Modified Three-port Approach for Absolute Alcohol-induced Sclerosis of Iris Stromal Cyst: A Case Report

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ABSTRACT

Iris stromal cysts are rare, progressive ocular lesions that can cause visual impairment and amblyopia due to visual axis obstruction, corneal endothelial damage, uveitis, and secondary angle-closure glaucoma. Management is challenging due to recurrence, and surgical resection carries severe risks such as epithelial downgrowth, glaucoma, blindness, and potential loss of the eye. Absolute alcohol-induced sclerosis is a less invasive alternative; however, the literature on technique modifications remains limited. This case report describes the successful management of a primary iris stromal cyst with secondary ocular hypertension in a 9-year-old Filipino male using a modified three-port approach for absolute alcohol-induced sclerosis. The patient presented with a 4-month history of intermittent redness and pain in the left eye and was found to have elevated intraocular pressure (IOP) due to an iris stromal cyst. A modified three-port setup was prepared using a 30-gauge needle connected to a 3-way stopcock, a 3-mL syringe for aspiration, and an extension tube connected to a syringe containing absolute alcohol mixed with trypan blue dye. Although a 3-mL syringe was used for alcohol infusion, a 1-mL syringe may provide finer control. Postoperatively, transient corneal edema, mild anterior chamber inflammation, and steroid-induced intraocular pressure elevation were observed but resolved with medical management. At 18 months post-surgery, the patient remained asymptomatic, with a best-corrected visual acuity of 20/20, well-controlled IOP without medication, and no cyst recurrence. This case illustrates the effectiveness of a modified three-port approach in treating iris stromal cysts while preventing complications such as visual axis obstruction, glaucoma, and the need for more invasive surgery. This technique presents a practical and accessible option, especially in resource-limited settings. The paper also emphasizes the importance of meticulous technique and awareness of alcohol leakage, with key precautions outlined for safe application.

Keywords: iris cyst, ocular hypertension, absolute alcohol, case report

INTRODUCTION

Iris cysts are fluid-filled, epithelial-lined cavities in the iris, classified as primary or secondary, and further sub-categorized based on their tissue origin.[1] Primary iris stromal cysts in pediatric patients, though uncommon and benign, are considered aggressive due to their tendency to enlarge, leading to visual impairment and amblyopia from visual axis obstruction, corneal endothelial damage, uveitis, or secondary angle-closure glaucoma.[1–3] Early intervention is crucial for these cases; however, management is challenging due to the tendency for recurrence, particularly when using fine-needle aspiration alone.[1,2] Consequently, aspiration is often combined with absolute alcohol, antimitotic agents, or laser treatment for permanent regression.[1] The technique for intracystic absolute alcohol-induced sclerosis was first introduced by Behrouzi and Khodadoust in 2003, and later modified by Shields et al. using a 3-way T extension (Alaris;

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CareFusion Corporation) to facilitate multiple treatment cycles without changing syringes.[3–5] However, this apparatus is not widely available, and while some publications and surgical videos have mentioned adaptations using a three-way stopcock, the exact configurations are not fully detailed, making consistent replication challenging.[6–8] This case report offers a detailed account of a modified setup for alcohol-induced sclerosis of an iris stromal cyst in a pediatric patient. We outline practical adjustments to previously documented techniques, aiming to enhance procedural ergonomics, utility, and reproducibility. This comprehensive description is intended to assist ophthalmologists in performing this rare procedure using readily available materials while minimizing potential complications.

CASE PRESENTATION

A 9-year-old Filipino male with no significant medical or ocular history presented with intermittent left eye redness and pain for 4 months. Due to persistent symptoms, an ophthalmologist was consulted, who discovered elevated intraocular pressure (IOP) and an iris stromal cyst in the affected eye. Initial treatment included timolol and brimonidine eye drops twice daily, bimatoprost eye drops once daily, and acetazolamide 250 mg/tablet, administered as half a tablet three times per day. Although medications effectively controlled the IOP, surgical intervention was recommended to address the iris cyst. Financial constraints prompted referral to our institution for further management.

Ocular examination showed best corrected visual acuity (BCVA) of 20/20 in the right eye (OD) and 20/21 in the left eye (OS), with a slightly enlarged pupil (5 mm) and mild dyscoria in the left eye but no relative afferent pupillary defect. Under medication, the IOP was measured as 14 mmHg (OD) and 12 mmHg (OS) on Goldmann applanation tonometry. The right eye appeared normal, except for the presence of iris flocculi, whereas the left eye exhibited an inferonasal translucent mass (2.5 mm × 6.0 mm) containing cloudy fluid and some pigments, elevating the anterior iris surface (Figure 1). The cornea was clear, except for the area where the mass touched the corneal endothelium. No inflammation or neovascularization was observed. Gonioscopy revealed open angles in both eyes, except for the area occupied by the iris cyst in the left eye. Ultrasound biomicroscopy (UBM) of the left eye confirmed the presence of a single, unilocular, thin-walled iris stromal cyst in the inferonasal anterior chamber with sparse homogeneous hyperechoes. The maximum dimensions of the cyst were 2.31 mm × 5.73 mm. Microcysts were incidentally discovered in the ciliary body at the superior angle (Figure 2). Preoperative specular microscopy was not available for this case.

