Avoid Compromising Quality in Glaucoma Surgery

BY PAUL F. PALMBERG, MD, PhD

Several decreases in Medicare payments to providers and facilities are scheduled to take effect in January. These include reduced payments to physicians for trabeculectomy and bundling mitomycin C (MMC) in the facility fee for trabeculectomy and graft material in the facility fee for aqueous drainage device implantation. The reduction in physicians’ payments far exceeded the recommendation from a work effort survey, and there was no rationale for bundling MMC or graft material, actions that threaten the quality of patients’ care, because they impede the use of materials needed for efficacy or safety.

Fortunately, there are ways to mitigate the damage caused by the failure to reimburse facilities for the cost of MMC and patch grafts and to reduce the need for—or expense of—postoperative interventions after trabeculectomy.

SWITCH FROM SPONGES TO SUBCONJUNCTIVAL INJECTION OF MMC

Administering 20 to 40 µg by subconjunctival injection uses far less MMC per case, allowing for multiple applications from a single vial. If one were to use the Mitosol kit (Mobius Therapeutics) per its package insert (1 mL of 0.2 mg/mL to wet sponges), then 200 µg of MMC would be expended. This amount delivered via an injection could treat 10 patients with a 20-µg dose or five patients with a 40-µg dose. Obtaining MMC from a compounding or hospital pharmacy would further decrease the cost, making it more affordable for an ambulatory surgical center. Any use of MMC other than Mitosol per the package instructions is off label, even though MMC use is the standard of care.

USE A LONG NEEDLE TRACK INSTEAD OF A PATCH GRAFT FOR TUBE IMPLANTS

The safety of tube implant surgery can be improved by using a long needle track instead of a patch graft to protect the tube from exposure. Feliz Gil Carrasco, MD, introduced the use of a long needle track in the sclera and has reported a low tube exposure rate of 0.4% 10 years postoperatively. On the other hand, the use of a needle entry near the limbus and a tube covered by a patch graft was associated with a 5% tube exposure rate 5 years postoperatively in the Tube Versus Trabeculectomy (TVT) Study. It appears that moving the tube entry site into the sclera behind the zone of excursion of the upper lid is even safer than the use of a patch graft. Another benefit is that the silicone tube is less able to straighten out over time, keeping it behind the corneal endothelium.

As a modification to Dr. Carrasco’s technique, I have been using an oblique path for the tube. I create a groove 3 mm behind the limbus near 12 o’clock and enter the anterior chamber in the far peripheral superior nasal angle, well out of the way of future lens surgery in phakic eyes. I use a 23-gauge needle bent sideways 3.5 mm from the end so that the groove acts as a stop to prevent possible lens injury from the needle. I hold a side-bent needle mounted on a syringe with one hand resting on the patient’s forehead, and I use the other hand to fixate the eye at the groove as the needle enters the sclera at one-third depth. As I approach the limbus, I rotate the tip of the needle downward to enter the eye parallel to and just above the iris plane. This is easier to judge when looking down perpendicular to the iris plane.

ADJUST IOP AT THE EQUILIBRIUM FLOW INTRAOPERATIVELY IN TRABECULECTOMY SURGERY

I adjust IOP intraoperatively and use a safety valve trabeculectomy to reduce postoperative visits and the risk of complications associated with hypotony. Suner et al described a valve-like trabeculectomy wound with careful intraoperative adjustment of IOP at equilibrium flow. Using this technique yielded an average IOP of 10 mm Hg on the first postoperative day, kept postoperative visits for IOP adjustment to a minimum, and reduced the risk of hypotony to 4%.

PERFORM TRANSCORNEAL BLEB NEEDLING AT THE SLIT LAMP

When the IOP is elevated after a trabeculectomy in the presence of a soft bleb, the site of excess resistance is
likely to be at the exit of the scleral flap. For this, I perform transcorneal needling at the slit lamp rather than take the patient to the OR. I prep the eye with topical proparacaine to numb the cornea, administer apraclonidine for vasoconstriction and povidone-iodine 5% for antisepsis, apply 3.5% lidocaine gel over the bleb, and place a solid-bladed speculum. I mount a half-inch 30-gauge needle on a tuberculin syringe and create a bayonet shape by using a blade breaker to bend the needle back at the hub and then forward 3 mm from the hub. I find this Z shape helpful for approaching the cornea parallel to the surface without touching the lower lid. I pass the needle into the cornea parallel to the surface until the bevel is in. Next, I turn the needle posteriorly to enter the anterior chamber and then rotate it forward to pass out through the trabeculectomy ostium. I twist the needle side to side to tear surface fibrosis.

This technique makes a self-sealing entry through the cornea rather than a hole in the bleb as in usual needling procedures. Bleeding is usually avoided because the torn tissue is avascular. Another advantage is that hypotony is rare, since the margins of the bleb are still intact. Moreover, I can use this technique without the expense and paperwork required for the OR.

