

ANGLE SURGERY FOR STEROID-RESPONSE GLAUCOMA

Is this intervention appropriate for these eyes?

BY MANJOOL SHAH, MD, AND DANIEL LAROCHE, MD



YES TO ANGLE SURGERY

BY MANJOOL SHAH, MD

Steroid-response glaucoma is a trabecular meshwork (TM) disease. Steroid use can induce microstructural changes in the TM, notably the formation of cross-linked actin networks and increased expression of myocilin. Cellular changes in the TM include a reduced phagocytosis capability and the inhibition of proteases. The deposition of material, such as extracellular matrix and other cellular debris, in the TM has also been shown to occur. Considering the mechanisms of steroid-response glaucoma, shouldn't its treatment target the TM?

GNIOSCOPY-ASSISTED TRANSLUMINAL TRABECULOTOMY FOR STEROID-RESPONSE GLAUCOMA

A few years ago, my colleague and I conducted a retrospective chart review of patients who underwent gonioscopy-assisted transluminal trabeculotomy (GATT) at Kellogg Eye Center between 2016 and 2018.¹ The study's inclusion criteria were (1) steroid-response glaucoma as the main mechanism behind elevated IOP, (2) at least 3 months of follow-up after GATT, and (3) an age greater than 18 years.

A total of 13 patients qualified for the analysis. Their mean age was 58 years (range, 26–73 years). Patients' sex was evenly divided between male and female. Seventy-eight percent of patients were White, and 22% were Black.

Preoperatively, patients had IOPs in the 20s and 30s mm Hg on three or four medications, as is typical of steroid-response glaucoma. By 6 months after GATT, all patients had experienced at least a 20% reduction in IOP. By month 12, all patients had an IOP of less than 15 mm Hg, and more than 80% of patients were taking no glaucoma medications.

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NO TO ANGLE SURGERY

BY DANIEL LAROCHE, MD

I perform MIGS regularly. My go-to approach for mild to moderate primary open-angle glaucoma is generally early cataract extraction combined with the placement of a Hydrus Microstent (Alcon). In one investigation, 80% of patients did not require eye drops after being treated with this approach.¹ I also find that the most cost-effective approach to treating glaucoma in resource-poor areas is goniotomy with a Sinsky hook. Both of these techniques bypass the obstructed TM and restore aqueous outflow through the collector channels. They also both enhance outflow to the distal aqueous veins.

As much as I value MIGS, there are exceptions to its use. I believe caution should be exercised in cases of neovascular glaucoma, uveal glaucoma, and steroid-response glaucoma. Corticosteroids decrease aqueous outflow by inhibiting the degradation of extracellular matrix material in the TM. This can lead to an accumulation of an excessive amount of material within the outflow channels and a subsequent increase in outflow resistance. Increased stiffness in the TM affects the entire drainage system of the eye, so it must be bypassed completely. Dexamethasone has been shown to reduce singularity and stiffness at the actin and myocilin levels.^{2,3}

In my patients, I have found that stopping steroid use reduces IOP and stops the process of IOP elevation without surgical intervention approximately 97% of the time. Chronic corticosteroid response typically resolves within 1 to 4 weeks.⁴ The small percentage of patients who have intractable glaucoma or require ongoing steroid therapy need further treatment.

In a study by Abtahi et al,⁵ one in eight patients developed a steroid response after undergoing cataract extraction combined with ab interno trabeculectomy (Trabectome,

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Postoperative complications were as expected for GATT, including transient hyphema (30%); posterior anterior synchiae formation (10%); transient IOP spike (15%); a tonic, middilated pupil (5%); and a retinal detachment that occurred 3 months postoperatively and was thought to be unrelated to GATT. Although a steroid response after GATT has been a topic of discussion, I wonder whether it is more likely that an

episcleral thrombus is occurring rather than a true steroid mechanism.

In patients with steroid-response glaucoma, angle surgery offers a targeted approach to treating diseased and dysfunctional TM tissue. The procedure also significantly reduces IOP and the number of medications required and offers protection against hypotony. These eyes often require long-term steroid use to address underlying inflammation, so a robust solution that continues to treat the disease is warranted.

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MicroSurgical Technology) or iStent (Glaukos) implantation.

Ngai et al⁶ conducted a study of 20 patients with steroid-response glaucoma who underwent ab interno trabeculectomy. The average preoperative IOP was 33.8 ± 6.9 mm Hg, and an average of 3.85 ± 0.75 glaucoma medications were used preoperatively. At 12 months postoperatively, IOP was 15.00 ± 3.46 mm Hg ($P = .03$), and 2.3 ± 1.4 glaucoma medications were used ($P < .01$). Five patients had ceased steroid treatment, and five had tapered steroid treatment, which might have augmented their surgical outcomes. Ten patients who continued topical steroid treatment still required multiple glaucoma medications, and one patient needed a secondary glaucoma surgery (glaucoma drainage device implantation).

A retrospective chart review by Shah et al⁷ examined the outcomes of GATT in 13 patients with steroid-response glaucoma. The investigators found that the average IOP decreased by 16.4 mm Hg (55%) to 19.5 mm Hg (63%) at between 3 and 24 months postoperatively. A total of 38% of patients developed transient hyphema. Evidence has shown that outflow is maximized at about 4 clock hours.⁸ It is an option to treat only 180° or 4 or 5 clock hours and bypass the maximum outflow resistance to lower IOP and reduce the risk of hyphema.

In a study comparing trabeculectomy and medical therapy in patients with steroid-response glaucoma,⁹ successful IOP control (IOP < 15 mm Hg) was achieved in 100% of eyes treated with trabeculectomy ($n = 30$) and 77% of eyes treated with medical therapy ($n = 23$). In another study evaluating the success rates of trabeculectomy for steroid-response glaucoma, trabeculectomy was more successful than trabeculotomy for achieving an IOP of less than 18 mm Hg at 3 years postoperatively.¹⁰

My colleagues and I published a case report of a patient with bilateral uveitic glaucoma and Cogan syndrome who underwent combined cataract extraction, goniotomy, Ahmed Glaucoma Valve (New World Medical) implantation, and retrobulbar tube placement.¹¹ Preoperatively, the IOP was in the high 30s mm Hg OU. The patient was administering five glaucoma medications and required ongoing steroid treatment. Postoperatively, the IOP was 12 mm Hg OD on two glaucoma medications and 11 mm Hg OS on no glaucoma medication.

From a legal perspective, caution is warranted when performing MIGS in cases of steroid-response glaucoma because the gold standard is trabeculectomy and tube shunt surgery. Based on the available data, more than MIGS may be required for the management of steroid-response glaucoma in patients who have intractable glaucoma or need ongoing steroid therapy. ■

Patients who undergo angle surgery can continue to use corticosteroids postoperatively. In our study, 82% and 67% of patients were still administering the drugs at 1 year and 2 years, respectively. Some even had an increased steroid requirement due to inflammatory disease activity. With angle surgery, it is possible to address damage at the site of the disease and continue efforts to control inflammation.

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