

Hemorrhage Associated with Ophthalmic Procedures

Ronald W. Pelton, MD, PhD
Anne M. Menke, RN, PhD

Purpose of risk management recommendations

OMIC regularly analyzes its claims experience to determine loss prevention measures that our insured ophthalmologists can take to reduce the likelihood of professional liability lawsuits. OMIC policyholders are not required to implement risk management recommendations. Rather, physicians should use their professional judgment in determining the applicability of a given recommendation to their particular patients and practice situation. These loss prevention documents may refer to clinical care guidelines such as the American Academy of Ophthalmology's *Preferred Practice Patterns*, peer-reviewed articles, or to federal or state laws and regulations. However, our risk management recommendations do not constitute the standard of care nor do they provide legal advice. Consult an attorney if legal advice is desired or needed. Information contained here is not intended to be a modification of the terms and conditions of the OMIC professional and limited office premises liability insurance policy. Please refer to the OMIC policy for these terms and conditions.

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Anticoagulation management of patients undergoing ophthalmic procedures has become increasingly challenging as the population ages and new antithrombotic agents come into use. Interruption of anticoagulation for ophthalmic or oculofacial surgery decreases the risk of bleeding but increases the risk of clot formation. Ophthalmologists must work toward a delicate equilibrium between prevention of excessive bleeding and decreasing the risk of thromboembolism.

OMIC claims data indicates that ophthalmologists who do not properly screen patients for bleeding risks and manage hemorrhage when it occurs often face malpractice lawsuits. In Part 1 of this article, we present a closed claim study of hemorrhage following blepharoplasty that resulted in a large settlement. This case highlights the errors in management that can lead to blindness and litigation. Part 2 provides a detailed discussion of how to screen patients who may be at increased risk for hemorrhage. Part 3 discusses how to monitor for signs and symptoms of hemorrhage, while Part 4 describes how to begin to manage an orbit compartment syndrome. Many other aspects of the prevention and management of

hemorrhage deserve attention; the few discussed here have figured most prominently in malpractice cases.

Part 1: Blepharoplasty case summary

A middle-aged man presented for functional bilateral upper blepharoplasty. He had no history of bleeding problems and had recently undergone surgical repair of a hernia without incident. While he had reported occasional episodes of elevated blood pressure, he had never been treated for hypertension. His pressure in the office was 140/84, and his platelet count was normal. A platelet function study routinely ordered by the ambulatory surgery center on the day of surgery, however, was elevated. No abnormal bleeding was noted during the procedure, nor upon admission to the post-anesthesia care unit.

Soon the patient's blood pressure began to rise, and he was treated with antihypertensive medications. About an hour after the first rise in pressure, the nurse notified the ophthalmologist that the left upper eyelid was bleeding briskly and couldn't be closed. The surgeon was operating on another patient, so he instructed the nurse to apply ice and pressure. An hour and a half later when he could leave the operating room, the ophthalmologist examined the patient and noted that the bleeding appeared to have stopped.

The ophthalmologist felt that orbital bleeding and optic nerve compression needed to be ruled out. He ordered a stat CT, which revealed a left-sided hematoma, displaced globe, and stretched optic nerve. The ophthalmologist continued with additional surgery cases and did not review the CT report until four and half-hours after the bleeding started. When he then reexamined the patient, the globe was tense and proptosis was noted. He ordered Mannitol and prepared to take the patient to the operating room for a lateral canthotomy to decompress the globe and relieve the pressure. The hospital had trouble assembling a team, so the surgery was not performed for another two hours.

The patient ended up with no light perception on the left side and brought a malpractice suit against the surgeon alleging negligent evaluation of an abnormal preoperative clotting study and negligent management of an orbital compartment syndrome. Despite the plaintiff's allegations, a hematology expert for the defense concluded that the patient had no clotting abnormalities. Instead, both plaintiff and defense ophthalmology experts felt the poor outcome was due to the ophthalmologist's failure to recognize and emergently treat the orbital compartment syndrome. The case settled for \$800,000.

Part 2: Assessment of hemorrhage risk during the preoperative assessment

The primary purpose of the preoperative medical assessment is to determine if the chosen procedure and anesthesia are safe and appropriate for the patient, and to help anticipate potential complications related to ophthalmic and medical comorbidities. The assessment is

conducted by performing a history and physical examination.¹ With regard to hemorrhage risk, pay particular attention to bleeding disorders, medication history (especially systemic anticoagulants), and use of food supplements and vitamins such as ginkgo biloba or high doses of Vitamin E. Anticoagulation agents are most commonly used in patients with atrial fibrillation, valvular heart disease, and deep venous thromboembolism. Ask about these, as well as a history of cerebrovascular disease, hypertension, and the presence of cardiac stents. Stopping antiplatelet therapy in patients with stents can lead to major cardiovascular events such as myocardial infarction, stroke, stent thrombosis, and even death. Thus, consult with the patient's cardiologist to help quantify thromboembolic risk and determine if medications can be stopped.