The patient was diagnosed with a primary iris stromal cyst and secondary ocular hypertension in the left eye, and the treatment plan involved sclerosis using absolute alcohol. Informed consent was obtained after discussing the risks and benefits of the procedures. A modified setup for absolute alcohol-induced sclerosis of an iris stromal cyst was aseptically assembled in the operating room using sterile materials (Figure 3). The control valve of a 3-way stopcock (Surgitech, Jiangsu Webest Medical Products Co. Ltd., China) was loosened with multiple rotations to facilitate switching. A 30-gauge needle (Simplex G30X1/2"; China) was attached to the male luer locking port, and an empty 3-mL syringe (Terumo Corporation, Philippines) was connected to the opposite female port for aspiration. A 4-cm extension tube obtained by trimming the tubing of a volumetric solution infusion set beginning at the connector tip (Cos-Med, Cosmomedical Inc, Batangas), connected the female side port to a 1-mL syringe (Terumo Corporation, Philippines). The 1-mL syringe was filled with a mixture of absolute alcohol (100%; Joedy Merchants Consumer Goods Trading, Philippines) and trypan blue ophthalmic dye (0.06%; Auroblue, Aurolab, India) added dropwise until the alcohol turned blue. The solution was primed into the needle hub to minimize the dead space and prevent bubbles during injection.

The patient was placed under general anesthesia. The surgeon was positioned on the temporal side for optimal

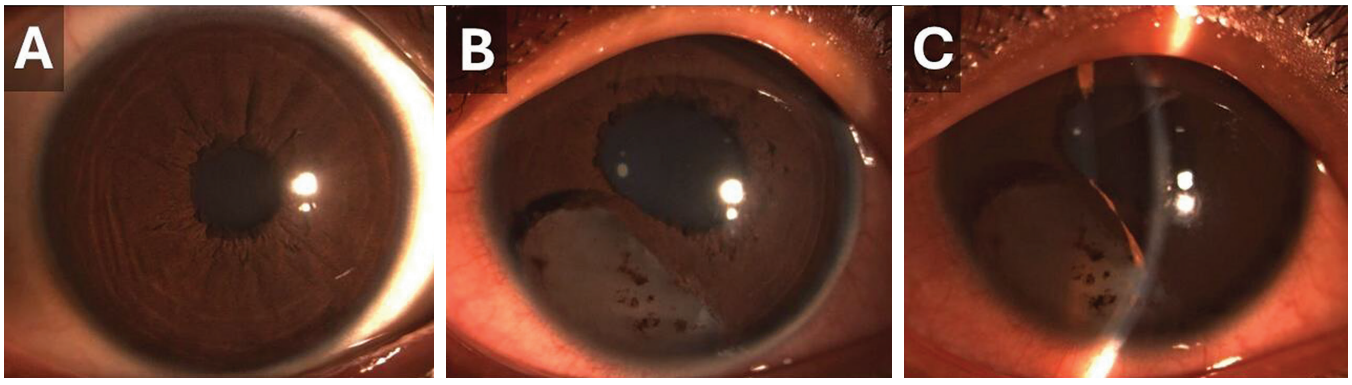

Figure 1. Initial slit-lamp photographs show bilateral iris flocculi along the pupillary border **(A and B)** and an inferonasal iris cyst in the left eye, causing anterior iris displacement near the pupillary margin **(B and C)**.

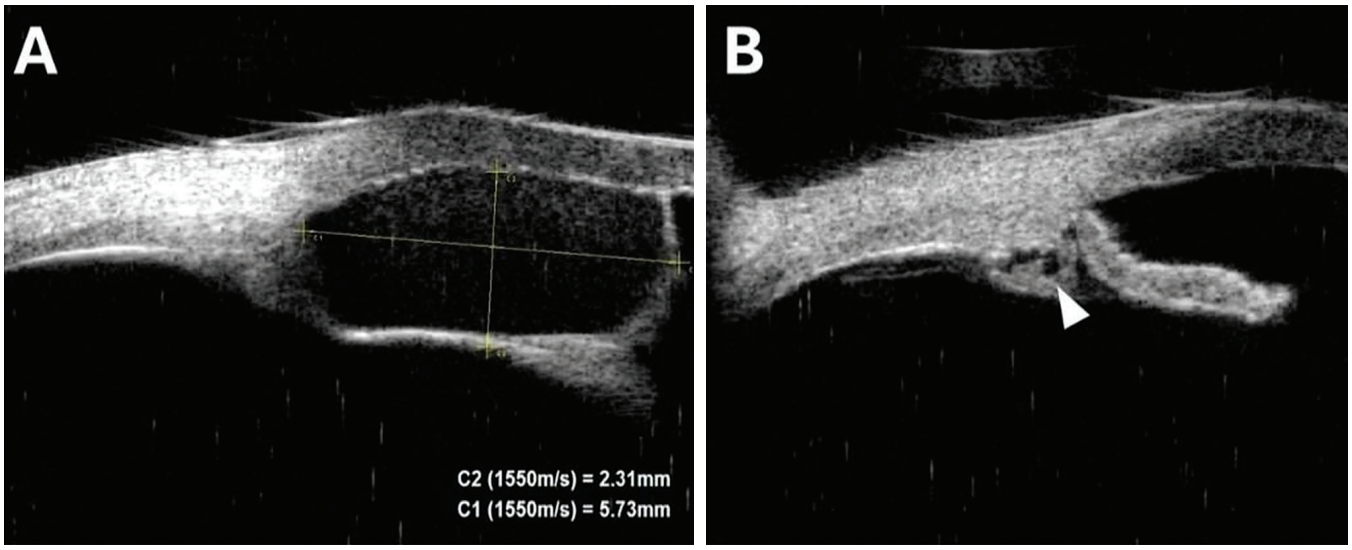

Figure 2. Ultrasound biomicroscopy (UBM) confirmed the presence of a single, unilocular stromal iris cyst extending onto the corneal endothelium at the inferonasal angle **(A)** and microcysts at the ciliary body (arrowhead) in the superior angle of the left eye **(B)**.

