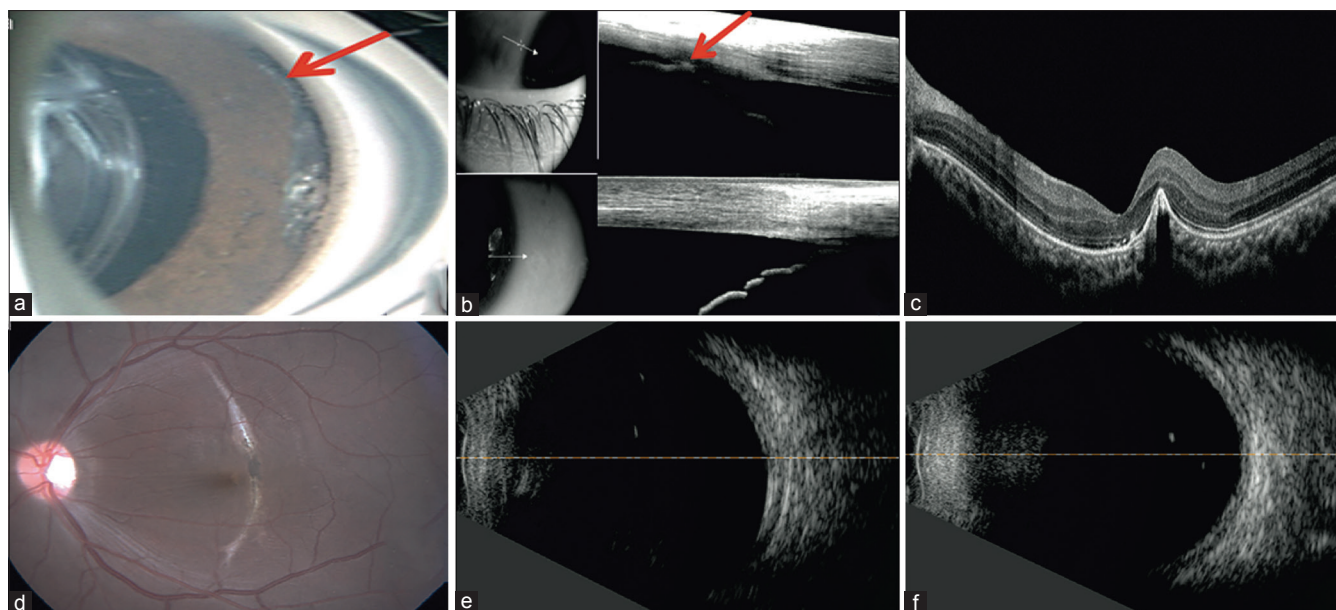


Figure 3: (a and b) Gonioscopy and AS-OCT shows internal compression by eyelet, (c) OCT shows parafoveal choroidal rupture, (d) Resolution of disc oedema, (e and f) Resolution of choroidal effusion

Postulated mechanisms for IOP restoration are, approximation of ciliary body to sclera by scleral fixation of Cionni's ring eyelet causing anatomical closure and postoperative inflammation, which can result in scarring and permanent adhesion. In our case both IOL and Cionni's ring were placed in the bag and only eyelet of Cionni's ring was used to mechanically push ciliary body towards sclera, thus minimizing complications like ciliary body erosion, hemorrhage, pain, and severe inflammation.

Our patient had postoperative IOP spike possibly because aqueous production normalized due to re-apposition of ciliary body to the scleral spur but the collapsed trabecular meshwork as a result of chronic hypotony took some time to recover its normal filtration function.

The biggest advantage of this procedure is that, no new surgical technique is required as most of the anterior segment surgeons are well versed with both phacoemulsification and Cionni's ring implantation. Hence, as such there is no learning curve and any ocular surgeon who performs cataract surgeries can carry out this procedure with ease and good outcomes.

In conclusion, this surgical procedure which we report is effective and technically simple way for managing small cyclodialysis associated with cataract.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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Conflicts of interest

There are no conflicts of interest.

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