1. **Hypertension.** Hemorrhage is the most significant sight-threatening complication of any eyelid procedure, and uncontrolled hypertension greatly increases this risk.^{2,3} Even in healthy patients, blood pressure may suddenly spike to high levels both during and after surgery. Such spikes will go unnoticed if the pressure is not monitored. Uncontrolled hypertension can also lead to a cardiac event or stroke. For these reasons, question patients about a history of hypertension, and take their blood pressure during the preoperative assessment. Consider referring patients with elevated blood pressure to their primary care physician for an evaluation before surgery.
2. **Bleeding history.** Query patients about a personal or family history of excessive bleeding or bruising associated with prior surgical and dental procedures. Examine those with a positive history for evidence of ecchymoses, petechiae, and purpura. Consider referring patients with a positive history or exam to their primary care physician or cardiologist for an evaluation that includes recommendations for perioperative management of anticoagulants.
3. **Prescription and over-the-counter medication history.** In recent years, new antithrombotic agents (both anticoagulant and antiplatelet) with pharmacologic profiles that differ from their predecessors have come into use. In addition, numerous over-the-counter (OTC) drugs, vitamins, and herbal supplements can affect the patient's tendency to bleed during surgery. Ask the patient to tell you about all drugs and supplements. Provide the patient with a list of these drugs and supplements to facilitate identification of those that can increase bleeding risk. Dr. Pelton has shared the list he uses (<https://www.omic.com/anticoagulant-list/>).

¹ See Menke AM "Preoperative medical assessment" for a detailed discussion, including when to refer the patient to a primary care physician or cardiologist: <https://www.omic.com/preoperative-medical-assessment/>.

² Mejia JD, Egro FM, Nahai F. Visual loss after blepharoplasty: incidence, management, and preventive measures. *Aesthet Surg J*. 2011 Jan;31(1):21-9.

³ Hass AN, Penne RB, Stefanyszyn MA, Flanagan JC. Incidence of postblepharoplasty orbital hemorrhage and associated visual loss. *Ophthalmic Plast Reconstr Surg*. 2004 Nov;20(6):426-32.

Anticoagulants: Issues to consider before stopping medications

Ophthalmologists often call OMIC’s Risk Management Hotline to ask whether they should continue or stop anticoagulant therapy, and for appropriate timeframes for discontinuing and restarting these medications. OMIC has no position on this issue, and there is no simple answer to these complex questions. Factors to consider include the surgical procedure with its associated risk of bleeding (e.g., pre-septal versus post-septal eyelid surgery), the patient’s underlying risk of bleeding (e.g., medication-associated risk versus genetic disease), the patient’s underlying risk of a thromboembolic event (e.g., recent cardiac stents, atrial fibrillation, or history of past thrombotic events), the timing of the medication interruption and subsequent resumption of antithrombotic therapy, as well as whether bridging therapy is to be used.

Drugs such as warfarin and aspirin have been used for decades to treat patients with clotting issues. New novel direct oral anticoagulants (DOACs) that interrupt the clotting cascade are increasingly prescribed to treat patients with atrial fibrillation, prosthetic heart valves, cardiac stents, and deep vein thrombosis (DVT). These DOACs include betrixaban, rivaroxaban, apixaban, edoxaban, and dabigatran. Recent studies have shown that DOACs reduce the risk of intraocular bleeding by approximately one-fifth compared to the risk associated with warfarin.⁴

Many ophthalmologists routinely perform cataract surgery on healthy adults who take anticoagulant or antiplatelet drugs without stopping them if neither retrobulbar nor peribulbar anesthesia is planned.⁵ However, many surgeons do discontinue all such medications before procedures with a high risk of hemorrhage, such as eyelid, orbit, and retinal surgery.⁶ There is risk associated with this approach as well. Indeed, the MARK study found that “the discontinuation of oral antithrombotic agents and addition of heparin bridging therapy are associated with adverse events in the peri-procedural period. Low-dose heparin bridging therapy is associated with bleeding events and may not actually reduce the risk of thromboembolism.”⁷ Eye surgeons contemplating an elective surgical procedure with a significant risk of perioperative or postoperative bleeding may wish to consider postponing the procedure until the patient has completed an appropriate course of the antithrombotic drug. In addition, the eye surgeon should contact the patient’s cardiologist or primary care provider to discuss the optimal patient management strategy for stopping and restarting the patient’s antithrombotic therapy. Changing these medications regimens should only be done in consultation with the prescribing physician.