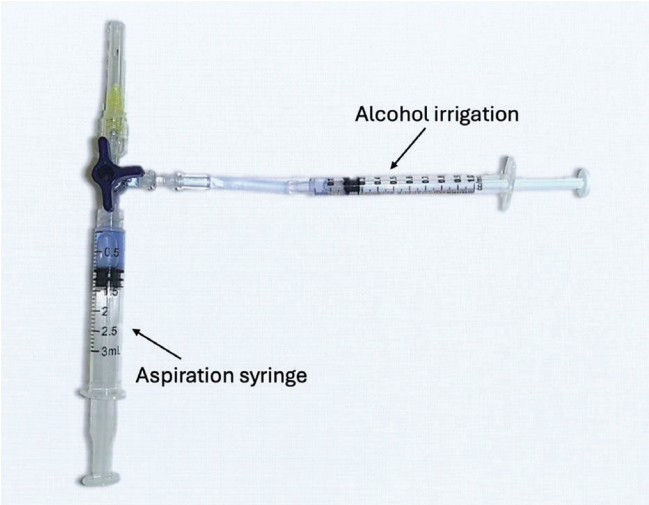

Figure 3. The modified three-port setup for absolute alcohol-induced sclerosis of iris stromal cyst consisted of a 3-way stopcock with a 30-gauge needle on the male luer locking port. The female ports were connected to a 3-mL aspiration syringe and a 1-mL alcohol irrigation syringe through a 4-cm extension tubing repurposed from an infusion set.

access to the inferiorly located iris cyst. Incisions were made at the 12 and 9 o'clock positions using a 15° straight ophthalmic knife. Dispersive viscoelastic (Viscoat®, Alcon Laboratories, Inc., USA) was injected into the anterior chamber to protect the endothelium. Under high magnification, the 30-gauge needle in the modified setup was introduced tangentially, with the bevel facing up, through the 6 o'clock limbus into the center of the cyst (Figure 4A). The cyst fluid was aspirated with the 3-mL syringe (Figure 4B) until the cyst was drained, avoiding needle contact with the cyst wall. Without changing the position of the needle, the control valve was switched to inject absolute alcohol, transforming the contents into a whitish precipitate (Figures 4C and 4D). With cyst overinflation, some alcohol leaked into the chamber (Figure 4E). The leaked alcohol was immediately aspirated, and the area was irrigated with balanced salt solution (BSS) (Figure 4F). After replacing the dispersive viscoelastic, a new 30-gauge needle was inserted, followed by careful injection of alcohol, which was allowed to remain for one minute before being aspirated. This process was repeated for four additional cycles. Unlike the first attempt, subsequent injections were more controlled and did not aim for complete reinflation to minimize the risk of leaks. After the final aspiration, the needle was removed, and the cyst walls were carefully peeled away from the endothelial attachments using microforceps (Figure 4G). As the cyst wall was removed, an opening formed, allowing for the removal of the remaining precipitates within the cyst. The strongly adherent attachments at the 6 o'clock position were left intact. The chamber was then irrigated with BSS, and the corneal wounds were sutured with 10-0 nylon.

The treatment regimen included topical prednisolone acetate 1% hourly with a weekly tapering schedule, moxifloxacin 0.5% four times daily until the sutures were removed after one week, and atropine sulfate 1% three times daily for two weeks. Anti-glaucoma medications were discontinued. Postoperatively, BCVA initially decreased to 20/125 due to focal corneal edema (Figure 5A) but improved to 20/35 by week 3 and 20/20 by week 5. Stromal edema and mild anterior chamber inflammation resolved by week 3. A collapsed cyst cavity and depressed iris were observed

inferonasally (Figure 5B). Anterior synechiae formed at the superior border of the cyst wall following atropine discontinuation (Figure 5C). The IOP initially stabilized at 12 mm Hg, spiked to 40 mm Hg by week 3 due to steroid response, and then returned to 7 mm Hg by week 5 after resuming timolol/brimonidine eyedrops twice daily. At 2 months, specular microscopy showed a reduced cell count in the left eye (1923 cells/mm^2 in OS compared to 3086 cells/mm^2 in OD), while pachymetry remained normal at 576 µm. In contrast, optical coherence tomography (OCT) of

