Cyclodialysis as a Complication of Gonioscopy-Assisted Transluminal Trabeculotomy and its Management

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Dear Editor,

Cyclodialysis cleft is an uncommon but clinically significant cause of ocular hypotony. It can develop after ocular trauma or surgeries involving manipulation of the iris root, trabecular meshwork, or ciliary body. The condition has been reported following procedures such as cataract surgery, iridectomy, trabeculectomy, Kahook Dual Blade goniotomy, and microhook-assisted ab interno trabeculotomy.[1,2,3,4]

Although cyclodialysis cleft has been reported as a complication following gonioscopy-assisted transluminal trabeculotomy (GATT), its underlying mechanisms, diagnostic challenges, and optimal management strategies remain insufficiently characterized in the literature. GATT is a conjunctiva-sparing ab interno trabeculotomy technique that was first described by Grover et al.[1] and has since been reported to be effective even in advanced glaucoma cases.[5] Here we report a case of persistent hypotony caused by a cyclodialysis cleft following polypropylene suture-assisted GATT, which was successfully managed with direct cyclopexy followed by a repeat GATT to restore intraocular pressure (IOP) control.

A 33-year-old man with primary congenital glaucoma was referred for persistent hypotony in the right eye one month after GATT performed at another center. Best corrected visual acuity (BCVA) was 20/200 in the right eye and 20/20 in the fellow eye. IOP measured 7 mmHg in the right eye without medication and 13 mmHg in the left eye while on triple therapy. Both eyes were buphthalmic, and the right fundus exhibited hypotony maculopathy (Figure 1A, B). Despite advanced cupping, peripapillary retinal nerve fiber layer (RNFL) thickness appeared falsely preserved in the right eye, consistent with "green disease" secondary to hypotony, whereas the fellow eye demonstrated true RNFL loss (Figure 1C, D).

Gonioscopy demonstrated a superior cyclodialysis cleft extending from 12 to 2 o'clock (Figure 1E). This was confirmed by ultrasound biomicroscopy (UBM), which showed separation of the ciliary body from the scleral spur, along with supraciliary fluid (Figure 1F). Hypotony had persisted since the early postoperative period following the initial GATT surgery.

Persistent hypotony despite atropine (administered for 2 weeks) and argon laser photocoagulation led to the decision to perform direct transscleral suture cyclopexy. The surgical steps are shown in Figure 2. On postoperative day 1, IOP transiently increased to 42 mmHg, which was considered an expected indicator of successful cyclodialysis cleft closure.[6,7] The IOP spike was promptly managed with oral acetazolamide (Diazomid®, Sanofi, İstanbul, Türkiye) and intensive topical therapy including dorzolamide/

