Brief Communication

Anti-thrombotics in ophthalmic surgery: To continue or cease?

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Introduction

Patients undergoing ophthalmic procedures, including cataract, glaucoma, and vitreoretinal surgeries, are often elderly with significant co-morbidities. In this context there is an increase in patients on anti-thrombotics (aspirin, Novel oral anticoagulants (NOACS), antiplatelet drugs). Generic guidelines have been published to address the issues of anti-thrombotics in the broader context of regional anaesthesia (RA), but guidelines are absent for RA in ophthalmic surgery. The literature is limited to reviews based on case series. Some clinicians discontinue antithrombotics for fear of bleeding and its sequelae resulting from RA techniques and surgical procedures, whereas others continue ant-ithrombotics being cognizant of the risks of life-threatening thromboembolic events.

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This brief communication explores the evidence on the safety of RA during eye surgery in patients receiving antithrombotics.

Pharmacology of antithrombotic drugs

This section summarizes core drug properties, typical half-lives, clearance pathways, commonly used pre-operative hold intervals stratified by kidney function and procedural bleeding risk, suggested post-operative restart windows.[1,2]

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Agent	Mechanism of action	Half life (hrs)	Clearance	Usual pre-op hold for elective surgery	recommended post op restart
Warfarin	Vit K antagonist	36-42	Hepatic	Stop about 5 days before surgery; check INR on day of surgery	Evening of surgery or next day if hemostasis is secure
Dabigatran	Direct thrombin inhibitor	12-17	Renal	CrCl ≥50 mL/min: hold 24–48 h; CrCl 30–49: hold 48–72 h; CrCl <30: hold 72–96 h	24 h (low-risk procedure) to 48–72 h (high-risk procedure) after surgery if hemostasis is secure
Apixaban	Factor Xa inhibitor	12	Mixed hepatic/renal	CrCl ≥50: hold 24–48 h; CrCl 30–49: hold 48–72 h; consider ≥72 h for very high-risk surgery	24 h (low-risk) to 48–72 h (high-risk) after surgery if hemostasis is secure
Rivaroxaban	Factor Xa inhibitor	5-13	Mixed hepatic/renal	CrCl ≥50: hold 24–48 h; CrCl 30–49: hold 48–72 h; extend for very high-risk surgery	24 h (low-risk) to 48–72 h (high-risk) after surgery if hemostasis is secure
Edoxaban	Factor Xa inhibitor	10-14	Renal	CrCl ≥50: hold 24–48 h; CrCl 30–49: hold 48–72 h; consider longer for high-risk surgery	24 h (low-risk) to 48–72 h (high-risk) after surgery if hemostasis is secure
Aspirin	Irreversible COX 1 inhibitor	7-10 days	Hepatic	Often continue for low-to-moderate risk ophthalmic procedures; consider 3–5 day hold for select high-risk orbital/oculoplastic cases after cardiology review	Usually continue; if held, restart when hemostasis is secure (often within 24 h
Clopidogrel	P2Y12 receptor antagonist	Platelet effect 5-7 days	Hepatic	Consider 5 day hold for high-bleeding-risk surgery; avoid interruption during mandatory DAPT after stenting; coordinate with cardiology	Restart once hemostasis is secure (often 24–72 h), individualized
Prasugrel	P2Y12 receptor antagonist	Platelet effect 5-7 days	Hepatic	Consider 7 day hold for high-bleeding-risk surgery; avoid interruption during mandatory DAPT; coordinate with cardiology	Restart when hemostasis is secure; individualized

Table :1 Pharmacology and perioperative timing of key antithrombotic agents[1]

Anesthetic Implications Of Antithrombotics In Opthalmic Blocks

Modern ophthalmic RA techniques include needle-based (peribulbar block) or cannula-based (sub-Tenon's) blocks. The risk of haemorrhage in patients taking antithrombotics remains controversial, with the reported incidence ranging from 0.016 to 1.7%.[3] Sub-tenon blocks are considered safe for patients on anti-thrombotics, albeit subconjunctival haemorrhage may occur, which usually resolves spontaneously.[4]