⁴ Sun MT, Wood MK, Chan W, Selva D, Sanders P, Casson RJ, Wong CX. Risk of Intraocular Bleeding with Novel Oral Anticoagulants Compared with Warfarin: A Systematic Review and Meta-analysis. *JAMA Ophthalmol.* 2017 Aug 1;135(8):864-870.

⁵ Grzybowski A, Ascaso FJ, Kupidura-Majewski K, Packer M. Continuation of anticoagulant and antiplatelet therapy during phacoemulsification cataract surgery. *Curr Opin Ophthalmol.* 2015 Jan;26(1):28-33.

⁵ Kent TL, Custer PL. Bleeding complications in both anticoagulated and nonanticoagulated surgical patients. *Ophthal Plast Reconstr Surg* 2013; 29:113–117.

⁷ Gotoh S, Yasaka M, Nakamura A, Kuwashiro T, Okada Y. Management of Antithrombotic Agents During Surgery or Other Kinds of Medical Procedures with Bleeding: The MARK Study. *J Am Heart Assoc.* 2020 Mar 3;9(5): e012774.

Although prescription antithrombotic drugs are commonly used, patients are even more likely to be on agents such as aspirin, nonsteroidal anti-inflammatory drugs (NSAIDs), vitamin E, and ginkgo biloba because these drugs are widely available OTC. Regardless of the mechanism of action, continued use of these anticoagulant and antiplatelet medications—including those obtained OTC—increases the risk for vision-threatening hemorrhage. This risk of vision loss must be carefully weighed against the increased risk of potentially life-threatening thromboembolic events. The ophthalmologist must carefully determine the need for these medications to treat the patient's conditions and the risk of thromboembolism.⁸ Before making any changes to the patient's medications, consult with the physician who prescribed them. In some instances, you may need to ask the patient's primary care provider and/or cardiologist for a preoperative medical assessment with specific input on these medications.⁹ This consultation recommendation is echoed in a Science Advisory from five professional groups including the American Heart Association and the American College of Surgeons.¹⁰ The Advisory cautioned that stopping antiplatelet therapy in patients with coronary artery stents could result in myocardial infarction or death.

Types of anticoagulants and when to stop them

The following general information may be of use during the planning phase but may not be sufficiently detailed to direct treatment clinical decisions.

- 1. Aspirin (acetylsalicylic acid)** is the most commonly prescribed antiplatelet drug for the prevention of cardiovascular disorders. It **irreversibly** inhibits platelet activation and has been shown to reduce the risk of nonfatal stroke and myocardial infarction by 25-30%, and the rate of cardiovascular death by 15%.¹¹ Aspirin has a short half-life (3 to 6 hours), but its irreversible effects will continue for the lifetime of the platelet (8 to 9 days). If aspirin needs to be discontinued, instruct the patient to stop taking it 7 to 10 days prior to surgery.¹² After stopping aspirin therapy, platelet function recovery depends on the turnover rate of the platelets, which is approximately 10% per day.¹³

⁸ Douketis JD, Spyropoulos AC, Spencer FA, et al. Perioperative management of antithrombotic therapy: antithrombotic therapy and prevention of thrombosis, 9th ed: American College of Chest Physicians Evidence-Based Clinical Practice Guidelines. *Chest* 2012; 141 (Suppl): e326S–e350S.

⁹ Makuloluwa AK, Tiew S, Briggs M. Peri-operative management of ophthalmic patients on anti-thrombotic agents: a literature review. *Eye (Lond)*. 2019 Jul;33(7):1044-1059.

¹⁰ AHA/ACC/SCAI/ACS/ADA Science Advisory. Prevention of Premature Discontinuation of Dual Antiplatelet Therapy in Patients with Coronary Artery Stents. *Circulation* 2007;115: 813-818.

¹¹ Paez Espinosa EV, Murad JP, Khasawneh FT. Aspirin: pharmacology and clinical applications. *Thrombosis*. 2012; 2012:173124. doi: 10.1155/2012/173124. Epub 2011 Nov 17. PMID: 22195279; PMCID: PMC3236360.

¹² Kristensen SD, Knuuti J, Saraste A, et al.: 2014 ESC/ESA Guidelines on non- cardiac surgery: cardiovascular assessment and management: The Joint Task Force on non-cardiac surgery: cardiovascular assessment and management of the European Society of Cardiology (ESC) and the European Society of Anaesthesiology (ESA). *Eur Heart J* 2014; 35: 2383–431.

¹³ Kalra K, Franzese CJ, Gesheff MG, Lev EI, Pandya S, Bliden KP, Tantry US, Gurbel PA. Pharmacology of antiplatelet agents. *Curr Atheroscler Rep*. 2013 Dec;15(12):371. doi: 10.1007/s11883-013-0371-3. PMID: 24142550.

