Warfarin: Perioperative Management

Thrombosis Canada
Thrombose Canada

Key Takeaways:

- Warfarin needs to be interrupted for most surgery/procedure
- Bridging with a short acting anticoagulant is recommended only in a small, selected group of high risk patients
- Involve the surgeon/proceduralist regarding the resumption of anticoagulation after the surgery/procedure

Objective:

- To provide an approach to the perioperative management of warfarin-treated patients who require an elective or urgent surgery/procedure.
- To provide an approach for bridging anticoagulation, if needed, during warfarin interruption.

For guidance on management of patients who require an urgent or emergency surgery/procedure, please refer to the Perioperative Anticoagulant Management Algorithm found on the Thrombosis Canada website under the "Clinical Tools" tab, then choose "Algorithms"

Background:

Bridging anticoagulation refers to administering a short-acting anticoagulant, typically a low-molecular-weight heparin (LMWH), before and after surgery or an invasive procedure to minimize the time that warfarin-treated patients are not anticoagulated. This is different from providing routine thromboprophylaxis in the post-operative setting.

Indications for Bridging Anticoagulation:

There is no strong evidence-based indication for bridging anticoagulation; bridging is suggested in patients at high risk for thromboembolism (**Table 1**), not suggested in low-risk patients, and optional in intermediate-risk patients based on individual patient characteristics.

Table 1. Patient Stratification for Bleeding Risk

High thromboembolic risk *(bridging anticoagulation suggested)*

- Mechanical prosthetic mitral valve
- Dual mechanical heart valves (aortic + mitral)
- Rheumatic valvular heart disease
- Older generation (cage-ball, tilting disc) mechanical aortic valve
- Chronic atrial fibrillation (valvular or non-valvular) with a $CHADS_2$ score** of 5-6
- Recent (within 3 months) arterial thromboembolism (stroke, systemic embolism, transient ischemic attack [TIA])
- Recent (within 3 months) venous thromboembolism (deep vein thrombosis, pulmonary embolism)†
- Prior perioperative thrombotic event
- Severe thrombophilia (deficiency of protein C, protein S, or antithrombin; homozygous factor V Leiden or prothrombin gene G20210A mutation or double heterozygous for each mutation; multiple thrombophilias; antiphospholipid antibodies), active cancer associated with high VTE risk (pancreatic, primary brain, gastric, esophageal, myeloproliferative)

Intermediate thromboembolic risk *(bridging anticoagulation optional and based on individual patient characteristics)*

- Chronic atrial fibrillation with a $CHADS_2$ score***of 3-4
- Newer generation (bileaflet) mechanical aortic valve with major risk factors for stroke*** (multiple prior strokes, prior perioperative stroke, or prior valve thrombosis)
- Prior venous thromboembolism within last 3-12 months
- Non-severe thrombophilia (heterozygous factor V Leiden or prothrombin gene mutation)
- Active cancer or history of cancer

Low-risk *(bridging anticoagulation is not recommended)*

- Chronic atrial fibrillation (valvular or non-valvular) with a $CHADS_2$ score** of 0-2
- Prior venous thromboembolism over 12 months ago
- Bileaflet aortic replacement without any risk factors for stroke

*Empiric risk stratification used as a starting point for assessing perioperative thromboembolic risk; should be combined with clinical judgment that incorporates patient- and surgery-related factors.
**CHADS2 score estimates the risk of stroke in patients with non-valvular atrial fibrillation. The score is the total points for the presence of congestive heart failure (1), hypertension (1), age > 75 yrs (1), diabetes (1), stroke, transient ischemic attack or systemic embolism (2).
***Risk factors include: AF, prior stroke/TIA during anticoagulant interruption or other prior stroke/TIA, prior valve thrombosis, rheumatic heart disease, hypertension, diabetes, congestive heart failure, age ≥75 years.
†Consider a temporary inferior vena cava filter to be inserted after warfarin interruption and prior to surgery for patients in whom surgery is necessary within 2-4 weeks of a proximal DVT; filter can be left in situ for 1-2 weeks until therapeutic anticoagulation is re-established. Elective surgery within 3 months after a diagnosis of deep vein thrombosis or pulmonary embolism should generally be avoided unless benefits are felt to exceed the risks (e.g., expedited cancer diagnosis).

