

IATROGENIC CYCLODIALYSIS CLEFT

After closure of the cleft, this patient experienced intense pain and an extreme elevation in IOP that was refractory to medical management.

BY JACOB BRUBAKER, MD; JOHN T. LIND, MD, MS; AND LEONARD K. SEIBOLD, MD

CASE PRESENTATION

A 75-year-old man presented for a second opinion. The patient stated that his vision had been distorted since he had undergone cataract surgery 18 months earlier on his right eye. He said that glasses had not been helpful and that, after many visits, his surgeon had tried a “gel injection procedure” that resulted in several days of intense pain but did not improve vision. The patient said that, in addition to cataract surgery, angle-based surgery had been attempted to treat his glaucoma.

On examination, UCVA was 20/150 with a pinhole acuity of 20/40 OD and 20/25 OS. IOP was 3 mm Hg OD and 13 mm Hg OS. Notable findings at the slit lamp were corneal folds in the right eye and a well-positioned posterior chamber

IOL in each eye. A fundus examination revealed moderate cupping of both optic nerves and macular folds in the right eye. Gonioscopy showed a grade IV angle with a nasal cyclodialysis of 1.5 clock hours in the nasal angle of the right eye (Figure 1) and a well-positioned first-generation iStent Trabecular Micro-Bypass Stent (Glaukos) in the nasal angle of the left eye. OCT imaging revealed optic nerve cupping and macular folds (Figures 2 and 3).

A diagnosis of iatrogenic cyclodialysis cleft as the cause of the low IOP and resulting poor vision as well as the required repair were discussed with the patient. One day after the repair, IOP was 18 mm Hg, UCVA was 20/50, and the patient

was very happy. The next day, he called to report pain and blurry vision. On examination, IOP was 43 mm Hg. The elevated IOP persisted during the ensuing week despite the use of a fixed combination of dorzolamide and timolol, brimonidine, travoprost, and acetazolamide. The patient reported intense pain and an inability to sleep. He said that he was exhausted and desperately desired a solution after all his struggles.

How would you have approached the initial cyclodialysis repair? Now that the IOP is elevated despite aggressive medical management, how would you proceed?

—Case prepared by Jacob Brubaker, MD

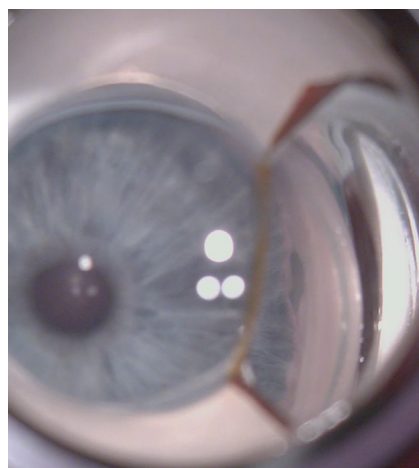


Figure 1. A gonioscopic view of the nasal angle of the right eye reveals a cyclodialysis cleft.

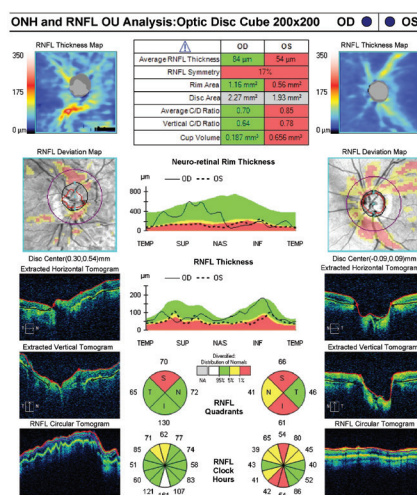


Figure 2. OCT of the optic nerve.

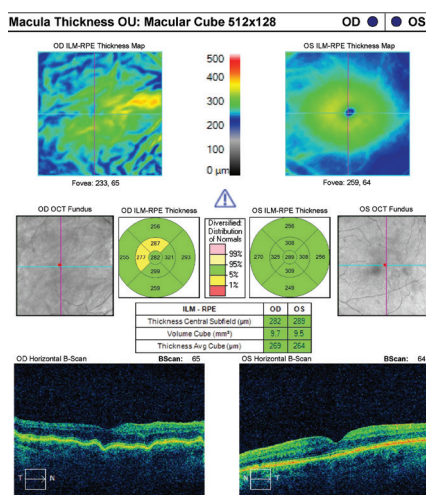


Figure 3. OCT shows macular folds from chronic hypotony.

