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Argon laser photocoagulation for the treatment of challenging iris cysts: A case series

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Abstract

Purpose: This study aims to highlight three cases of challenging and recurrent iris cysts and emphasize argon laser as a potential therapeutic solution.

Case reports: This case series presents three patients of varying ages, each with distinct manifestations of iris cysts, treated using different therapeutic approaches. In Case 1, a 15-year-old boy with a large iris cyst causing corneal edema and elevated intraocular pressure received cyst aspiration and ethanol injection initially. After recurrence, two sessions of argon laser photocoagulation were administered. Case 2 involved an 8-month-old infant with corneal edema and band keratopathy alongside a sizable iris cyst. The primary treatment comprised cyst aspiration and ethanol injection, supplemented by argon laser treatment. Subsequently, the cyst was marsupialized, and argon laser was used again upon recurrence. Case 3 pertains to a 52-year-old man with an iris cyst, treated through several sessions of argon laser photocoagulation. There was no evidence of recurrence after more than 1.5 years of follow-up in all cases.

Conclusion: Successful treatment of iris cysts is demonstrated in this series of cases utilizing minimally invasive argon laser photocoagulation.

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Keywords: Iris cyst; Laser photocoagulation; Intracystic ethanol injection.

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Introduction

Elevation and irregularity of the iris can be concerning, as they may be indicative of serious conditions such as iris or ciliary body tumors. However, these symptoms are more commonly associated with benign and uncommon conditions, one of which is iris cysts [1,2]. There are several classifications for iris cysts, with the widely used classification proposed by Shields dividing them into primary and secondary types [3,4]. Primary iris cysts originate from neuroepithelial cells. Although posterior pigment epithelial cysts comprise the majority of Primary iris cysts, Primary cysts can be found inside the iris stroma and even as free-floating cysts in the anterior chamber or vitreous cavity [5]. Most primary iris cysts, especially those found in adulthood, typically show minimal growth over time and do not usually require treatment due to the rarity of subsequent complications. On the other hand, secondary iris cysts are caused by specific underlying factors such as penetrating trauma (implantation cysts), certain medications such as miotics or latanoprost, uveitis, and tumors. Implantation cysts can be solid (pearl) or fluid-filled (serous) and are a type of secondary cyst [1]. Secondary cysts have the potential to grow larger and are associated with complications such as secondary glaucoma, corneal edema, astigmatism, uveitis, and cataracts [6,7]. As a result, therapeutic interventions may be necessary for these types of cysts [8]. The management of iris cysts depends on their type, growth rate, and associated complications. While asymptomatic cysts may not require immediate intervention, regular monitoring is recommended. Intervention is typically considered when the cyst becomes large enough to occupy over half of the anterior chamber or shows signs of growth or complications [3,5,8]. There are several management options available regarding iris cysts, including drainage, surgical excision, electrocautery, cryoablation, photocoagulation, or even intracystic irrigation of cytotoxic agents such as ethanol. However, most of these methods are either surgically invasive, impermanent with temporary relief, or both. Therefore, it is crucial to consider various parameters when selecting the appropriate treatment option, with the primary goal being minimal invasiveness. Laser treatment is a less invasive approach that has shown promising results, however, surgical intervention is the last choice as it

is more invasive [3]. In this series of cases, we present three patients referred to the cornea department at Farabi Eye Hospital. These individuals were diagnosed with iris cysts that proved to be recurrent and resistant to treatment. We will also provide a comprehensive review of their treatment journeys.