1. **Non-steroidal anti-inflammatory drugs (NSAIDs)** are **reversible** platelet inhibitors that act by inhibiting various COX enzymes. NSAID's effect on platelet function is considered to be short-term and typically normalizes within three days. However, this can vary between drugs in the class. Short-acting drugs such as ibuprofen, diclofenac, and indomethacin restore 50% of platelet function within 6 hours of the last dose and normal functioning of the platelets returns after 24 hours.¹⁴ NSAIDs are usually stopped 24-72 hours before surgery.¹⁰
2. **Thienopyridines** such as **clopidogrel** (Plavix) and **ticlopidine** (Ticlid) are often prescribed after the placement of coronary artery stents. The thienopyridines are pro-drugs in which active metabolites **irreversibly** affect platelet function in a time- and dose-dependent fashion. There may be serious adverse effects if this therapy is prematurely discontinued: ophthalmologists should consult the cardiologist or prescribing physician for advice on whether it is safe to stop the medication, and when this should be done.¹⁵ Due to the irreversible mechanism of action of these agents, it is generally recommended that **if** they are to be stopped, this should happen 5 to 7 days before non-cardiac elective surgery.¹⁶
3. **Non-thienopyridines** such as **ticagrelor** (Brilinta) and **cangrelor** (Kengreal) are relatively new antiplatelet agents. Ticagrelor is a **reversible** antiplatelet agent and its effect is achieved within 2 hours. The plasma half-life is 8 to 12 hours. It should be discontinued 5 days before surgery.¹⁴ Cangrelor is a direct, **reversible**, and intravenously administered drug that can inhibit 95% to 100% of platelet activity within the first two minutes of administration. The plasma half-life of cangrelor is 3 to 6 minutes, which allows recovery of 80% to 90% platelet function within 60 to 90 minutes of discontinuing the intravenous infusion.¹⁷

¹⁴ Hall R, Mazer CD. Antiplatelet drugs: a review of their pharmacology and management in the perioperative period. *Anesth Analg*. 2011 Feb;112(2):292-318.

¹⁵ Grines CL, Bonow RO, Casey DE Jr, Gardner TJ, Lockhart PB, Moliterno DJ, O'Gara P, Whitlow P; American Heart Association; American College of Cardiology; Society for Cardiovascular Angiography and Interventions; American College of Surgeons; American Dental Association; American College of Physicians. Prevention of premature discontinuation of dual antiplatelet therapy in patients with coronary artery stents: a science advisory from the American Heart Association, American College of Cardiology, Society for Cardiovascular Angiography and Interventions, American College of Surgeons, and American Dental Association, with representation from the American College of Physicians. *Circulation*. 2007 Feb 13;115(6):813-8.

¹⁶ Narouze S, Benzon HT, Provenzano D, Buvanendran A, De Andres J, Deer T, Rauck R, Huntoon MA. *Interventional Spine and Pain Procedures in Patients on Antiplatelet and Anticoagulant Medications (Second Edition): Guidelines from the American Society of Regional Anesthesia and Pain Medicine, the European Society of Regional Anaesthesia and Pain Therapy, the American Academy of Pain Medicine, the International Neuromodulation Society, the North American Neuromodulation Society, and the World Institute of Pain*. *Reg Anesth Pain Med*. 2018 Apr;43(3):225-262.

¹⁷ Capodanno D, Milluzzo RP, Angiolillo DJ. Intravenous antiplatelet therapies (glycoprotein IIb/IIIa receptor inhibitors and cangrelor) in percutaneous coronary intervention: from pharmacology to indications for clinical use. *Ther Adv Cardiovasc Dis*. 2019 Jan-Dec; 13:1753944719893274.

4. **Vitamin K antagonists (warfarin, acenocoumarol, phenprocoumon)** are also called coumarins. Warfarin, the most recognized and widely used drug of this group, has been available for more than 50 years. Warfarin interrupts the clotting cascade by inhibiting vitamin K-dependent coagulation factors. The half-life of warfarin is 36 to 42 hours, but this can be altered by multiple factors. Warfarin use is usually discontinued 5 days before elective surgery.¹⁸ The international normalized ratio (INR) is used to monitor the dosage with the target therapeutic dose in the range of 2.0 to 3.5.¹⁹ In practice, it is difficult to titrate warfarin due to the high number of pharmacological interactions and genetic variations that can affect its metabolism. Some patients at high risk for thromboembolism may need bridge therapy with heparin.²⁰
5. Novel DOACs include **apixaban** (Eliquis), **edoxaban** (Savaysa), **rivaroxaban** (Xarelto), and **betrixaban** (Bevyxxa). These drugs are direct inhibitors of factor Xa with more predictable pharmacokinetics, fewer drug interactions, shorter half-lives, and quicker onset than warfarin. The common mechanism of action of these drugs is to bind to the active site of factor Xa, thus inactivating it. Factor Xa is considered the rate-limiting step for the progression of the coagulation cascade and ultimately clot formation. The advantages of prescribing DOACs are their short half-life and rapid onset of action, allowing for an easier interruption and re-initiation of anticoagulation therapy after surgery. In addition, direct inhibitors of factor Xa have a lower bleeding risk compared to vitamin K antagonists, making the use of routine coagulation tests unnecessary. However, the pharmacokinetic properties of each DOAC can vary depending on the renal and liver function of the patient.²¹ These drugs are usually stopped 2-3 days prior to the procedure.
6. Another DOAC, **dabigatran** (Pradaxa), is a direct inhibitor of thrombin and is the only medication in this category. It prevents the conversion of fibrinogen to fibrin and thus stops clot formation. Dabigatran has a quick onset of action (0.5 to 2 hours) and a plasma half-life of around 12 hours. However, the half-life of this drug is tremendously affected by renal function, since the kidney excretes 80% of the drug (less than 10% is excreted by the liver). Avoid dabigatran use in patients with creatinine clearance less than 30ml/min due to the potential for drug accumulation and spontaneous hemorrhage. Similar to other DOACs, dabigatran is usually stopped 2-3 days prior to the procedure if kidney function is normal.