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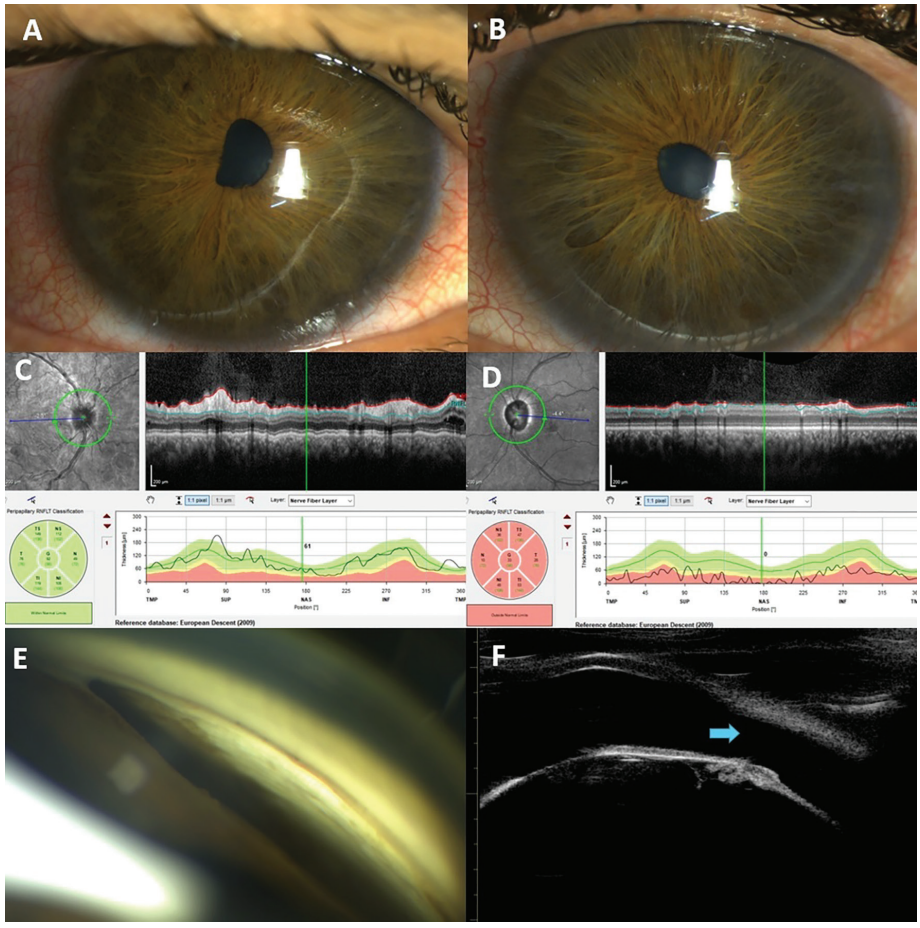

Figure 1. Buphthalmic appearance of the right (A) and left (B) eye. Optical coherence tomography analysis shows "green disease" in the right eye (C) and significant atrophy of the retinal nerve fiber layer in the left eye (D). Gonioscopy shows a cyclodialysis cleft extending from 12 o'clock to 2 o'clock (E). Ultrasound biomicroscopy confirms the presence of the cyclodialysis cleft (blue arrow) and suprachoroidal effusion (F)

timolol (Tomec®, Abdi İbrahim İlaç, İstanbul, Türkiye), brimonidine tartrate (Alphagan-P®, Allergan, Irvine, CA, USA), and bimatoprost (Lumigan®, Allergan, Irvine, CA, USA). No postoperative hyphema or intraocular bleeding was observed. IOP gradually decreased and stabilized around 24 mmHg under maximal tolerated medical treatment, with no evidence of further visual deterioration. UBM confirmed complete anatomical closure (Figure 3A, B). BCVA improved to 20/50.

Given the patient's young age and need for long-term pressure control, we opted to repeat GATT 2 weeks after the cyclopexy. Importantly, the trabecular meshwork remained structurally intact following cyclopexy (Figure 3C), allowing reestablishment of aqueous outflow through Schlemm's canal. During the revision surgery, visualization of the blue polypropylene suture (Prolene®, Ethicon Inc., Somerville, NJ, USA) confirmed correct canalization (Figure 3D). One week after repeat GATT, the IOP stabilized at 12 mmHg and remained between 12 and 16 mmHg on once-daily latanoprost (Xalatan®, Pfizer Inc., New York, NY, USA) throughout a 2-year follow-up period.

Several surgical approaches have been described for the management of cyclodialysis clefts, including argon laser photocoagulation, transscleral cryotherapy, cyclophotocoagulation, scleral buckling, and internal tamponade with gas or silicone oil.[8] While these methods aim to promote closure by inducing inflammation or reducing uveoscleral outflow, their success may be limited in cases of large, persistent, or anatomically well-defined clefts. Direct transscleral suture cyclopexy allows precise