**JOHN T. LIND, MD, MS**

I find cyclodialysis repairs to be some of my most challenging and rewarding surgeries. Occasionally, a cyclodialysis cleft cannot be verified in the clinic by gonioscopy because of anterior segment shallowing, but anterior segment imaging can be performed in an attempt to delineate the size and position of the cleft. In this situation, intraoperative gonioscopy with the aid of an OVD can help with the delineation of the cleft.

Multiple modalities for the closure of a cleft have been described, including medical management, laser ablation, transscleral cryosurgery, and intravitreal gas injection. I have successfully corrected cyclodialysis clefts surgically in two ways, direct cyclopexy¹ and the use of a sulcus-sutured capsular tension ring (off-label indication).² The location and size of the cleft determine which technique I use.

This case demonstrates the importance of anticipatory guidance for patients. I explain that, if the cleft repair is truly effective, they will not like me for a few days. Patients with repaired clefts frequently experience severe pain and blurred vision secondary to an acute rise in IOP. These IOP spikes can often be managed medically until the conventional outflow system kicks into gear. If, however, a gonioscopic examination reveals extensive synechiae formation in the angle, the IOP may not normalize.

In this case, the choice of surgical intervention depends on the extent of preexisting cupping and visual field loss and on the IOP. If the target IOP is not achieved, a trabeculectomy or the implantation of a Xen Gel Stent (Allergan) or a glaucoma drainage

device can be considered. Mechanisms causing steroid-induced glaucoma should be considered if the patient was treated with these agents for months before the repair.

**LEONARD K. SEIBOLD, MD**

For a small nasal cleft such as in this case, I would favor a cross-chamber cyclopexy technique. With this straightforward approach, a conjunctival peritomy is made, but no scleral flap is required. The extent of the cleft is visualized using gonioscopy and marked at the limbus. A 27-gauge needle is passed ab externo into the sulcus starting just lateral to the cleft's boundary and 1.5 mm posterior to the limbus. A 10-0 polypropylene (Prolene) suture on an STC-6 straight needle (Ethicon) is passed from a temporal corneal incision, across the anterior chamber, and into the ciliary sulcus. The straight needle is docked into the 27-gauge needle and externalized. This process is repeated with the other arm of the suture just outside the other edge of the cleft. The suture is then simply tied externally, the knot is rotated, and the conjunctiva is reapproximated.

The closure of the cleft presents a much more common scenario: elevated IOP refractory to maximal medical therapy. Given this patient's exhaustion and the extreme elevation in IOP, I would proceed to aggressive surgical intervention. He has suffered enough, and I want to choose a procedure that will control the IOP reliably and quickly. Although a goniotomy is a tempting option because of its minimally invasive nature, I would not trust the trabecular outflow pathway to function normally after such a long period of hypotony.

I would therefore perform filtering surgery with either a Xen Gel Stent or an Ahmed Glaucoma Valve (New World Medical). Both procedures can predictably lower IOP quickly and prevent the hypotony that has plagued this patient.

**WHAT I DID: JACOB BRUBAKER, MD**

Initially fearing that the iStent had become lodged in the subchoroidal space, I called the cataract surgeon, from whom I learned that the cleft was the result of a goniotomy procedure gone wrong and that there was no risk of a malpositioned stent. I discussed with the patient his surgical options, including an external versus an internal approach. We elected to proceed with an external approach because of the relatively small size of the cleft.

After the eye was pressurized with an OVD, the cleft was visualized and marked. A peritomy and a scleral flap were created. An incision was then made though the sclera with care taken to stop short of penetrating the choroid. Several interrupted 10-0 nylon sutures were used to close the cleft (Figure 4). Closure was confirmed with intraoperative gonioscopy (Figure 5). The OVD was evacuated from the eye.

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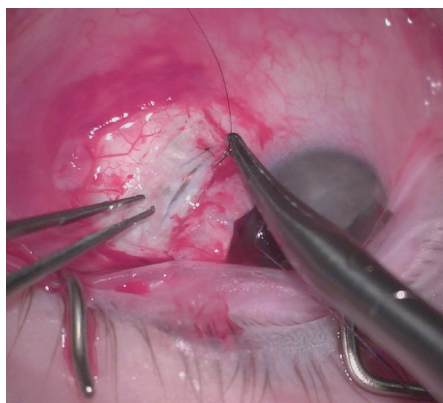


Figure 4. The cleft is closed with sutures.

