

Glaucoma Surgery in Patients on Blood Thinners

Five approaches to this challenging scenario.

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The relevant literature demonstrates three things:

1. Anticoagulation does not increase the risk of serious complications with peribulbar-block anesthesia or cataract surgery¹⁻³

2. Embolic stroke can result in major disability or death in 70% of patients, thrombosis of a mechanical heart valve is fatal in 15% of patients, and perioperative myocardial infarction is associated with a two- to four-fold increased risk of death⁴

3. A recent case-controlled study showed a higher risk for hemorrhagic complications in its anticoagulated patients.⁵ In this study, there was a small number of serious events, and patients who discontinued anticoagulants versus those who continued them did not have a statistically significant difference in the rate of hemorrhagic events

My routine for my glaucoma surgery in patients on anticoagulants and antiplatelet agents is as follows. Preoperatively, I counsel them about their slightly higher risk of bleeding-related complications, but I reassure them that I will be prepared with instruments to limit any hemorrhage. I explain that I want to protect them from the risk of the more serious complications of stroke or cardiac problems by having them continue their usual dose of anticoagulants. I communicate with the patient's physician that it is unnecessary to discontinue these medications. We have the international normalized ratio (INR) checked within a few days of surgery and cancel if it is excessively out of range.

Intraoperatively, I meticulously control any hemorrhage or oozing. Initially, I use an 18-gauge eraser-type tip to cauterize the sclera and later switch to a 23-gauge

"A 23-gauge pointed tip ... allows excellent control of finely oozing vessels within the bed of the scleral flap or edge of the sclerostomy."

—Cynthia Mattox, MD

pointed tip that allows excellent control of finely oozing vessels within the bed of the scleral flap or edge of the sclerostomy as well as any bleeding vessels from the iridectomy. I always dissect anteriorly far into the avascular clear cornea to perform my "sclerostomy" with a Kelly punch, without engaging any structures in the angle.

When implanting a tube, I find that the preoperative use of Avastin (Genentech, Inc., South San Francisco, CA) and avoidance of hypotony in neovascular cases, the cauterization of the scleral entry site, and the device's perfect placement in the anterior chamber help prevent a hyphema. Before closing the conjunctiva, I check again for any source of oozing.

With my trabeculectomy technique, I rarely see a postoperative hyphema, although I will occasionally see a small hemorrhage lining the posterior edge of the scleral flap that can limit aqueous flow. Digital massage and/or laser suture lysis will re-establish flow.

BRADFORD J. SHINGLETON, MD

For the vast majority of my patients, I make no changes in their anticoagulative medical program,

including baby aspirin, regular aspirin, nonsteroidal anti-inflammatory medications, Plavix (Sanofi Aventis US LLC [Bridgewater, NJ] and Bristol-Myers Squibb Co. [Princeton, NJ]), Coumadin (Bristol-Myers Squibb Co.), and other blood thinners.

The risk of bleeding with topical anesthesia is effectively nil, and even with a peribulbar block, the risk of an orbital hemorrhage is exceedingly small. There is a slightly increased risk of external conjunctival/episcleral bleeding with the maintenance of blood thinners, but I have found this to be manageable in all cases intraoperatively and have not noted a tendency toward exacerbation of bleeding-related problems postoperatively. Complications certainly can occur, however, and surgeons must not be dogmatic in their approach. Each case needs to be individualized, and occasionally I will alter the anticoagulation program.

It is often safe to stop Coumadin in patients who are taking the drug for atrial fibrillation. For those who have had deep vein thrombosis or pulmonary emboli, the risk of stopping anticoagulation may be much higher than that of bleeding with the procedure. For patients who must stop Coumadin or antiplatelet therapy and who are at significant risk for clotting, I consult the medical unit to provide appropriate heparin coverage, as necessary, to avoid a catastrophic systemic embolic event.