Technique	Risk On Anti Thrombotics	Typical Use	How To Reduce Bleeding
Topical only	None	Cataract (clear-corneal), YAG/SLT lasers and procedures that do not require injections	Avoid unnecessary manipulation, gentle speculum use
Subconjunctival / subcutaneous (periocular) injections	Very low	Subconjunctival anesthesia/medication; eyelid local infiltration for minor lesion excision, biopsies, chalazion I&D skin wheal	Use small-gauge needle; inject slowly; add epinephrine where appropriate; brief post-injection compression to limit oozing/subconj hemeorrhage
Sub-Tenon (blunt cannula)	Low	Cataract, cornea, selected retina/glaucoma cases when akinesia/analgesia beyond topical is needed	Prefer blunt cannula over sharp needle; slow incremental injection; post-injection compression; avoid elevated venous pressure
Peribulbar (needle)	Moderate	Longer cases requiring akinesia when Sub-Tenon is insufficient or not feasible	Use smallest effective volume; avoid high airway/venous pressure; careful aspiration before injection; monitor closely for early bleeding

Table: 2 Relative risks and preventive measures for patient on anti-thrombotics[13]

Anesthetic Implications Of Antithrombotics And Opthalmic Surgery Cataract Surgery:

- Phacoemulsification for cataract surgery is the standard of care, and significant bleeding is very rare, even in patients receiving anti-thrombotics. Literature to date reports no sight-threatening complications associated with local anaesthetic blocks in patients who are on single anti platelet agents undergoing cataract surgery. Most complications reported are subconjunctival haemorrhages, hyphema that resolve spontaneously without affecting vision.[3]
- However it is recommended to stop P2Y12 receptor inhibitors perioperatively (in absence of high risk thromboembolic incidence) for surgeries done under peribulbar block.

- American Association of Opthalmology (AAO) advise continuation of warfarin in patients undergoing cataract surgery provided INR is in the therapeutic range . Consideration for sub-Tenon's or topical anaesthesia should be given in patients on warfarin to minimise the risk of haemorrhagic complications.
- Directly acting oral anticoagulants (DOACS) are omitted 2 days pre-operatively (depending on renal function) and re-started 1 to 2 days postoperatively if adequate haemostasis is achieved.

Vitreoretinal surgery

The control of perioperative haemostasis and haemorrhage is essential during vitreoretinal surgery. The risk of haemorrhage depends on the underlying vitreoretinal pathology. During manipulation of fragile and highly vascular tissue within an enclosed anatomical space, patients with diabetes and vascular retinopathy are prone to bleed. Complications include hyphaema and subretinal, suprachoroidal, or vitreous haemorrhages.[5] The incidence of postoperative vitreous cavity haemorrhage in patients on antithrombotics ranges between 1.6% and 13%, averaging 7.3%.[6] A recent study in patients undergoing vitreoretinal surgery who received antiplatelet agents found a significant increase in haemorrhagic complications of 20.4% in patients on antiplatelet agents vs 4.9% in control subjects).[7] Of these, 6.8% (three out of 44 patients) on antiplatelet therapy (clopidogrel) developed long-term sight-threatening haemorrhagic complications, including submacular haemorrhage. Hence it is prudent to discontinue clopidogrel for 5 days in the preoperative period. NOACs are less likely to cause sight threatening haemorrhage although evidence is scarce. Cessation of antithrombotics can potentially impact on morbidity and even mortality. It is therefore important to consider the risks and benefits of antithrombotics and exercise individualized clinical judgement for each specific patient.[8]

Glaucoma Surgery

Studies have shown an increased risk of hemorrhagic complications with anti-thrombotic use in glaucoma surgery. Perioperative bleeding complications such as hyphaema, intrableb bleeding, and suprachoroidal haemorrhage are known to occur. Aspirin appears to be safe in trabeculectomy but patients on warfarin are at increased risk of bleeding which may require pre and post operative monitoring.[9] Bridging therapy with LMWH to be considered in patients with high thromboembolic risk. Decision regarding discontinuation of anticoagulants should be done with the consent / permission of the cardiologist.