Findings

Case 1: A 15-year-old boy suffering from pain and vision loss for the past 3 months was referred to the cornea department. The patient mentioned repeated blows to the face while exercising. He had developed corneal edema and intraocular pressure (IOP) rise during the previous 2 weeks and had been examined and followed up in other centers where he was treated with medications before being referred to our clinic. In the slit lamp examination, a large iris cyst was located superiorly that had filled about two-thirds of the anterior chamber. The cyst was in contact with the cornea and obscured the visual axis. IOP was 28 mmHg on timolol and corneal edema was significant. Therefore, the patient was scheduled for surgical intervention. Cyst fluid was gently emptied by a 27-gauge needle via a small paracentesis through the superior clear cornea under general anesthesia. The aspirated fluid was sent for cytological analysis, and no evidence of a malignancy was identified. Without removing the needle tip from the eye, the syringe was replaced with another syringe containing ethanol (ETOH). The amount of ethanol was equal to the amount of fluid removed from the cyst. Subsequently, ETOH was gently irrigated into the cyst until the wall of the cyst became white which took around one minute. ETOH was then aspirated and the needle was removed. Paracentesis from the peripheral cornea opposite the cyst was used to inject viscoelastic and maintain the anterior chamber during the procedure. The cyst was then viscodissected and separated from the surrounding tissues of the cornea. Using compressive forces, the cyst was deflated and flattened. The anterior chamber was irrigated and incisions were sealed. The patient received postoperative treatment with topical antibiotics, atropine, and dexamethasone eye drops for 2 weeks. After 2 months of follow-up, a local recurrence was seen. As the patient was young and phakic we decided not to carry out more invasive surgical procedures. Argon laser photocoagulation was therefore chosen as the next treatment procedure. Two hundred twenty-five 500-µm irradiation spots, at 200 to 300 mW output power and 0.2 s in duration, were applied first to the posterior wall of cyst then to the anterior wall and surrounding iris in a continuous fashion. After one week of follow-up, cyst size significantly decreased. Argon laser photocoagulation was repeated in two sessions until the cyst flattened. There were no signs of recurrence during the next six months when a small local recurrence was detected. Another session of argon laser photocoagulation was sufficient to flatten the cyst. There were no signs of recurrence during the next 3 years of follow-up. Final visual acuity was 20/20 and IOP was 15 mmHg (Figure 1).

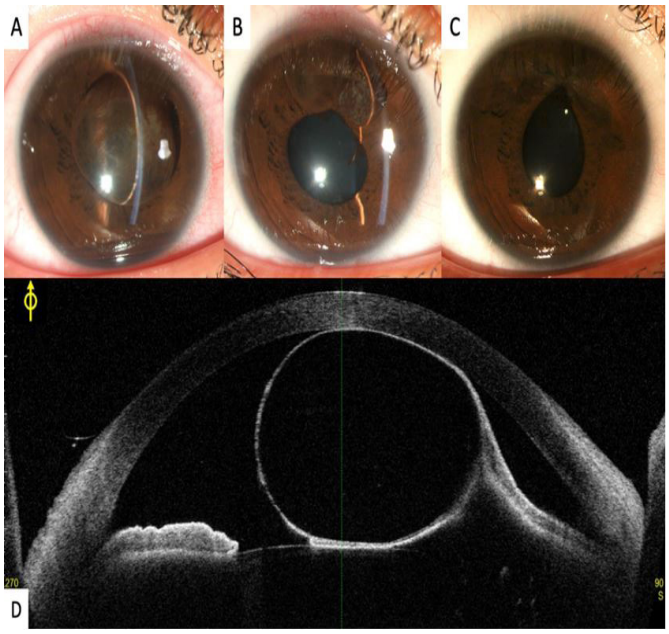

Figure 1: An iris cyst is seen superiorly in the anterior chamber obscuring the visual axis (A). Despite cyst aspiration and ethanol injection, the recurrence of the cyst is observed (B) and after two sessions of argon laser photocoagulation (C). AS-OCT shows a vertical cross-section of the cyst occupying more than half of the anterior chamber (D).