See the Procedure-Specific Bleed Risk Stratification Tables at the end of this guide.

Bridging Anticoagulation Options:

Pre- and post-operative dosing:

- Subcutaneous (SC) therapeutic-dose LMWH (all agents should be given at half dose or prophylactic dose on the day prior to operative intervention):
  - enoxaparin 1 mg/kg twice daily or 1.5 mg/kg once daily
  - dalteparin 100 IU/kg twice daily or 200 IU/kg once daily
  - tinzaparin 175 IU/kg once daily

- Intravenous (IV) unfractionated heparin (UFH) to achieve a therapeutic activated partial thromboplastin time (aPTT) or anti-Xa defined according to local laboratory parameters is not commonly used. IV UFH is typically held 4-6 hours before an invasive procedure.

Alternative post-operative dosing strategies for high-bleed-risk procedures:

- **In patients for whom post-operative therapeutic-dose bridging is otherwise planned and who undergo a high-bleed-risk surgery/procedure**, therapeutic-dose LMWH/UFH should generally **not be restarted immediately post-operatively**. A stepwise approach should be used. If hemostasis is adequate, consider starting **prophylactic-dose anticoagulation** 12–24 hours post-operatively, such as SC LMWH — enoxaparin 40 mg once daily, dalteparin 5000 IU once daily, or tinzaparin 4500 IU once daily — or prophylactic-dose SC UFH according to local protocol. Reassess bleeding risk and hemostasis daily. Escalation to intermediate-dose or therapeutic-dose bridging may be considered **no earlier than ~48–72 hours post-operatively**, provided hemostasis remains secure and procedure-related bleeding risk has decreased. If bleeding risk remains high, or if there are ongoing concerns from the surgeon/proceduralist or managing physician, continue prophylactic-dose anticoagulation and reassess over the next several days before considering escalation
- **In patients undergoing very-high-bleed-risk or critical-site procedures**, including cardiac, spinal, or intracranial surgery/procedures, early post-operative therapeutic-dose LMWH/UFH bridging should be avoided. Post-operative options include prophylactic-dose LMWH or prophylactic-dose SC UFH when hemostasis is adequate, delaying anticoagulation until bleeding risk decreases, or resuming warfarin alone. **Escalation to therapeutic-dose bridging, if ultimately pursued, should occur only after reassessment confirms secure hemostasis, a lower bleeding risk, and a persistent indication for therapeutic-dose bridging**; this decision should be made in consultation with the surgeon/proceduralist and, where relevant, anesthesia.

Monitoring:

There is no need for laboratory monitoring with SC LMWH bridging. Monitoring of the aPTT (or anti-Xa, if available) is required for bridging with IV UFH.

Adverse Effects:

Bridging is associated with a 2% increase in risk for major bleeding and a 10-15% risk for minor bleeding. Bridging should be used judicioulsy to minimize the risk of bleeding.

Peri-Procedure Management Questions and Answers:

Is peri-procedure warfarin interruption always needed?

Deciding if warfarin interruption is needed is based on the bleeding risk of the surgery/procedure (see **Procedure-Specific Bleed Risk Stratification Tables** at end of this guide). Most surgeries/procedures require warfarin interruption but, in general, minimal-bleed-risk procedures (eg, simple dental extractions, cataract surgery, minor skin procedures) do not need warfarin interruption, unless there are specific patient circumstances associated with an increased bleeding risk (e.g., prior bleeding with warfarin continuation).