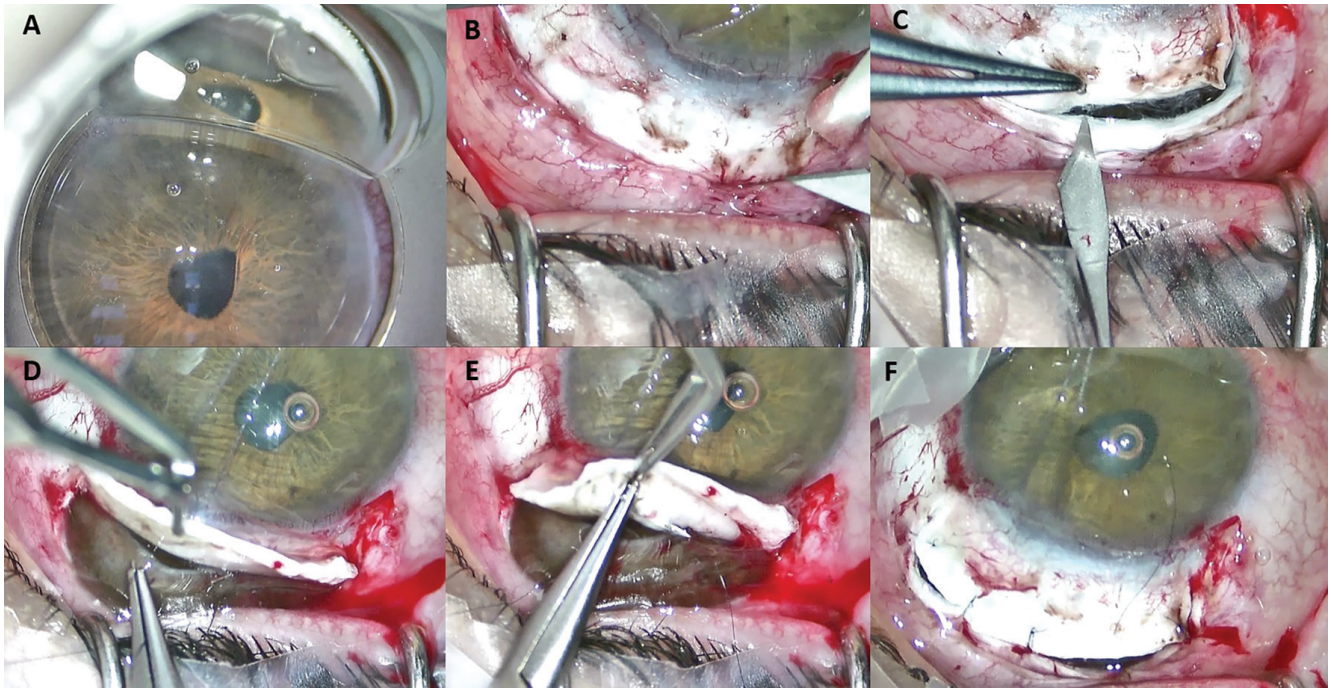

Figure 2. A) The superior border of the cleft was visualized using a surgical goniolens. B) Superior peritomy and scleral cauterization were performed. C) The sclerotomy area was created using a straight 15° micro-knife. D) 10/0 nylon suture was passed through the underlying ciliary body. E) Afterwards, the 10/0 nylon suture was passed through the corresponding inner wall of the sclera. F) The ciliary body and sclera were reapposed and the sclera was closed with 10/0 nylon suture

anatomical reapposition of the ciliary body to the scleral spur and is considered the most definitive surgical option, particularly in refractory cases. In the present case, given the clearly localized cleft, persistent hypotony, and failure of conservative measures, direct cyclopexy was preferred to achieve prompt and durable closure while preserving the angle anatomy for potential future angle-based surgery.

This case highlights two key clinical lessons. First, cyclodialysis cleft is a potential complication of GATT when the Prolene suture enters the suprachoroidal space rather than Schlemm's canal. In eyes with congenital glaucoma, anatomic variations such as angle dysgenesis, posterior displacement of the trabecular meshwork, and abnormal ciliary body insertion may increase the risk of posterior misdirection of the Prolene suture during GATT, potentially leading to cyclodialysis cleft formation. This risk can be mitigated through careful identification of the correct trabecular entry plane, assisted by blood reflux from Schlemm's canal or selective trabecular meshwork staining. Furthermore, in young patients with prominent iris processes, an initial incision inadvertently made into these structures may allow the Prolene suture to advance through a tunnel posterior to the trabecular meshwork. Subsequent traction on the suture during GATT may then result in separation of the ciliary body from the scleral spur, resulting in a cyclodialysis cleft.