Case 2: An 8-month-old infant with a sizable iris cyst in the left eye was referred to the clinic. The parents first noticed the small cyst when the child was 4 months old, and it had been monitored by an ophthalmologist. However, due to a gradual increase in size, the patient was subsequently referred to our center. During the examination under anesthesia, a large iris cyst was identified, situated nasally, occupying more than half of the anterior chamber, and attached to the cornea. The cornea displayed edema. Band keratopathy was evident, and the visual axis was obstructed, necessitating surgical intervention. Similar to the previous case, the cyst was initially drained through aspiration and ethanol injection. A second peripheral corneal paracentesis, positioned diagonally opposite the cyst, facilitated the injection of viscoelastic to completely separate the cyst walls from surrounding structures. When the cyst was flattened, endolaser photocoagulation was performed using a 20-gauge argon laser probe through the second paracentesis. The laser was applied to encircle the cyst and then directly to the cyst roof, titrated to induce tissue shrinkage and closure of the potential space (184 spots; mean power, 215 mW range, 50-440 mW; duration, 50-100 milliseconds). Postoperative medications included topical corticosteroids and antibiotics for two weeks. Upon examination two months post-treatment, the cyst was absent. However, signs of recurrence were observed approximately four months after surgery, leading to the scheduling of retreatment five months post-surgery. The subsequent intervention involved anterior cyst wall marsupialization and argon laser photocoagulation. No signs of recurrence were observed during the 1.5 years of follow-up.

Case 3: A 52-year-old man was referred to our clinic with an iris cyst in the right eye. He had a history of blunt trauma one year before. The cyst had increased in size over the last three months. On slit lamp examination, a large inferior cyst occupying about one-third of the anterior chamber was observed. it was in contact with the cornea. Although the visual axis was unobstructed, the visual acuity had decreased to 20/40. As the patient was phakic and refused surgical intervention, we planned argon laser photocoagulation at the outset. This was performed in the same fashion as explained in case 1. The anterior wall could not be treated adequately due to its contact with the cornea. The cyst size was significantly decreased after a one-week follow-up. Argon laser photocoagulation was repeated 1 month later, after which the size was further reduced. However, the anterior wall of the cyst remained attached to the cornea, and this intact wall caused fluid retention and accumulation in the cyst after a while. Over the next 2 months, the cyst slightly enlarged. The patient was therefore advised to have surgery to remove the