**CONCLUSION**

There are ways to at least mitigate the potential harm done to our patients and the viability of our practices by the coming reductions in payment for procedures and surgical materials. Using MMC more efficiently, substituting a long needle track in the sclera for the use of patch grafts, performing trabeculectomy in a way that reduces the need for visits to postoperatively adjust the IOP, and performing needling at the slit lamp instead of in an OR all reduce cost and can even improve outcomes.


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**Adapt and Evolve**

**BY JEFFREY A. KAMMER, MD**

The glaucoma community was blindsided by the dramatic 25% reduction in work relative value units (wRVUs) for a standard trabeculectomy. Not only was this reduction an affront to our profession’s sense of worth, but it also represented a major hit to our bottom line.

This seismic shift in remuneration forces us to reconsider where trabeculectomy figures into the glaucoma treatment paradigm. We are being challenged to provide cost-effective glaucoma care that is both highly effective and fiscally prudent. In order to survive as a glaucomatologist in this new environment, we will need to (1) treat glaucoma patients aggressively earlier in the...
TREAT PATIENTS AGGRESSIVELY AND EARLY

In general, eye care providers tend to be complacent early in the glaucomatous process. Unfortunately, the rate of retinal nerve fiber layer loss and visual deterioration accelerates rapidly as the disease progresses. Because undertreatment in the early stages of glaucoma carries significant negative long-term implications, we must treat ocular hypertensive patients, glaucoma suspects, and individuals with early glaucoma much more aggressively than we have in the past. Although our extensive armamentarium of topical glaucoma medications remains important for the early treatment blitz, this strategy assumes that patients use drops as prescribed and have the manual dexterity to successfully instill the medication in their eyes. We know that these presuppositions tend to be incorrect and that patients often go undertreated.

Historically, ophthalmologists have hesitated to pursue early surgical intervention with a trabeculectomy or tube shunt due to the risk profile and the intensity of the postoperative care. Fortunately, we are at the precipice of a revolutionary surgical paradigm shift, wherein invasive, high-risk surgery (ie, trabeculectomy and tube shunts) is being delayed or reduced by low-risk, minimally invasive procedures for patients with early glaucoma.

Low-Risk Surgical Options

The first microinvasive glaucoma surgery (MIGS) device approved in the United States was the iStent Trabecular Micro-Bypass Stent (Glaukos). When placed in combination with cataract surgery, a single iStent reduced IOP by 20.9% (21.1 to 16.7 mm Hg) 6 months postoperatively with a 74.3% reduction (2.30 to 0.59) in the mean number of glaucoma medications.1 More impressively, these results were maintained over the long term, with a 16.33% reduction in IOP and a 63.6% reduction in ocular hypertensive medications after 5 years.2

Although the iStent is not FDA approved as a standalone procedure in the United States, the results of international studies have been encouraging. In two small case series of single iStent insertion as the sole procedure, the investigators observed more than 20% reductions (23.9%3 and 27.3%4) in IOP and a significant decrease in the mean number of ocular hypotensive medications after 1 year. When two trabecular microbypass stents were placed, researchers reported a 32.5% reduction in IOP (from 25.3 to 17.1 mm Hg), and patients discontinued all glaucoma drops by 13 months postoperatively.5

Financial Benefits

For the aggressive treatment of early glaucoma with MIGS procedures to achieve widespread adoption, it will need to be mutually beneficial for the payers and clinicians. Researchers in Canada compared the cost of implanting two iStent devices to that of the long-term burden of glaucoma medications. The investigators reported a cost savings of CAD $1,272 compared to two drug therapies and CAD $2,124 compared to three drug therapies.6 Although comparable studies have not been performed in the United States, these results suggest that MIGS is a cost-effective alternative to medical therapy. Moreover, it is quite possible that the early, aggressive treatment of glaucoma could have benefits far beyond that which we can easily quantify in terms of increased productivity in patients whose vision would be saved with a low-risk surgical procedure that is independent of patients’ compliance. MIGS can also be financially beneficial for surgeons. The implantation of an iStent is currently billed under a Category III, Current Procedural Terminology code 0191T and is reimbursed by all Medicare carriers and most commercial payers. Authorization should be obtained before the procedure is scheduled. Specific physician remuneration varies widely depending on the payer, but reimbursement is often better than for cataract surgery alone. The iStent has been approved as a procedure to be performed in conjunction with cataract surgery. That said, it is possible to insert multiple iStents or to place an iStent as a standalone procedure if the patient chooses to pay out of pocket.

Combined Surgical Procedures

Physicians have begun combining MIGS technology with procedures other than cataract surgery to test for an additive effect. Radcliffe et al reported on a technique called

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Abbreviation: wRVUs, work relative value units.
ICE, which stands for iStent, cataract surgery, and endocyclophotocoagulation. They documented a 19% decrease in IOP (19.1 to 15.5 mm Hg), with a 23% reduction in medication burden (2.2 to 1.7) 69 ±43.6 days postoperatively.

A recent study evaluated the results of patients with refractory glaucoma who were treated with two trabecular microbypass stents and one suprachroidal stent (iStent Supra; Glaukos; not available in the United States) in addition to topical travoprost. Two years postoperatively, all eyes achieved more than a 20% IOP reduction, and 69.7% achieved more than a 50% reduction in IOP.