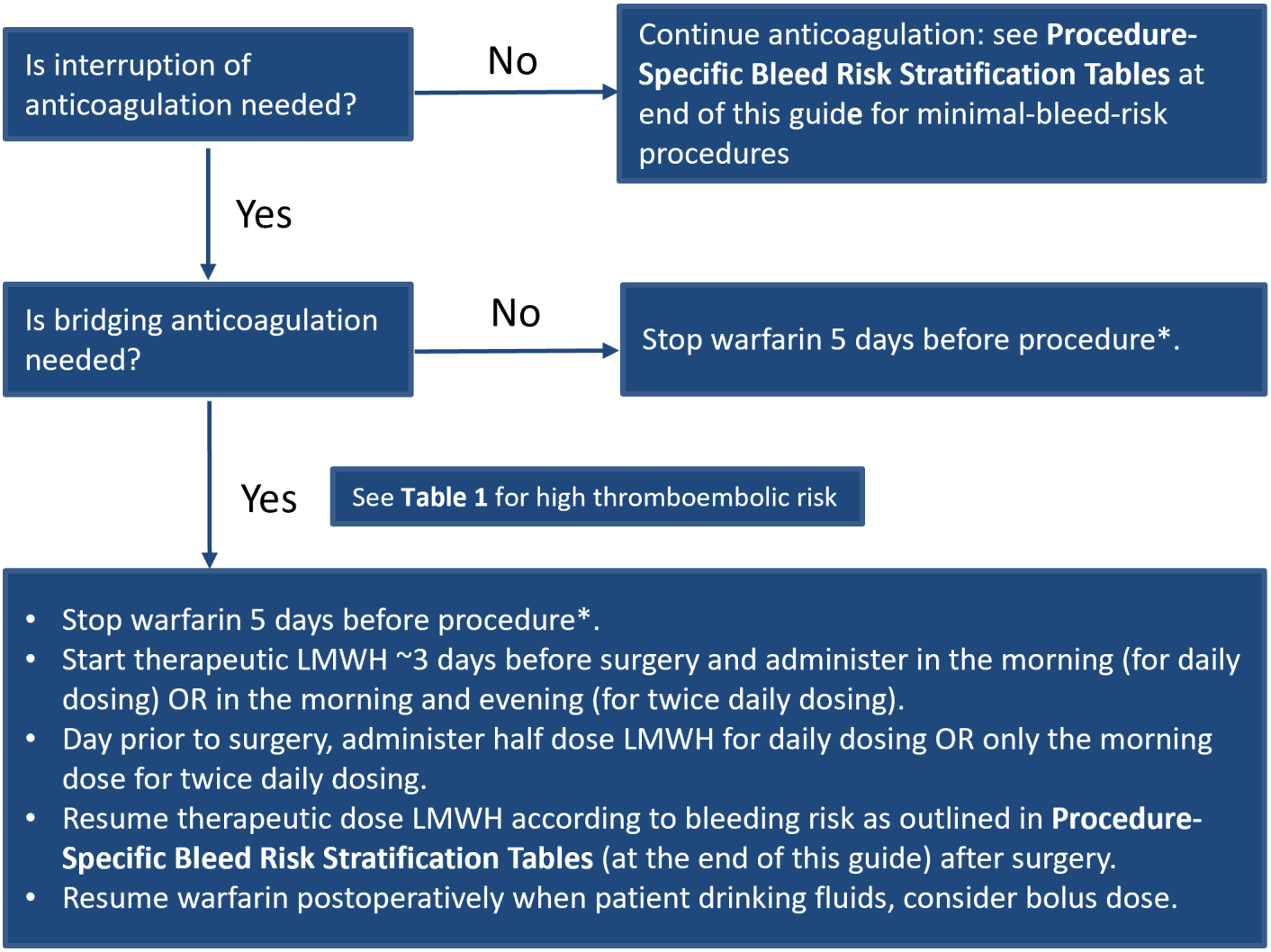
Is bridging anticoagulation needed during warfarin interruption?

The need for bridging is driven by patients' estimated risk for thromboembolism (see **Table 1**).

What is the perioperative anticoagulant management after warfarin interruption for elective procedures?