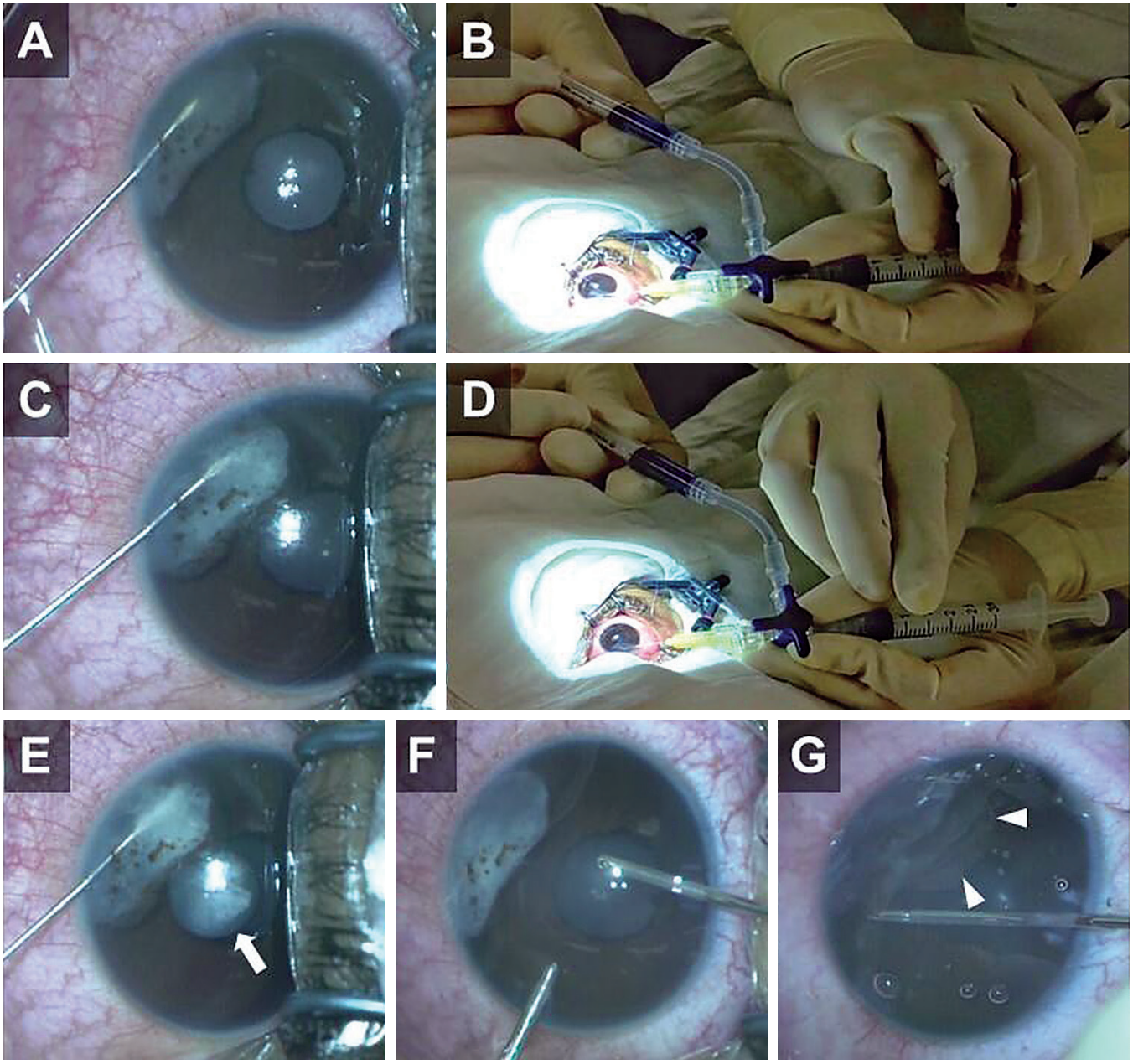

Figure 4. Technique for absolute alcohol-induced sclerosis of iris stromal cyst using a modified three-port setup. After filling the chamber with dispersive viscoelastic, a 30-gauge needle was introduced transcorneally into the cyst center, with the bevel facing up, followed by aspiration of the cyst fluid **(A)**. Note the direction of the stopcock valve for aspiration **(B)**. Absolute alcohol was injected, causing immediate precipitation, and left for one minute or until the cyst walls turned white **(C)**. The valve was turned clockwise to facilitate the injection of alcohol. The assistant managed the alcohol syringe **(D)**. Overfilling led to cyst rupture and alcohol leakage into the chamber *(arrow)* **(E)**, which was immediately aspirated and irrigated **(F)**. After four cycles of alcohol irrigation and aspiration, the cyst wall was separated *(arrowheads)* from the endothelium using microforceps **(G)**.