In the event of intraocular bleeding during surgery, intraocular underwater diathermy can be very effective in treating the bleeding vessel. Such bleeding tends to arise from an iris vessel exposed with an iridectomy or stretching of the pupil. Superficial bleeding of episcleral vessels can easily be controlled by underwater diathermy. A small hyphema or limited postoperative suprachoroidal hemorrhage can occur after any glaucoma procedure, and I treat it the same whether the patient is on Coumadin or not. If the hyphema or suprachoroidal hemorrhage is extensive, Coumadin is generally stopped depending on the patient's general medical condition, and surgical evacuation may be indicated.

MARLENE R. MOSTER, MD, AND PARUL KHATOR, MD

We are encountering an increasing number of patients requiring glaucoma surgery who are on anticoagulation therapy. Because subconjunctival hemorrhages and hyphemas can negatively affect the outcome of glaucoma surgery, careful consideration must be given to this patient population. These concerns, however, must be weighed against the inherent risk of thromboembolic events from discontinuing anticoagulation. Our approach, therefore, is to allow patients to continue anticoagulation therapy, regardless of whether it is

aspirin, warfarin, or clopidogrel (Plavix). We ask patients to stop warfarin the night before surgery and resume dosing the next day if all is well. Given the turnaround time for platelets, we did not find stopping the Plavix or aspirin for 5 days helpful, and further discontinuation puts the patient at risk for a myocardial infarction or stroke. Our approach is feasible, because patients receive combination (topical, subconjunctival, and intracameral) anesthesia as opposed to retrobulbar blocks, thus eliminating the possibility of a retrobulbar hemorrhage.

“Although anticoagulation therapy is a surgical risk factor, the systemic health of the patient is paramount.”

—Marlene R. Moster, MD, and
Parul Khator, MD

We eradicate any apparent intraoperative bleeding with liberal cautery. In addition, many pseudophakic patients with deep chambers do not require a peripheral iridectomy, which decreases the risk of bleeding from the ciliary body or iris. We place several releasable sutures at the flap that give us greater postoperative control of the IOP. The pressure decreases in a graduated fashion as these sutures are sequentially removed. Combined with a minimal use of postoperative digital ocular compression at the slit lamp, this approach decreases the risk of undesirable hemorrhagic complications such as suprachoroidal hemorrhage in our experience.

Although anticoagulation therapy is a surgical risk factor, the systemic health of the patient is paramount, and we always keep in mind our profession's precept, First do no harm.

STEVEN V. L. BROWN, MD

Glaucoma surgeons are often confronted with a candidate for filtering surgery who has cardiovascular comorbidities that require anticoagulation and/or antiplatelet therapy. Individuals who use vitamin/herbal supplements present similar considerations. The significant risk of complications in individuals on anticoagulants is well known.⁵ Currently, there does not appear to be a consensus on the appropriate management during the perioperative period. Clearly, a significant risk of thromboembolism if anticoagulation is discontinued is in juxtaposition with the risk of hemorrhagic complications from the surgery.

In patients on anticoagulants, I prefer to use what I call *bridge therapy*, which translates as a brief perioperative/postoperative dose of unfractionated heparin or subcu-

taneous Lovenox (enoxaparin sodium 1 mg/kg; Sanofi Aventis US LLC). Accordingly, the patient's managing internist/cardiologist and I must be in agreement on our evaluation of risk factors, and there should be a corresponding, detailed informed consent.

My surgical technique for filtering surgery requires topical and sub-Tenon's lidocaine 2% as well as 1% intracameral (methylparaben-free) lidocaine. I modify my approach somewhat. Initially, I create an inferotemporal paracentesis with a gradual egress of aqueous and instill an ophthalmic viscosurgical device to maintain the anterior chamber's stability and corresponding IOP. The viscoelastic is not removed at the end of the case. I predominantly use a fornix-based conjunctival approach with subconjunctival/Tenon's dissection using hydrodissection with balanced salt solution. I carry the partial-thickness scleral flap well into clear cornea for a "punch corneaectomy" to avoid potential bleeding. A relatively tight closure of the scleral flap is followed by the release of sutures after postoperative day 3.