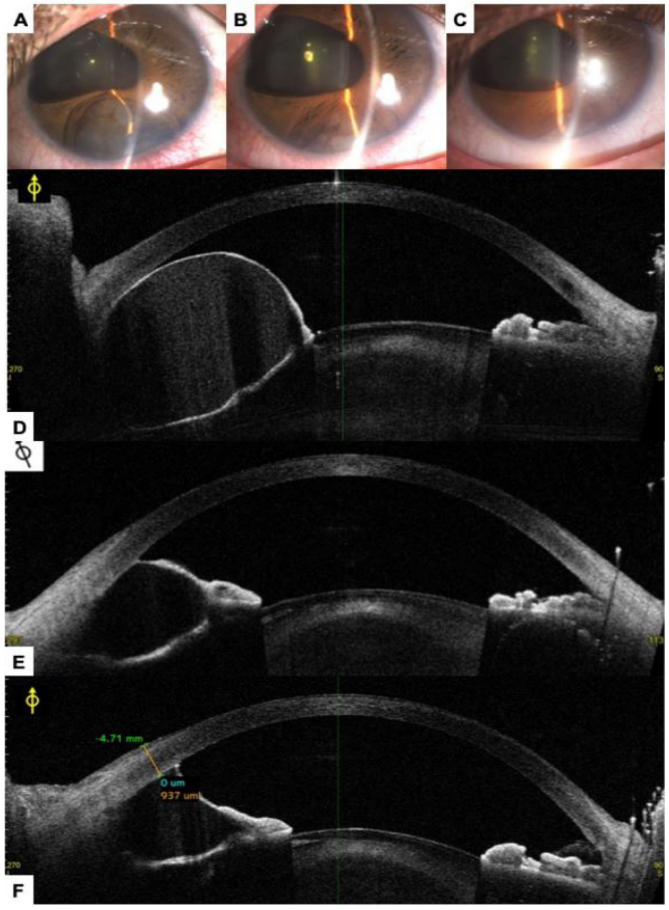

Figure 2: An iris cyst is observed in the anterior chamber prior to treatment (A). Subsequent images showcase the cyst following the initial session of argon laser photocoagulation (B) and after the second session of treatment (C). Accompanying AS-OCT scan reveals incomplete resolution of the cyst following the final treatment. It is important to note that due to the cyst's attachment to the corneal endothelium, achieving adequate treatment of the anterior cyst wall was challenging, resulting in an inability to achieve complete cyst resolution (F).

cyst wall from the cornea, but the patient was reluctant to have the surgery. During a year of follow-up, two additional laser sessions were required. Throughout this follow-up period, the cyst maintained a small and stable size, showing no return to its original dimensions. Consequently, no further treatment was necessary. The patient sustained a Vision of 20/25, and the IOP measured at 14 mmHg (Figure 2).

Discussion

The treatment of iris cysts depends on their natural course and consequent complications rather than their classification. Although the behavior of the majority of primary epithelial cysts is benign, iris stromal cysts, especially if found in childhood, tend to enlarge, resulting in obscuration of the visual axis and amblyopia. Such a condition demands urgent intervention [8]. Secondary iris cysts grow faster and are more likely to cause complications, including secondary glaucoma, corneal decompensation, astigmatism, uveitis, amblyopia, and cataracts. Therefore, secondary cysts usually require more interventions [9,10]. The treatment of iris cysts begins in a step-by-step manner. Asymptomatic cysts usually do not need any intervention and can be observed through regular follow-up. Observation is ceased if the cyst is large enough to occupy more than half of the anterior chamber or if the cyst has shown growth or complications such as glaucoma and corneal decompensation are encountered [3,5,11]. There are numerous reports indicating that iris cysts exhibit high resistance to treatment and they frequently recur after different treatment methods, which can be accompanied by potentially destructive and sight-threatening complications [12]. Even invasive treatments like removing part of the patient's iris, have shown a possibility of recurrence. Waeltermann et al. have reported a resilient case of congenital iris cyst in a 7-year-old, where the cyst returned to its original size after needle aspiration, argon iridotomy, marsupialization, and excisional iridotomy. Cryogenic therapy was eventually required to eliminate the cyst [12]. While surgical excision may be more successful in treating the cystic form of epithelial invasion, there have been six reported cases where surgical excision converted the cyst into a more serious and difficult-to-treat downgrowth type of invasion. This highlights how surgical manipulation can inadvertently worsen the condition. Therefore, less invasive methods allow for more continuous treatment of the patient without significant damage to the eyes. Hence, employing less invasive methods becomes essential to ensure continuous patient treatment without causing significant damage to the eyes. Aspiration of the cyst fluid and intracystic injection of absolute alcohol is another treatment option. In this method, the content of the cyst is aspirated and the same amount of ethanol is injected through the same needle. This method has been documented to be efficacious with only a transient inflammatory response after the procedure [13,14]. Similar therapeutic intervention can be carried out by using antimitotic agents such as mitomycin-C and 5-fluorouracil [15,16]. Laser treatment of iris cysts is a noninvasive therapeutic option. Different kinds of lasers have been utilized in this regard, including thermal (argon or diode laser) and Nd:YAG laser [17,19]. Thermal lasers permanently damage the cyst wall through coagulation and shrinkage, thus preventing further production of intracystic material, while Nd:YAG laser prevents accumulation of intracystic material through penetration of the cyst wall. Laser treatments have been demonstrated to eradicate or stabilize iris cysts [3,17]. In this case series, we reported three cases of challenging recurrent iris cysts successfully treated with laser therapy. The third case was treated using the argon laser alone, after which the cyst gradually shrank and became stable after 1 year of follow-up. It can be postulated that this cyst didn't shrink completely because the anterior surface of the cyst could not be photocoagulated due to its contact with the cornea. Sugar et al. used argon laser to treat 5 iris cysts by coagulating the margins and walls of the cysts, with 1-week intervals between laser sessions. Of their 5 cysts, 3 faded away and one remained stable after shrinkage [17]. We had a similar result with 2 sessions of laser treatment at a 1-month interval. In cases 1 and 2, we initially used cyst aspiration and ethanol injection, following the same method as Behrousi and Khodadoust, who infused the same amount of ethanol after aspirating the cysts' contents. However, unlike our patients whose cysts recurred after primary treatment with ethanol, they reported successful treatment of 98 out of 99 cysts, with only 5 requiring re-treatment [13]. Shields et al. also reported the involution of 13 out of 15 cysts and the stabilization of 1 cyst after ethanol infusion, with successful results achieved in 10 cysts after only one session [14]. We think that aspiration of the cyst minimizes the surface area, limits dissemination of the contents, and reduces the required laser treatment parameters. In case 1, we utilized argon laser photocoagulation after recurrence, and in case 2 as adjunctive therapy with intracystic ethanol injection. The cysts were obliterated with a few sessions of argon laser photocoagulation, and there was no evidence of recurrence after more than 1.5 years of follow-