¹⁶ Lip GY, Durrani OM, Roldan V, Lip PL, Marin F, Reuser TQ. Peri-operative management of ophthalmic patients taking antithrombotic therapy. *Int J Clin Pract.* 2011; 65:361–71.

¹⁷ Keeling D, Baglin T, Tait C, Watson H, Perry D, Baglin C, Kitchen S, Makris M; British Committee for Standards in Haematology. Guidelines on oral anticoagulation with warfarin - fourth edition. *Br J Haematol.* 2011 Aug;154(3):311-24.

²⁰ Ansell J, Hirsh J, Hylek E, Jacobson A, Crowther M, Palareti G. Pharmacology and management of the vitamin K antagonists: American College of Chest Physicians Evidence-Based Clinical Practice Guidelines (8th Edition). *Chest.* 2008 Jun;133(6 Suppl):160S-198S

²¹ Alquwaizani M, Buckley L, Adams C, Fanikos J. Anticoagulants: A Review of the Pharmacology, Dosing, and Complications. *Curr Emerg Hosp Med Rep.* 2013 Apr 21;1(2):83-97. ²¹

7. **Fondaparinux (Arixtra)** is an anticoagulant medication chemically related to low molecular weight heparins (LMWHs). This agent is a pentasaccharide that acts as an indirect factor Xa inhibitor with a plasma half-life of 15 to 17 hours. Its anticoagulant activity persists even 2 to 4 days after the last dose of the drug in a person with normal renal function.¹⁹ If the patient's renal function is normal, fondaparinux should be discontinued 36 to 42 hours before a procedure.
8. **Heparin** is a naturally occurring polysaccharide that binds to the antithrombin receptor and enhances its potency to inactivate factors II and Xa. Intravenous heparin is usually discontinued approximately 12 hours before surgery and the partial thromboplastin time (PTT) is most commonly used to monitor intravenous heparin levels. Natural heparin consists of varying molecular weights while LMWHs such as **enoxaparin (Lovenox)** consist of only short chains of polysaccharide. Because they can be given subcutaneously and do not require PTT monitoring, LMWHs can be self-administered by patients who are at high risk for thromboembolic events or who are undergoing bridge therapy. They are usually started 2-3 days before the procedure and discontinued 12-24 hours prior to surgery. **Enoxaparin** can cause thrombocytopenia, so platelet levels should be checked before surgery.²² Consult with the prescribing physician or pharmacist.
9. **Other drugs** that affect platelet function, such as sulfinpyrazone, dipyridamole, tricyclic antidepressants, phenothiazines, furosemide, and steroids disturb platelet function for only 24-48 hours; they are usually stopped 2-3 days before surgery.
10. **Herbal supplements and vitamins** have varied mechanisms of action and duration of effect. Consult with the prescribing physician or pharmacist to determine when to stop them.

The optimal management for each antithrombotic agent in the peri-procedural time frame cannot always be firmly established because of the various factors previously discussed, including the chosen surgical procedure and associated blood loss, the patient's intrinsic risk of bleeding due to medications or genetic disease, the patient's underlying risk of a thromboembolic event, the timing of the medication interruption, etc. In addition, hemostasis and anticoagulation may be altered for numerous reasons including genetic disorders, malignancy, sepsis, surgery, and various drugs. It bears repeating that consultation with the physician who prescribed the anticoagulant medication is needed to ensure that it is safe to discontinue the drug(s) during the perioperative period. Carefully document the decision-making process, consultations, and patient education.

²² Mantha S, Miao Y, Wills J, Parameswaran R, Soff GA. Enoxaparin dose reduction for thrombocytopenia in patients with cancer: a quality assessment study. *J Thromb Thrombolysis*. 2017;43(4):514-518.