I also modify my surgical technique and approach to management when placing a glaucoma drainage device. Specifically, if I do not use a topical and/or subconjunctival anesthetic, then I perform a peribulbar injection in both the inferotemporal and superotemporal quadrants. Judicious cautery is imperative.

EYDIE G. MILLER-ELLIS, MD

I prefer to stop blood thinners (eg, aspirin, Coumadin, Aggrenox [Boehringer Ingelheim Pharmaceuticals, Inc., Ridgefield, CT], Plavix) in patients who are undergoing glaucoma surgery because of the potential for intraocular hemorrhage. In patients on Coumadin, their therapeutic INR is typically between 2.0 and 3.5. I prefer an INR of less than 2.0, so with the permission of the primary care physician or cardiologist, I stop the Coumadin 5 days preoperatively. This approach is not feasible in some patients, such as those with an artificial heart valve, deep vein thrombosis, or atrial fibrillation. Communication with the patient's primary care physician is essential to assessing the individual risk.

In some cases, I may think that the blood thinner was stopped but the patient forgot to do so. Most of the time, I proceed with the surgery. I always assess the risk of bleeding-related complications (eg, retrobulbar hemorrhage, hyphema, suprachoroidal hemorrhage, and decompression retinopathy) against the individual's risk of glaucomatous visual loss. I am very conservative with monocular patients. A suprachoroidal hemorrhage could have devastating consequences.

In all patients, the risk of bleeding can be minimized in several ways. For example, I rarely perform a retrobul-

bar block. Topical lidocaine jelly or TetraVisc (Cynacon/Ocusoft, Inc., Richmond, TX) combined with intracameral and/or subconjunctival preservative-free lidocaine 1% provides excellent anesthesia. If more anesthesia is needed, such as with the insertion of a glaucoma drainage device, I create a superior limbal peritomy, dissect beneath Tenon's layer, pass a blunt cannula posterior to the equator, and inject approximately 2 to 3 mL of lidocaine 2% into the retrobulbar space. I find this approach provides excellent anesthesia.

"The risk of a suprachoroidal hemorrhage and decompression retinopathy can be lessened by avoiding rapid decompression of the eye."

—Eydie G. Miller-Ellis, MD

Because the iris is the primary source of intraocular bleeding during glaucoma surgery, avoiding the creation of an iris incision decreases the risk of bleeding. With a standard trabeculectomy, I always perform a peripheral iridectomy in a phakic eye and often do so in a pseudophakic eye to avoid obstruction of the internal ostomy by the iris. An Ex-Press mini glaucoma shunt (Optonol Ltd., Neve Ilan, Israel) can avoid an iris hemorrhage, as an iridectomy is not done in these cases. Also, a glaucoma drainage device does not require a peripheral iridectomy and is another way to avoid an iris incision.

The risk of a suprachoroidal hemorrhage and decompression retinopathy can be lessened by avoiding rapid decompression of the eye. An osmotic agent, such as mannitol, can be used preoperatively to dehydrate the vitreous and lower the IOP. I, however, rarely use mannitol. Instead, I usually make a paracentesis at the beginning of the case and gradually release aqueous during the early steps so that, by the time I create the sclerostomy, the IOP is somewhat low. In addition, I place sutures in the scleral flap before creating the sclerostomy in high-risk patients (eg, high myopes, aphakes) so that I can close it rapidly and minimize the duration of intraoperative hypotony. The anterior chamber can also be filled with viscoelastic to minimize hypotony. Additionally, the risk of a postoperative suprachoroidal hemorrhage can be lessened by tying the sutures in the scleral flap tightly enough to avoid hypotony.

In summary, the precautions I take in patients on blood thinners are not performing a retrobulbar block, not creating an iris incision, and minimizing intra- and postoperative hypotony. □

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