up (up to 3 years in case 1). In these cases, we utilized argon laser treatment, following a similar approach as Scholz et al., who effectively addressed two post-keratoplasty iris cysts. In this fashion, laser treatment starts on the posterior surface and then progresses to the anterior wall and surrounding tissues [20]. Haller et al. reported using cyst aspiration with endolaser photocoagulation for 4 cysts and en bloc resection for 3 cysts. They concluded that conservative management of iris cysts can be effective with less damage to other ocular structures [21]. Despite the potential risks associated with reported treatments for iris cysts, such as hemorrhage, uveitis, iris atrophy, varying rates of endothelial damage, and cataract formation, our case series did not present any instances of these complications. This case series supports the limited number of published reports on the management of iris cysts with photocoagulation and we recommend this treatment as a minimally invasive option. We believe that safe separation of iris cysts from surrounding structures with or without controlled surgical drainage of the contents, optimizes the effectiveness of photocoagulation.

Conclusion

This case series demonstrates successful step-by-step management of recurrent iris cysts using a few sessions of laser therapy in combination with intracystic ethanol injection or marsupialization, with no evidence of recurrence after a considerable follow-up period. Laser photocoagulation, being a minimally invasive technique, proves to be an effective treatment choice for both primary and recurrent iris cysts.

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References

1. Konopińska J, Lisowski Ł, Mariak Z, Obuchowska I. Clinical features of iris cysts in long-term follow-up. Journal of Clinical Medicine. 2021; 10(2): 189. https://doi.org/10.3390/jcm10020189.

2. Shields JA, Sanborn GE, Augsburger JJ. The differential diagnosis of malignant melanoma of the iris: a clinical study of 200 patients. Ophthalmology. 1983; 90(6): 716-20. https://doi.org/10.1016/S0161-6420(83)34500-0.

3. Georgalas I, Petrou P, Papaconstantinou D, Brouzas D, Koutsandrea C, Kanakis M. Iris cysts: a comprehensive review on diagnosis and treatment. Survey of Ophthalmology. 2018; 63(3): 347-64. https://doi.org/10.1016/j.survophthal.2017.08.009.

4. Shields CL, Kancherla S, Patel J, Vijayvargiya P, Suriano MM, Kolbus E, Badami A, Sharma P, Jacobs E, Voluck M, Zhang Z. Clinical survey of 3680 iris tumors based on patient age at presentation. Ophthalmology. 2012; 119(2): 407-14. https://doi.org/10.1016/j.ophtha.2011.07.059.

5. Rao A, Gupta V, Bhadange Y, Sharma R, Shields JA. Iris Cysts:A Review. Semin Ophthalmol. 2011; 26(1): 11-22. https://doi.org/10.3109/08820538.2010.541319.