Informed consent

Discuss and document the risk of hemorrhage, thromboembolism, cardiopulmonary problems, and stroke (sample anticoagulant form available at <https://www.omic.com/anticoagulants-consent-form/>). Review the increased risk of bleeding if medications will be continued, and the increased risk of clots if they will be stopped. Take this increased bleeding risk into account when choosing the type of anesthesia. As part of the discussion, review written instructions for the patient on how and when to stop the medications (sample at <https://www.omic.com/anticoagulant-form-for-patients/>).

Communicate with anesthesia providers and nursing staff.

Inform the perioperative team of any pertinent medication history and the perioperative anticoagulant management plan. The perioperative team can help educate the patient, prepare the operating room with essential equipment and drugs (e.g., suction, cautery, gel foam, thrombin, etc.), monitor for signs of complications, and follow up with the patient after discharge. Address anticoagulant use in the pre- and postoperative orders (e.g., “Patient instructed to stop aspirin two weeks prior to surgery, and NSAIDs 48 hours before surgery. Patient will restart aspirin on the first postoperative day. On admission, verify with patient and document that these medications were stopped as ordered. Please call or text me if there are any questions or concerns”).

Anticoagulants: Time frame for restarting

Although recommendations on when to reinstitute anticoagulant therapy can be found online or in the *Physician's Drug Reference*, it is often hard to know when it is truly safe to restart them. One of the factors to consider is how long it takes for the medication to reach a therapeutic level. We cannot stress enough the importance of consulting the patient's prescribing physician or a pharmacist for this information. Instruct patients to carefully monitor for symptoms of hemorrhage once they restart medications. Be sure to provide current contact information so they may reach you after hours. If another physician is covering for you, inform him or her of any patients restarting anticoagulant therapy.

Part 3: Monitoring for hemorrhage during the perioperative period

Verify that the patient has stopped medications as ordered.

Redundancy creates safety nets for patients. Verify personally that the patient has stopped all medications as instructed and confirm that this important safety check has also been conducted and documented by both the admitting nurse and anesthesia provider. If the patient has not complied with instructions to stop the medications, determine if it is too dangerous to proceed. Prioritize patient safety rather than the preferences and convenience of the patient, staff, or facility. If anticoagulants are continued, consider obtaining current coagulation studies (if appropriate). Ask the anesthesia provider to review them with you before anesthesia is administered. Date and sign any lab reports, and document any pertinent discussions with the patient or anesthesia provider.

Hypertension

Measure the patient's blood pressure before administering any anesthesia. Reevaluate the decision to perform the procedure if the preoperative blood pressure is elevated. If the blood pressure is > 200 mm Hg systolic or 110 mm Hg diastolic, consider cancelling non-emergent surgery and sending the patient to the primary care provider for treatment. Be sure to document the referral. If the surgery is urgent or emergent, consider admission to a hospital so that you can stabilize and/or treat the medical problem(s). Once the patient's condition is optimized to the extent possible, perform the surgery under the direct supervision of a medical team and an anesthesiologist.

Perioperative monitoring

If an anesthesia provider is present, he or she will take responsibility for patient monitoring. If the procedure is performed in the office, or no anesthesia provider is present, see "Office-based Surgery for Adults" for additional advice on who can monitor the patient, and what emergency equipment to have available.²³ Monitor and document pulse and blood pressure before, during, and after the procedure. Carefully document any care given in response to changes in blood pressure readings or the clinical situation. Patients with a history of hypertension or patients who present with an elevated blood pressure on no therapy may have an exaggerated blood pressure response to any noxious stimuli (i.e., pain with injection, epinephrine in the injection, and pain in surgery due to incomplete or ineffective local anesthesia). Other painful stimuli such as bladder distention can also produce an abnormal blood pressure response. Sedation will not eliminate this blood pressure response, so find an alternative therapy if increased blood pressure needs to be treated.

Consider using a pulse oximeter to measure oxygen saturation for more complicated procedures or for patients at higher risk (e.g., patients receiving sedation, procedures that require extensive dissection or last longer than 30 minutes). In your postoperative orders, direct the nurse monitoring the patient to check for signs of bleeding and to immediately notify you of increasing bruising or swelling. If signs of bleeding are present, instruct the nurse to consult with you prior to discharging the patient from the post-anesthesia recovery unit.

Instruct patients and their adult caregivers on the signs and symptoms of bleeding as well as other potential complications. Provide precise **written** instructions on what to do if bleeding is suspected by the patient or caregiver, how to contact you, how and when to resume anticoagulant/antiplatelet medications, and the date of the first postoperative visit. Finally, tell the patient and caregiver what to do if bleeding or other sight-threatening complications are noted and you or the physician covering for you can't be reached.