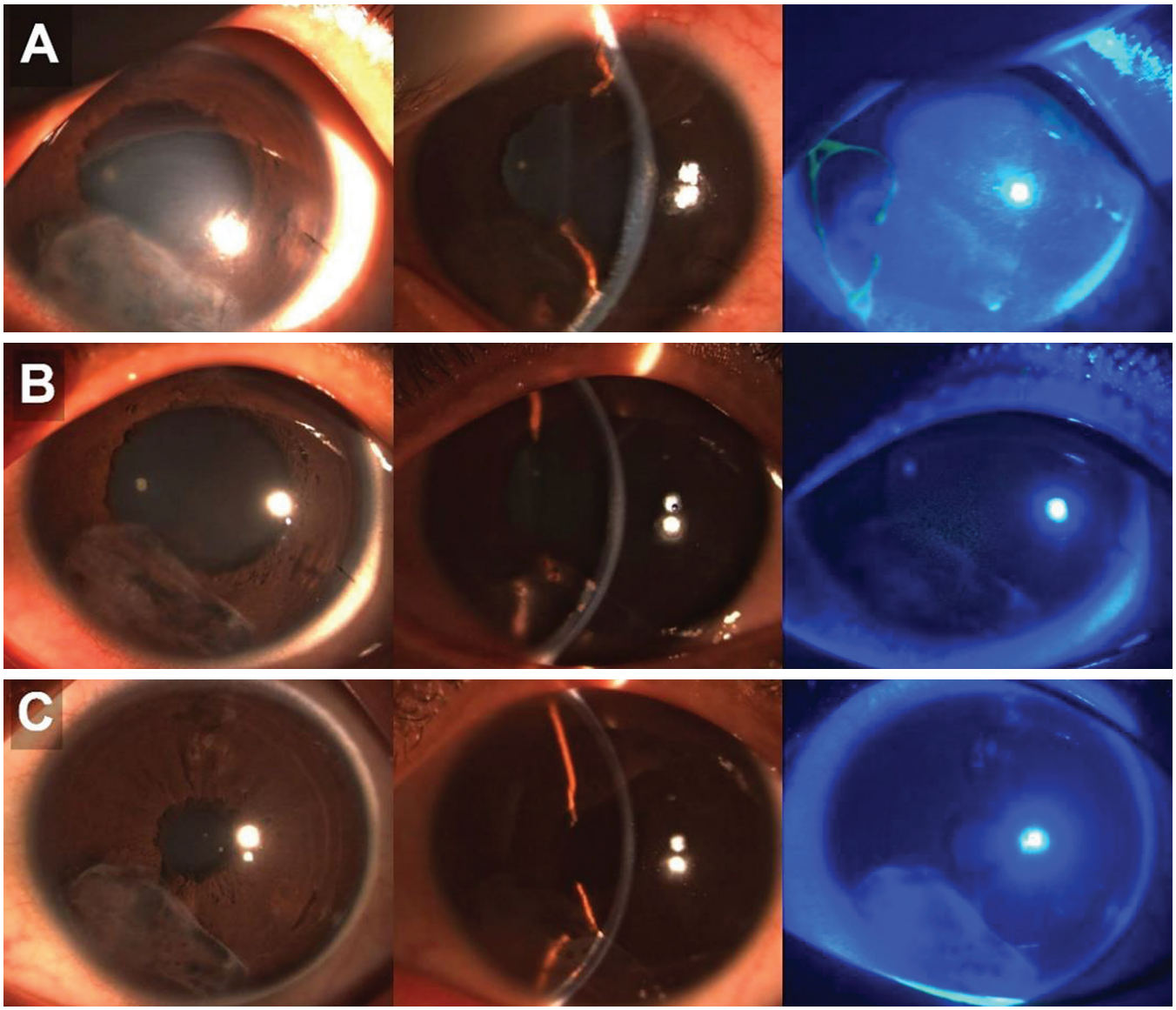

Figure 5. Postoperative slit-lamp photographs of the left eye. On day 1, central stromal edema was observed at the site of the alcohol leakage **(A)**. By week 3, the edema had subsided, revealing sectoral iris atrophy at the previous location of the cyst **(B)**. By week 5, anterior synechiae appeared at the superior cyst border, but no fluid recurrence was observed, and the cornea remained clear **(C)**.

the optic nerve head (ONH) showed unremarkable findings (Figure 6). At his most recent follow-up, 18 months later, the patient was asymptomatic, maintained a 20/20 BCVA, had an IOP of 15 mm Hg without medication, a clear cornea, and stable anterior chamber findings with no recurrence of cyst fluid (Figure 7).

DISCUSSION

Our patient had an iris stromal cyst in the left eye with no history of trauma, along with incidental findings of superior ciliary body cysts and bilateral iris flocculi, which were consistent with a congenital condition. Primary iris stromal cysts are generally sporadic, with no known genetic or syndromic associations reported in the literature. Similarly, iris flocculi are typically sporadic, and no genetic testing was conducted, as there were no clinical features suggestive of a syndrome or a family history indicative of an inherited condition. However, iris flocculi can also be familial and linked to *ACTA2* and *MYH11* gene mutations and the development of aortic aneurysms or dissections.[9] Therefore, genetic testing may be considered when financial circumstances allow, and ongoing monitoring and cardiac assessments are necessary to check for aortic disorders, particularly in adulthood.