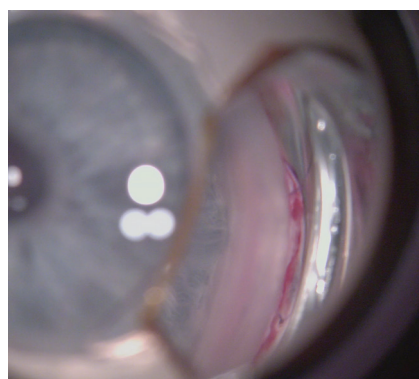


Figure 5. Intraoperative gonioscopy is used to confirm closure of the cleft.

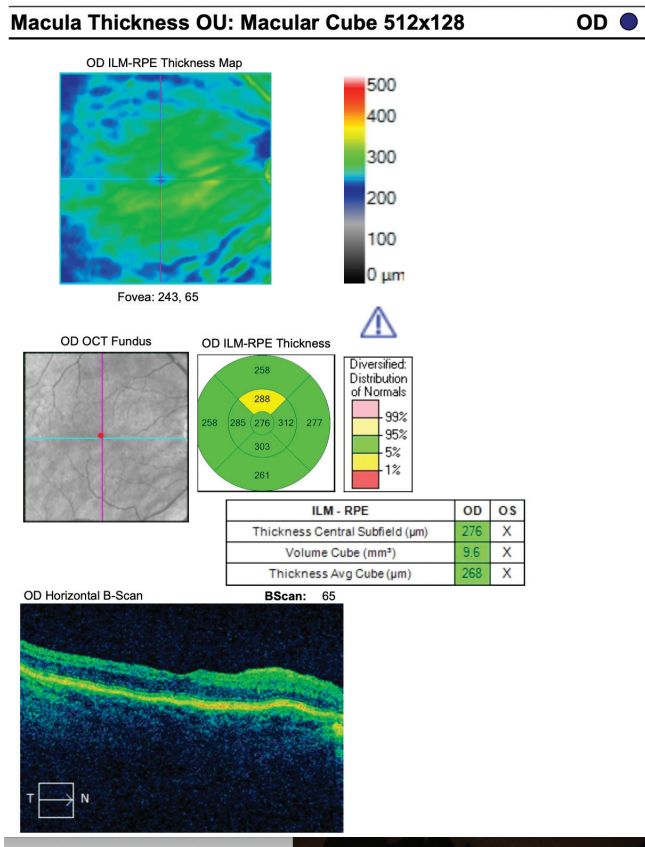


Figure 6. OCT shows improved macular folds 2 months after repair.

Before and after the procedure, I emphasized to the patient that, with proper closure, the IOP was likely to rise abruptly, which would be heralded by intense pain. I explained that this rise in IOP is believed to be caused by previous trabecular inactivity in the presence of an active cyclodialysis cleft but that, with time, this dysfunction typically resolves itself. Postoperatively the patient was given a sample of brimonidine to administer in case the IOP increased during the night.

The patient did well on postoperative day 1. The following day, he called emergently with the predicted pain and high IOP. After 1 week of therapy with a prostaglandin analogue, maximal aqueous suppressants, and several anterior chamber taps, IOP remained in the mid-40s mm Hg. At this point, I informed the patient that an additional procedure might be required. As a last-ditch effort before a return trip to the OR, we elected to try netarsudil ophthalmic solution 0.02% (Rhopressa, Aerie Pharmaceuticals). Although I typically do not use this drug when IOP is extremely elevated, I hoped that its ability to relax the trabecular

meshwork and improve aqueous outflow would be beneficial in this scenario. At the follow-up visit on the day after therapy was initiated, the patient reported that he was pain free and had “slept like a baby.” IOP was 13 mm Hg.

The patient was weaned off several glaucoma drops. UCVA was 20/25, and he was very happy (Figure 6). Although it is possible that the trabecular meshwork would have started functioning over time without the addition of netarsudil therapy, it is also probable that this drug facilitated the positive, rapid turnaround. In the future, it may be one of the first drops that I use in a similar situation rather than the last. ■

1. Kühle M, Naumann GO. Direct cyclohexy for traumatic cyclodialysis with persisting hypotony. Report in 29 consecutive patients. *Ophthalmology*. 1995;102(2):322-333.
2. Jing Q, Chen J, Chen J, Tang Y, Lu Y, Jiang Y. Clonidine-modified capsular tension ring for surgical repair of cyclodialysis after trabeculectomy: a case report. *BMC Ophthalmol*. 2017;17(1):196.

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