6. Grutzmacher RD, Lindquist TD, Chittum ME, Bunt-Milam AH, Kalina RE. Congenital iris cysts. The British journal of ophthalmology. 1987; 71(3): 227. https://doi.org/10.1136/bjo.71.3.227.

7. Naumann G, Green WR. Spontaneous nonpigmented iris cysts. Archives of Ophthalmology. 1967; 78(4): 496-500. https://doi.org/10.1001/archopht.1967.00980030498016.

8. Dubey S, Pegu J, Jain K. Iris cysts: Varied presentations and review of literature. Saudi J Ophthalmol. 2022; 35(4): 341-346. https://doi.org/10.4103/sjopt.sjopt_228_21.

9. 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; 27: 101648. https://doi.org/10.1016/j.ajoc.2022.101648.

10. Köse HC, Gündüz K, Hoşal MB. Iris Cysts: Clinical Features, Imaging Findings, and Treatment Results. Turk J Ophthalmol. 2020; 50(1): 31-36. https://doi.org/10.4274/tjo.galenos.2019.20633.

11. Shen CC, Netland PA, Wilson MW, Morris WR. Management of congenital nonpigmented iris cyst. Ophthalmology. 2006; 113(9): 1639. https://doi.org/10.1016/j.ophtha.2006.04.014.

12. Waeltermann JM, Hettinger ME, Cibis GW. Congenital cysts of the iris stroma. Am J Ophthalmol. 1985; 100(4): 549-554. https://doi.org/10.1016/0002-9394(85)90680-4.

13. Behrouzi Z, Khodadoust A. Epithelial Iris Cyst Treatment with Intracystic Ethanol Irrigation. Ophthalmology. 2003; 110(8): 1601-5. https://doi.org/10.1016/S0161-6420(03)00543-8.

14. 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; 132(6): 703-708. https://doi.org/10.1001/jamaophthalmol.2014.160.

15. Kawaguchi K, Yamamoto S, Nagae Y, Okada AA, Iwasaki N, Tano Y. Treatment of recurrent giant iris cyst with intracyst administration of mitomycin C. British Journal of Ophthalmology. 2000; 84(7): 799. https://doi.org/10.1136/bjo.84.7.799b.

16. Lai MM, Haller JA. Resolution of epithelial ingrowth in a patient treated with 5-fluorouracil. Am J Ophthalmol .2002; 133(4): 562. e4. https://doi.org/10.1016/S0002-9394(01)01419-2.

17. Sugar J, Jampol LM, Goldberg MF. Argon laser destruction of anterior chamber implantation cysts. Ophthalmology. 1984; 91(9): 1040. e4. https://doi.org/10.1016/S0161-6420(84)34184-7.

18. Kemmanu V, Yadav NK, Rachna VK, Devi S. Iris stromal cyst with cataract managed by cyst aspiration and diode laser photocoagulation in achild. Indian J Ophthalmol. 2011; 59(4): 333. e4. https://doi.org/10.4103/0301-4738.82017.

19. Baranwal VK, Kumar S, Gaur S, Satyabala K, Dutta AK, Murthy PK. An uncommon case of primary iris cyst managed with Nd YAG laser. medical journal armed forces india. 2015; 71: S82-4. https://doi.org/10.1016/j.mjafi.2013.04.001.

20. Scholz RT, Kelley JS. Argon laser photocoagulation treatment of iris cysts following penetrating keratoplasty. Arch Ophthalmol. 1982; 100(6): 926. e7. https://doi.org/10.1001/archopht.1982.01030030934006.

21. Haller JA, Stark WJ, Azab A, Thomsen RW, Gottsch JD. Surgical management of anterior chamber epithelial cysts. Am J Ophthalmol. 2003; 135(3): 309-313. https://doi.org/10.1016/S0002-9394(02)01960-8.