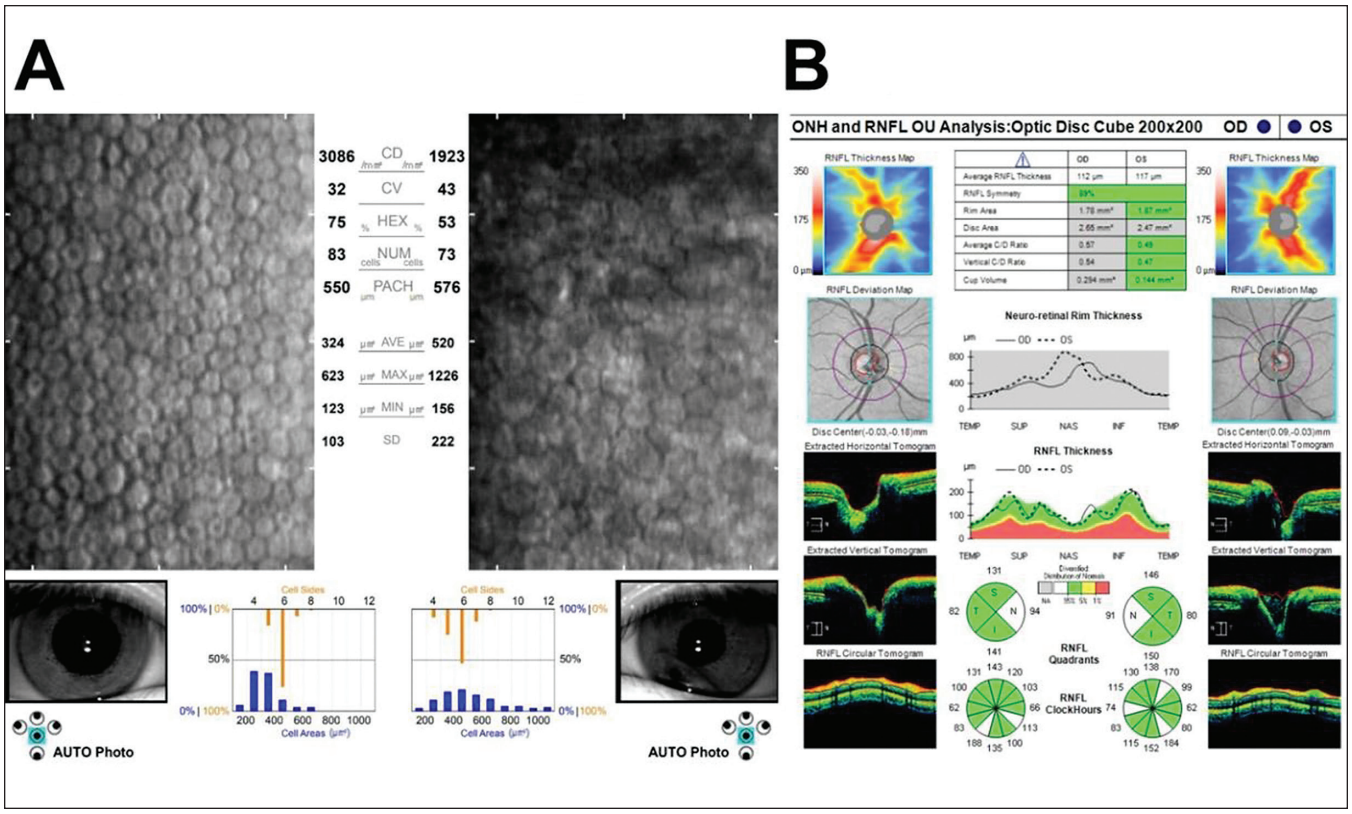

Figure 6. Postoperative diagnostics were performed two months post-surgery. Specular microscopy demonstrated a decrease in cell density (CD), an increase in the coefficient of variation (CV), and a decrease in hexagonality (HEX) in the left eye compared to the right eye; however, pachymetry was still within normal limits **(A)**. Optical coherence tomography (OCT) of the optic nerve head (ONH) showed comparable cup-to-disc ratios and retinal nerve fiber layer thickness in both eyes **(B)**.

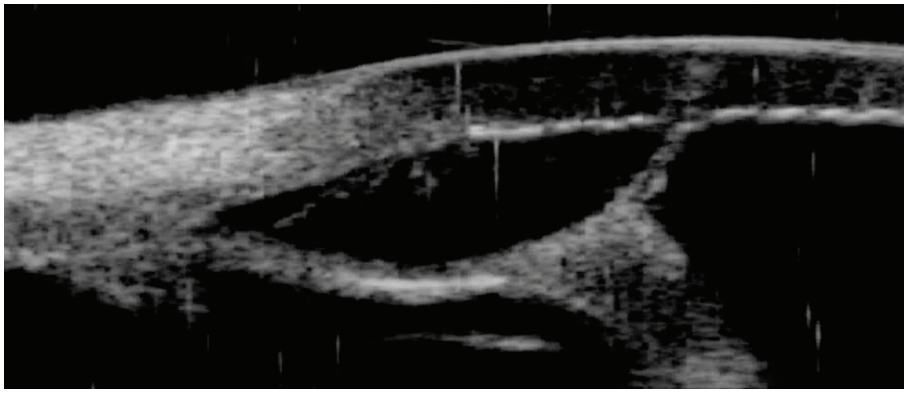

Figure 7. Postoperative ultrasound biomicroscopy (UBM) performed at 18 months post-surgery. There are anterior synechiae inferonasally, but there is no identifiable cystic mass causing angle closure.