²³ Menke, AM. Office-based Surgery for Adults. <https://www.omic.com/office-based-surgery-for-adults-recommendations/>..

Part 4: Management of Hemorrhage

A vision-threatening hemorrhage may occur despite careful preoperative planning and preparation, excellent technical execution of the surgical procedure, treatment of hypertension prior to, during, or after surgery, and appropriate application of cold compresses to the wound early in the postoperative period. Prompt intervention and appropriate attention to management may prevent unnecessary visual loss. The key to management is **early diagnosis**, prompt evaluation by a surgeon capable of treating the emergency, and precise/timely intervention to relieve pressure building within the orbit. In most instances, there is little time between the onset of symptoms and irreversible visual loss. As noted above, educate the patient, caregiver(s), and healthcare team on how to recognize hemorrhage and the importance of contacting you immediately (rather than waiting for normal business hours) if it is noted.

Ensure that a physician who is familiar with oculoplastic complications (especially with recognizing and treating an orbital compartment syndrome) manages the post-blepharoplasty patient. If you will be out of touch during the acute postoperative period, avoid delegating this responsibility to a colleague who is unfamiliar with, or uncomfortable with, managing orbital bleeding complications. Only colleagues who have equivalent knowledge and skill should provide coverage for you.

Initial evaluation of a report of postoperative bleeding

In any report of hemorrhage after surgery, obtain and document the following information:

- Time and onset of bleeding/swelling
- Presence or absence of active bleeding from the wound
- Presence or absence of pain
- Vision, with specific instructions as to how the vision is to be checked (i.e., occlusion of the non-involved eye)
- Ability or inability to open the lids voluntarily or forcefully

Train staff members who field these calls during office hours to ask these questions, document the responses, and immediately notify you of all reports of bleeding problems. If contacted by a hospital nurse or physician, direct the conversation by specifically asking these questions and documenting the responses. Do not rely on the hospital physicians or nurses to independently report these findings. In all cases, note the date and time of the call, what particular questions were asked of the patient/caregiver/healthcare team member, and the responses.

When to evaluate the patient in person

Have a low threshold for directing the post-surgical patient to come in for immediate examination, or for seeing the patient in the post-anesthesia recovery room or emergency department. Err on the side of examining the patient in person, regardless of the hour. Once you have been contacted by the patient or healthcare team member and have determined whether to treat the patient in person by telephone, document your decision-making process.

Some patients resist advice to come in for examination. Remain firm and give/document specific recommendations regarding the need for an in-person examination. Ask to speak to a family member if present, as well as to the patient if contacted by a family member. If the patient or caregiver refuses to come in, explain that the patient may rapidly lose vision, and document the refusal to come in. Document the time the call was received, and what decision was made, as well as the advice to come in for examination. During office hours, the patient can be seen in the office. After normal business hours, consider meeting the patient in the emergency room where appropriate care can be delivered if needed.

Management of an evolving orbit compartment syndrome

An orbital compartment syndrome is a vision-threatening emergency that requires **prompt action**. If, for any reason, you are not immediately available to manage the patient (e.g., you are operating on another patient), notify the nurse or ED physician that an ophthalmologist competent at treating orbital compartment syndrome is required. Be sure to convey the urgency of the situation. Document this conversation at the earliest opportunity, noting the time of the discussion and pertinent details.

The following recommendations were culled from the reviews of defense and plaintiff expert witnesses who were called upon to evaluate the care provided by OMIC policyholders in post-surgical hemorrhage cases. They are offered as possible responses. It may not be necessary to initiate all of these actions to stabilize the patient's condition.

1. Examine the eye, and note and record the vision, pupillary responses, and ocular motility before initiating treatment. Look for an afferent pupillary defect (APD) and recall that asymmetric pupils early after surgery may be due to the effect of residual epinephrine.
2. Immediately open the wound at the bedside to relieve pressure. Administration of additional local anesthesia and/or IV sedation may be necessary but is usually not needed. Use the gloved finger or a blunt sterile instrument to remove superficial clots in the wound. Do not probe deeply as this may cause more bleeding. Both upper and lower eyelid wounds may need to be opened. If the lower eyelid was tightened at the outer canthus at the time of surgery, release the suture if it can be found. This may require a small injection of local anesthetic at the outer canthus.
3. Establish IV access, and order intravenous corticosteroid treatment as soon as possible. Decadron in a 6 or 8 mg bolus is sufficient in most adult patients and can even be given to patients with diabetes and hypertension. One or two doses are easily tolerated by all but the most ill patients (ill patients are unlikely to have had elective blepharoplasty surgery). Avoid intravenous mannitol as it has no role in managing a patient with an acute orbit compartment syndrome caused by hemorrhage.
4. Check the patient's vital signs and treat hypertension if it exists. Once pressure is relieved, pain-induced hypertension may subside. Sedation may be more useful than

antihypertensive drugs in this situation. Both may be required, however. Refrain from over-treating hypertension in elderly patients as subsequent hypotension may compromise cerebral circulation and lead to a stroke.