Second, following successful cyclodialysis cleft repair, several surgical options can be considered for long-term IOP control, including trabeculectomy, implantation of a glaucoma drainage device, or repeat angle-based surgery. In the present case, repeat GATT remained a viable option for several reasons. One important consideration was the patient's young age, for which conjunctival preservation was prioritized to maintain future surgical options. In addition, gonioscopic and intraoperative findings demonstrated that the trabecular meshwork remained structurally intact after cleft repair, suggesting preserved functional potential despite the period of hypotony. Although prolonged hypotony may theoretically impair trabecular meshwork function, no structural collapse or scarring was observed in this case. Furthermore, given the patient's prior history of hypotony, avoiding bleb-forming procedures or permanent implants was considered advantageous. In this context, repeat GATT represented a reasonable and conservative approach to restore aqueous outflow while minimizing additional surgical morbidity. Nevertheless, we acknowledge that marked postoperative IOP elevations may pose a theoretical risk of further optic nerve damage or

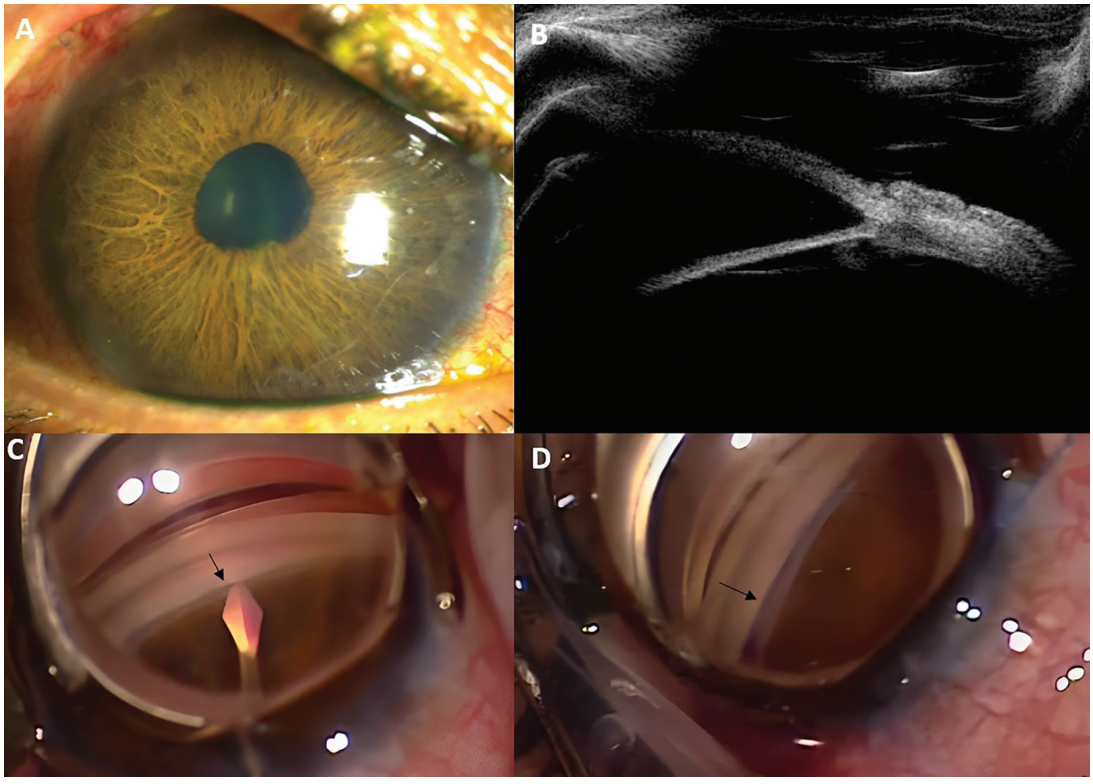

Figure 3. A) Two weeks after cyclodialysis repair, the cornea is clear and the iris appears normal. IOP is 24 mmHg with maximum tolerated medical treatment. B) Postoperative ultrasound biomicroscopy confirms complete closure of the cyclodialysis cleft and resolution of suprachoroidal effusion. C) A goniotomy incision made immediately adjacent to the previously repaired cleft area. The arrow shows the intact appearance of the trabecular meshwork overlying the area of cleft repair. D) Blue Prolene suture is seen in Schlemm's canal over the area of cleft repair (arrow)
IOP: Intraocular pressure

wipe-out phenomenon, particularly in eyes with advanced glaucoma. However, the pressure rise in our patient was transient, closely monitored, and rapidly controlled, and no additional functional loss was observed.