Iris stromal cysts presenting in children before 10 years of age often enlarge and lead to complications such as secondary angle-closure glaucoma and corneal decompensation, requiring early intervention.[1,2] Less invasive procedures, such as argon or Nd:YAG laser, have been suggested as an initial approach, since surgical resection carries severe risks such as epithelial downgrowth, glaucoma, blindness, and loss of the eye.[1,3] However, laser procedures are challenging to perform in uncooperative pediatric patients. Therefore, alternative treatment options must be considered. Absolute alcohol was chosen as an adjuvant to fine-needle aspiration due to its high success rate in cyst involution (93-94%), sclerosing effect that minimizes recurrence, and good safety profile in children.[3,4] Additionally, absolute alcohol is inexpensive and readily available compared to antimitotic agents. In this paper, we described practical modifications to the technique for alcohol induced sclerosis of iris stromal cysts. We employed a 3-way stopcock as an accessible alternative to the 3-way

T extension originally reported by Shields et al.[3] A similar setup was demonstrated by Lomi, where both irrigation and aspiration syringes were directly attached to the stopcock.[8] However, this configuration required the surgeon to manage both syringes, making it difficult to simultaneously stabilize the needle. To address this issue, Hamill suggests that an assistant handle the other syringe to allow more precise fluid exchange.[5] A novel addition to this setup, aimed at improving ergonomics, was the addition of a 4-cm extension tubing to the alcohol irrigation syringe. This tubing, trimmed from the connector-tip end of the tubing of a standard infusion set, can be customized in length, enabling the assistant to operate comfortably without obstructing the surgeon. This also addresses the limitation of existing stopcock extensions, which are typically connected to the main port, rather than the side port.

Complications from absolute alcohol-induced sclerosis can occur, including transient corneal edema, inflammation, IOP elevation, and persistent cyst adherence to the endothelium.[3,4] Inadvertent alcohol exposure to the anterior chamber also remains a significant risk of this technique. Regarding endothelial damage, there is limited published data on specular microscopy conducted before and after interventions in similar cases of iris cysts. In their series, Behrouzi and Khodadoust used endothelial cell loss as an indicator of ethanol leakage; observing no changes in cell count, they concluded that there was no leakage.[4] They also reported transient anterior chamber reactions and pain in two cases involving alcohol leakage; however, they did not provide cell counts.[4]

Another report was unable to obtain preoperative endothelial measurements because of a large iris stromal cyst yet recorded a postoperative endothelial cell density of 1700 cells/mm^2 despite no evidence of alcohol leakage.[10] In our case, postoperative specular microscopy showed reduced endothelial cell density in the affected eye compared with the contralateral eye. The reduced cell density in our patient is consistent with experimental histologic studies demonstrating toxic effects of absolute alcohol on rabbit corneal endothelium and with a reported case of corneal decompensation after bleb revision using absolute alcohol.[11] However, since no preoperative specular microscopy was available, it is not possible to definitively attribute postoperative endothelial cell count reduction to alcohol leakage alone. Prolonged endothelial contact from the cyst could have affected the baseline endothelial cell count, which was then exacerbated by the sclerosing procedure and, particularly, by alcohol leakage, supported by the immediate postoperative development of central corneal edema coinciding with the area of leakage.

The local toxic effects of absolute alcohol emphasize the importance of proper technique, regardless of the apparatus used for the procedure. To protect the corneal endothelium, dispersive viscoelastic is essential, as it acts as a barrier against potential leakage and minimizes endothelial damage. Once adequate protection is ensured, the cyst should be entered through the area adherent to the endothelium, with careful aspiration to prevent complete collapse and inadvertent wall perforation.[3] A tangential approach further reduces the risk of piercing the cyst wall as it deflates. Alcohol injection should be performed with precision to prevent overfilling and leakage of the alcohol. As recommended by Shields, infusion should aim for subtotal reinflation using a 1-mL syringe to minimize the risk of cyst rupture.[3] In our procedure, a 3-mL syringe was used for alcohol infusion, and although this is feasible with careful injection, a 1-mL syringe may provide finer control over the injection volume, reducing the risk of overinflation. Careful monitoring of alcohol distribution is necessary to ensure effective sclerosis and prevent unintended leakage. Intraoperative OCT may enable real-time guidance for controlled aspiration and irrigation.[8,10] However, in resource-limited settings, constant magnified microscopic visualization remains essential. Alcohol in the cyst can be identified by cyst wall whitening, cyst content precipitation, bubbles, and cyst distension. When the adherent cyst wall obstructs direct visualization, evaluating the swelling in a non-primary gaze, such as a downward gaze for an inferiorly located cyst, may improve the view. Alcohol leakage into the chamber typically appears as whitish precipitates or swirls, which can be directly visualized.[4] Although trypan blue has been anecdotally used to detect leakage, there is no direct evidence supporting its effectiveness. The reported intraocular staining concentration of trypan blue can be as low as 0.0125%.[12] In our case, the trypan blue dye might have been too diluted to enhance intraocular visualization and could have been obscured by alcohol-induced precipitation. From our experience, mixing trypan blue with absolute alcohol did not improve the visualization of alcohol leakage and may not be necessary for this procedure. However, undiluted trypan blue (Vision Blue, 0.06%, DORC International), when applied independently, may serve other purposes, such as aiding in the visualization of the cyst wall for complete removal with a vitrectomy system.[13]

Our modified three-port approach enabled multiple cycles of absolute alcohol aspiration and irrigation, effectively treating the cyst using readily available materials. However, this technique has limitations, including the challenge of working with small volumes, difficulty in turning the control valve if not adequately loosened, risk of alcohol leakage, and the risk of incomplete cyst wall removal, which may lead to anterior synechiae. While long-term follow-up is needed to assess potential late recurrence, this case contributes to the existing literature on iris cyst management and may guide future treatment strategies, particularly in pediatric patients. This presents a viable option for managing iris stromal cysts in resource-limited settings and may also be adaptable for use with other sclerosing agents in cases of recurrence. Further studies comparing this modified approach with other techniques would be valuable for establishing its relative efficacy and safety.