**GLAUCOMA SURGERY: KNOW YOUR OPTIONS**

Since the late 1960s, trabeculectomy has been the de facto gold standard for most patients with glaucoma who require surgical intervention. This practice has been based more on habit than evidence-based medicine. The recent cut in wRVUs for trabeculectomy has prompted many of us to consider other surgical options (Table).

The Ex-Press Glaucoma Filtration Device (Alcon) shunts aqueous from the anterior chamber into a subconjunctival reservoir. The implantation technique closely mirrors that of trabeculectomy except that we insert the device underneath the scleral flap through a very small opening at the blue line of the limbus in lieu of making an excisional sclerectomy and iridectomy.

A 2011 study by Good and Kahook compared the safety, efficacy, and bleb characteristics of the Ex-Press procedure with traditional trabeculectomy. They reported similar surgical success between the two groups, with an unqualified success of 77.14% in the Ex-Press group versus 74.29% in the trabeculectomy group 28 months postoperatively. The Ex-Press device demonstrated distinct advantages during the postoperative period. For one, patients in the Ex-Press group tended to regain their baseline visual acuity by 1 week after surgery versus 1 month in the trabeculectomy group. There were also fewer cases of early postoperative hypotony and hyphema in the Ex-Press versus the trabeculectomy group. Perhaps most interesting to us busy clinicians is the reduced number of visits for Ex-Press patients during the postoperative period. The combination of similar efficacy, fewer postoperative visits, and better remuneration makes the device an appealing alternative to the trabeculectomy.

Glaucoma drainage implants were first developed in the late 1960s. These implants have traditionally been relegated to patients with refractory glaucoma whom trabeculectomy carries a high risk of failure and patients who have a history of one failed trabeculectomy. The results of the Tube Versus Trabeculectomy (TVT) Study have altered this treatment paradigm. A direct comparison of the two showed that (1) tube shunt implantation had a higher rate of surgical success than trabeculectomy with mitomycin C at 5 years, (2) the mean IOP and number of glaucoma medications were similar for both procedures at 5 years, and (3) early postoperative complications occurred more frequently after trabeculectomy with mitomycin C compared to tube shunts. The use of aqueous drainage devices has the added benefit of removing the inherent risk of bleb-related infections. Moreover, the wRVUs are greater for tube shunts versus trabeculectomy. Tube shunt implantation represents another procedure that is as effective as trabeculectomy but with fewer complications and better remuneration. We glaucoma surgeons must consider these factors before following the age-old tradition of immediately choosing a trabeculectomy.

Nonpenetrating glaucoma surgery (NPGS) was specifically designed to improve the safety of conventional filtering procedures. The three main types of NPGS are deep sclerectomy, viscocanalostomy, and canaloplasty. Although these procedures are commonly performed outside the United States, their use has never gained traction as a popular alternative to trabeculectomy here.

While some practitioners have avoided NPGS because these procedures are technically challenging, others have cited a paucity of data to guide their decision-making process. A 2013 systemic review and meta-analysis of studies that directly compare two or more surgical techniques (one of which had to be an NPGS procedure and the other a trabeculectomy) addresses the latter concern. Trabeculectomy was more effective at reducing IOP than

**AT A GLANCE**

- Several decreases in Medicare payments to providers and facilities prompted ophthalmologists to find ways to address cuts in reimbursement.
- Glaucoma specialists can adapt to this new environment by treating glaucoma patients aggressively earlier in the course of the disease, increasing the use of other filtering surgeries, and enhancing clinical and surgical efficiency.
- Options to reduce cost and even improve outcomes include using MMC more efficiently, substituting a long needle track in the sclera for the use of patch grafts, performing trabeculectomy in a way that reduces the need for visits to postoperatively adjust the IOP, and performing needling at the slit lamp instead of in an OR.
The scope of PA practice in ophthalmology varies widely. In some practices, PAs support physicians largely by providing general medical care, taking the history, and perseverating additional income. In some practices, PAs much more comprehensively by having them see patients in the clinic, perform intravitreal injections, and create the initial cataract incisions in the OR.

The American Academy of Ophthalmology conducted a survey that evaluated the financial impact of physician extenders on physicians’ compensation. The Academy found that incorporating optometrists resulted in a 19.9% increase in median compensation (from $323,020 to $387,476) to physicians in cataract/anterior segment/comprehensive practices and a 40.9% increase in median compensation (from $293,465 to $413,683) to physicians in multiophthalmic specialties.

CONCLUSION

Our profession is under attack. We must respond by becoming more efficient, adopting new technology, and making informed clinical decisions. The evolution of our profession and practices will help us partially offset the loss of revenue that we are about to face.

8. Martínez de la Casa JM. Postoperative outcomes through 18 months following implantation of two trabecular micro-bypass stents, one suprachoroidal stent and travoprost in OAG not controlled by trabeculectomy and medications. Poster presented at: the 11th European Glaucoma Society Congress; June 7-11, 2014; Nice, France.

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