5. Re-examine the patient. Monitor orbital compliance (how “tight” is the orbit?), vision, pupillary responses, and ocular motility to determine if additional measures are necessary.
6. Treat ongoing hemorrhage. Evacuating a clot and opening the wound may be all that is necessary in some cases of orbital hemorrhage.
7. Perform canthotomy and cantholysis at the bedside if the orbit does not soften and vision does not improve almost immediately following opening of the wound. Local anesthesia and intravenous sedation may be necessary. Do not wait to get the patient into a surgical suite before performing this vision-saving procedure. Carry out the procedure at the bedside if the orbital pressure is high and there has been little or no response to opening the wound. Canthotomy and cantholysis are the best means for reducing orbital pressure in the hemorrhagic orbital compartment syndrome. By severing the attachments of the orbital diaphragm at the outer canthus, the orbit soft tissues can decompress anteriorly, and fresh blood deep in the orbit can escape. The canthotomy and cantholysis must be generous and may need to include both the superior and inferior crus of the canthal tendons. These structures may be difficult to visualize but can be “felt” by the surgeon as the tendons are divided by grasping each cru with forceps prior to making the cuts.
8. Re-examine the patient. Again, check vision, orbital compliance, pupillary response, ocular motility, and degree of bleeding to determine if the patient needs to be taken to the operating room for additional treatment at this time. The decision will depend upon the patient’s response to therapy up to this point.
9. Explore the wound in the operating room if more treatment is needed. Ask the operative team to prepare the operating room with essential equipment and drugs (e.g., headlight, retractors, suction, cautery, gel foam, thrombin, etc.). Open and explore the wound, identify and control bleeders, evacuate clots, re-examine the canthotomy and cantholysis to ensure adequacy. Consider performing bony decompression of the orbital floor and/or medial orbital wall (this is rarely required if a thorough canthotomy and cantholysis have been accomplished at the bedside). Place drains to allow egress of blood from the orbit.
10. Consult with an oculoplastic or orbital surgeon. Act promptly! Do not delay the treatment described above while waiting for consultation from an oculoplastic or orbital colleague **unless** the vision is stable, there is no APD, and ocular motility is reasonably normal. Remember that time is of the essence in treating the post-hemorrhagic orbit compartment syndrome.

11. Wait until after the acute management phase to decide whether to obtain imaging studies, such as CT or MRI scans. Precious time may be wasted ordering and obtaining the scan. The cause of the visual compromise is obvious, and imaging is not needed to direct management decisions. Moreover, the location of blood clots and bleeding sites are almost never identified on these scans. Imaging **after** the acute management may be useful in rare instances by allowing the surgeon to visualize anatomic relations, drains, etc., and by helping to document the absence of bleeding in the deep orbit, although this is almost never the cause of visual loss in blepharoplasty cases.
12. Avoid management techniques that have not proved useful. Anterior chamber paracentesis will not relieve orbital pressure and only increases the risk of visual loss. As noted above, IV Mannitol has no role in managing an orbital compartment syndrome. Monitoring of IOP is not contraindicated but is rarely useful in guiding therapy. Most importantly, do not base the decision to perform canthotomy or cantholysis or administer steroids on IOP measurements alone. Vision, pupillary response, ocular motility, and orbital compliance are far more useful clinical parameters to follow during the initial management stage.
13. Keep interested parties informed. Remember to confer with the patient, family, caregivers, and others to inform them of the complication, prognosis, and planned interventions. Call upon other members of the medical staff for supportive treatment and management of other medical issues, such as coagulation status, hypertension, and diabetes. Document these discussions as soon as possible.
14. Document dates, times, and events as soon as possible after the acute intervention. Do not wait to dictate the chart. Formulate your planned chart entry and make the chart entry before you leave the treatment facility where care was given. Document care rendered by others, including dates and times of telephone calls you made to others such as consultants, operating room personnel, anesthesia providers, radiologists, etc.

Summary

The decision to discontinue antiplatelet and/or anticoagulant medications for an ophthalmic surgical procedure is a complicated process with multiple facets. The ophthalmologist must weigh the risk of perioperative thromboembolic complications against that of complications from hemorrhage, monitor for hemorrhage, and be prepared to manage an orbital compartment syndrome. By taking the steps discussed in this article, ophthalmologists can protect their patients and reduce the likelihood of a malpractice lawsuit.

OMIC-insured ophthalmologists are invited to contact OMIC's Risk Management Department for assistance at (800) 562-6642, option 4, or at riskmanagement@omic.com.