CONCLUSION

This case report demonstrated a modified three-port approach for absolute alcohol-induced sclerosis for the effective treatment of a primary iris stromal cyst with secondary ocular hypertension in a pediatric patient. The procedure resulted in regression of the cyst and normalization of the intraocular pressure, preventing the progression to glaucoma and the need for more invasive surgeries. Minor complications, such as transient corneal edema and anterior chamber inflammation, were resolved with appropriate management. The persistence of endothelial adherence highlights the challenges in completely detaching the cyst wall. To minimize further endothelial compromise, it is crucial to protect the corneal endothelium using dispersive viscoelastic and to carefully control the volume of alcohol injected to prevent inadvertent alcohol leakage. This modified technique using a 3-way stopcock and customized extension tubing provides a practical and reproducible option for managing iris stromal cysts, particularly benefiting patients in resource-limited settings and offering an effective alternative to more complex surgical interventions.

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Statement of Authorship

All authors certified fulfillment of ICMJE authorship criteria.

Author Disclosure

All authors declared no conflicts of interest.

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REFERENCES

1. Georgalas I, Petrou P, Papaconstantinou D, Brouzas D, Koutsandrea C, Kanakis M. Iris cysts: A comprehensive review on diagnosis and treatment. Surv Ophthalmol. 2018 May-Jun;63(3):347-364. doi: 10.1016/j.survophthal.2017.08.009. PMID: 28882598.
2. Shields JA, Shields CL, Lois N, Mercado G. Iris cysts in children: classification, incidence, and management. The 1998 Torrence A Makley Jr Lecture. Br J Ophthalmol. 1999 Mar;83(3):334-8. doi: 10.1136/bjo.83.3.334. PMID: 10365043; PMCID: PMC1722970.
3. Shields CL, Arepalli S, Lally EB, Lally SE, Shields JA. Iris stromal cyst management with absolute alcohol-induced sclerosis in 16 patients. JAMA Ophthalmol. 2014 Jun;132(6):703-8. doi: 10.1001/jamaophthalmol.2014.160. PMID: 24723076.
4. Behrouzi Z, Khodadoust A. Epithelial iris cyst treatment with intracystic ethanol irrigation. Ophthalmology. 2003 Aug;110(8):1601-5. doi: 10.1016/s0161-6420(03)00543-8. PMID: 12917180.
5. Hamill B, Iris cyst Rx c ETOH [Internet]. 2020 [cited 2025 Feb]. Available from: https://www.youtube.com/watch?v=lmtYfjEwu_A
6. Wang MY, Kim G, Post-traumatic iris cyst requiring ethanol irrigation in Millenial Eye [Internet]. 2017 [cited 2025 Feb]. Available from: https://millennialeye.com/articles/2017-may-jun/post-traumatic-iris-cyst-requiring-ethanol-irrigation/
7. Ali BMH, Zhang W, Materin MA, Iris stromal cyst aspiration and irrigation with absolute alcohol in American Academy of Ophthalmology [Internet]. 2018 [cited 2025 Feb]. Available from: https://www.aao.org/education/clinical-video/iris-stromal-cyst-aspiration-irrigation-with-absol#disqus_thread
8. Lomi N, Triple treatment therapy for primary iris cyst [Internet]. 2023 [cited 2025 Feb]. Available from: https://www.youtube.com/watch?v=maKr4AfHDws
9. Redden LD, Lakosha H, Riaz KM. Successful treatment of bilateral familial iris flocculi associated with aortic valve abnormalities. Am J Ophthalmol Case Rep. 2025 Jul 12;39:102386. doi: 10.1016/j.ajoc.2025.102386. PMID: 40718499; PMCID: PMC12296538.
10. Lim SH, Dimacali VG, Mehta JS. Intraoperative optical coherence tomography guided iris stromal cyst treatment with absolute alcohol injection. Am J Ophthalmol Case Rep. 2022 Jul 3;27:101648. doi: 10.1016/j.ajoc.2022.101648. PMID: 35813582; PMCID: PMC9263856.
11. Perkins TW, Kumar A, Kiland JA. Corneal decompensation following bleb revision with absolute alcohol: clinical pathological correlation. Arch Ophthalmol. 2006 May;124(5):738-41. doi: 10.1001/archopht.124.5.738. PMID: 16682599.
12. Jhanji V, Chan E, Das S, Zhang H, Vajpayee RB. Trypan blue dye for anterior segment surgeries. Eye (Lond). 2011 Sep;25(9):1113-20. doi: 10.1038/eye.2011.139. PMID: 21681214; PMCID: PMC3178243.
13. Borgia A, Airaldi M, Semeraro F, Patel S V, Romano V. Trypan blue-assisted iris cyst excision. Am J Ophthalmol Case Rep. 2025 Feb 7;38:102275. doi: 10.1016/j.ajoc.2025.102275. PMID: 40094033; PMCID: PMC11907482.