Early recognition of a cyclodialysis cleft is essential to prevent hypotony maculopathy. In eyes with severe hypotony and a shallow anterior chamber, direct visualization of a cyclodialysis cleft may not be feasible using gonioscopy or UBM alone. In such cases, temporary deepening of the anterior chamber with a viscoelastic agent followed by repeat gonioscopy may facilitate identification of the cleft and aid in accurate diagnosis. Once the cyclodialysis cleft is repaired, angle-based surgery can again be considered if the trabecular meshwork remains functional. Our case demonstrates that repeat GATT can provide lasting IOP control after successful cleft repair, and therefore represents an important management consideration.

Ethics

Informed Consent: Written informed consent was acquired from the patient in this case report.

Declarations

Authorship Contributions

Surgical and Medical Practices: Z.A., Concept: Z.A., A.Y.Ü., Design: Z.A., A.Y.Ü., Data Collection or Processing: Z.A., A.Y.Ü., Analysis or Interpretation: Z.A., A.Y.Ü., Literature Search: A.Y.Ü., Writing: A.Y.Ü.

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References

1. Grover DS, Godfrey DG, Smith O, Feuer WJ, Montes de Oca I, Fellman RL. Gonioscopy-assisted transluminal trabeculotomy, ab interno trabeculotomy: technique report and preliminary results. Ophthalmology. 2014;121:855-861.
2. Aktas Z, Ucgul AY, Bektas C, Sahin Karamert S. Surgical outcomes of Prolene gonioscopy-assisted transluminal trabeculotomy in patients with moderate to advanced open-angle glaucoma. J Glaucoma. 2019;28:884-888.
3. Ishida A, Mochiji M, Manabe K, Matsuoka Y, Tanito M. Persistent hypotony and annular ciliochoroidal detachment after microhook Ab interno trabeculotomy. J Glaucoma. 2020;29:807-812.
4. Alshaikhsalama A, Nathan N. Cyclodialysis clefts following microinvasive glaucoma surgery with consecutive intraocular pressure spikes. Case Rep Ophthalmol Med. 2022;2022:7595507.
5. Soyugelen G, Güvenç U, Burcu A. Outcomes of gonioscopy-assisted transluminal trabeculotomy (GATT) in advanced glaucoma: a retrospective analysis. Medicina (Kaunas). 2025;61:444.
6. Küchle M, Naumann GO. Direct cyclopexy for traumatic cyclodialysis with persisting hypotony. Report in 29 consecutive patients. Ophthalmology. 1995;102:322-333.
7. Huang MY, Tseng HY. Spontaneous closure of cyclodialysis cleft in a case of normal-tension glaucoma post Ab-interno trabeculotomy. Cureus. 2022;14:e23276.
8. Sethi A, Udenia H, Beri N, Angmo D, Bari A, Sharma N, Dada T. Surgical management of cyclodialysis cleft: an update. J Curr Glaucoma Pract. 2025;19:143-152.