Thromboembolic Risk Category	Clinical indications of warfarin therapy		
	Atrial fibrillation	Mechanical heart valve	Venous Thromboembolism (VTE)
High Risk>10%	CHADS {1}score 5 or 6 Recent stroke/TIA (transient ischemic attack)	Any mechanical mitral valve Old (caged ball/ tilting disc) aortic valve	Recent (3 or more) VTE High risk thrombophilia
Moderate Risk 5-10%	Rheumatic heart disease. CHADS score 3 or 4	Bi-leaflet aortic valve >1 risk factors {2}	VTE within 2-12 months Moderate risk thrombophilia {3}he Active cancer {4}
Low Risk>5%	CHADS score 0-2(no prior stroke/ TIA)	Bi-leaflet aortic valve without any risk factors	VTE >12 months

1. CHADS score indicates score based on cardiac failure, hypertension, age ,diabetes, VTE, TIA
2. Age more than 75yrs, atrial fibrillation, congestive heart failure, hypertension, diabetes, TIA
3. Heterozygous, factor V-Leiden/ prothrombin gene mutation
4. Cancer that is metastatic or treated within the past 6 months

Table: 3 Indications of bridging therapy in patients on warfarin[14]

Other ophthalmic surgeries (oculoplastic, squint, and corneal graft surgeries)

For elective oculoplastic procedures many surgeons consider holding P2Y12 inhibitors or DOACs when the patient's systemic risk and stent timing allow, while continuing aspirin in selected cases after cardiology input. Meticulous hemostasis, blood pressure control, and a postoperative hematoma surveillance protocol (including readiness for urgent wound exploration and lateral canthotomy/cantholysis) are essential. Sub-Tenon/local techniques are preferred.

Moderate -High Risk> 2 Low risk=0-1

Antithrombotics To Cease Or To Continue

The higher the score the greater is the risk of thromboembolism. Bridging therapy to be considered in high risk group if anticoagulants are to be stopped for surgery.[11] Stratification of the patients may be performed to classify them as high, intermediate, and low-risk groups for thromboembolism.[12] The conundrum does exist for the ophthalmologist and the anaesthetist, as they weigh the risk of bleeding from RA techniques and specific ophthalmic procedures.

CHADS-VASC Stroke Risk Score	
Symptoms	**Index Score**
Congestive heart failure LVEF≤35%	1
Hypertension	1
Age ≥75 yrs	2
Diabetis Mellitus	1
Stroke /TIA/ Thromboembolic event	2
Vascular Disease (MI/PDA)	1
Age 65-75 yrs	1
Sex(Female)	1

Table :4 CHADS score[From ESC-AF guidelines]

Conclusion

There is paucity of high quality studies to help in the formation of unequivocal recommendations. This is compounded by the published literature frequently having incomparable patient population groups, methodological design, and reported outcomes. Serious haemorrhagic complications secondary to RA in ophthalmic surgery is rare. In this context Sub-Tenon's block appears to have safety benefits for the patient on anti-thrombotics. Anaesthesiologist play an important role as advocates of patient safety and act in the patients' overall best interest. The ophthalmic surgeons' perspective regarding the cessation or continuation of antithrombotic therapy in the context of the specific eye surgery has to be taken into account. Most ophthalmic surgeries can safely be performed when anticoagulation within therapeutic range. Antithrombotic cessation in patients with high thromboembolic risk may result in life-threatening sequelae, hence they should be continued unless there are strong mitigating reasons to stop, especially in the context of avascular cataract surgery. For other ophthalmic surgeries the surgeons remain concerned about the perceived risk of sight-threatening haemorrhage and failure of surgery. Standard guidelines advice stoppage of warfarin 5 days prior to surgery (with bridging therapy when indicated) and NOACS to be stopped 24 to 48 hours in the preoperative period. An ideal approach in making the decision regarding antithrombotic cessation or continuation should be made after determining the risk–benefit analysis, and agreed upon for the individual patient by the multidisciplinary team comprising of the surgeon, anaesthesiologist and the cardiologist.

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Conflicts of interest

There are no conflicts of interest.

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