A suggested management algorithm is shown in **Figure 1, below.**

Figure 1. Peri-Operative Management of Warfarin-Treated Patients Before and After Surgery/Procedure



*In selected patients only, measurement of the INR on day -1 may be warranted (eg, if recent supratherapeutic INR); if on day -1 the INR >1.5, consider administering vitamin K, 1-2 mg orally.

When is it safe to resume bridging anticoagulation after surgery/procedure?

The timing of post-procedure resumption of bridging depends on:

1. the bleeding risk of the procedure (see **Procedure-Specific Bleed Risk Stratification Tables** at end of this guide),
2. whether there has been adequate post-operative hemostasis (based on wound inspection and drainage tubes to detect bleeding), and
3. the class of anticoagulant used.

Minimizing bleeding is important because of associated morbidity; a delay in warfarin resumption because of bleeding also exposes patients to an increased thromboembolic risk.

Special considerations:

Dental procedures: In patients having a simple dental extraction (1-2 teeth) or endodontic (root canal) procedures, warfarin can be safely continued. To reduce the incidence of gingival bleeding, patients can take oral tranexamic acid mouthwash (5 mL just before the procedure, and 2-3 times daily after the procedure until bleeding subsides).

Eye procedures: In patients having a cataract extraction, especially if done with topical and not retrobulbar anesthesia, warfarin can be safely continued. For other eye procedures, warfarin is generally interrupted but consultation with an ophthalmologist is advised.

Colonoscopy and gastroscopy: Warfarin interruption will be needed for most patients who undergo colonoscopy because the potential for polyp removal cannot always be determined beforehand. Caution is warranted after removal of large (>1 cm) polyps since bleeding can occur 2-7 days after polypectomy due to dislodgement of eschar. Polyp-related bleeding may be reduced with endoscopic application of clips to the polyp stalk.

Diagnostic or other procedures: Caution is warranted with anticoagulation after selected diagnostic tests (e.g. biopsy of kidney, liver or prostate; endoscopic retrograde cholangiopancreatography [ERCP] with sphincterotomy) or minor surgeries (e.g. pacemaker placement) when excessive bleeding can lead to serious complications.

Perioperative management of patients receiving antiplatelet therapy:

Please see the **Clinical Guides** on **Acetylsalicylic Acid (ASA), Clopidogrel (Plavix®), Ticagrelor (Brilinta®), Prasugrel (Effient®),** Additional information can be found as well in the 2022 American College of Chest Physicians Clinical Practice Guideline on the Perioperative Management of Antithrombotic Therapy [https://www.ccs.ca/en/guidelines].

Pediatrics: Pediatricians with expertise in thromboembolism should, where possible, manage pediatric patients on warfarin. Adult guidelines are appropriate in children, although holding warfarin for 3 days instead of 5 days is usually sufficient. Consultation with an experienced pediatric hematologist and cardiologist (as appropriate) is recommended to determine the need for bridging anticoagulation.

Procedure-specific Bleed Risk Stratification tables

For details, please see Shaw JR, et al. J Thromb Haemost. 2026:S1538-7836(26)00055-3. doi:10.1016/j.jtha.2025.12.031

A: General Surgery, Otolaryngology (ENT), and Plastic Surgery
B: Orthopedic Surgery
C: Urologic and Gynecologic Surgery
D: Endoscopic Procedures
E: Interventional Radiology and Percutaneous Procedures – Non-Vascular
F: Interventional Radiology and Percutaneous Procedures – Vascular
G: Cardiology Procedures

H: Neuraxial and Pain Procedures
I: Dermatologic Procedures
J: Dental and Maxillofacial Surgery
K: Ophthalmic Procedures

Table A: General Surgery, ENT (Ear-Nose-Throat; Otolaryngology), Plastic Surgery

BLEED RISK STRATIFICATION	SURGERY/PROCEDURE TYPE
HIGH-BLEED-RISK*	Any major surgery with anticipated extensive tissue injury Major cancer surgery (solid tumor resection) Major intrabdominal organ resection (hepatectomy, gastrectomy, pancreatectomy) Reconstructive plastic surgery† Bowel resection and anastomosis surgery Mastectomy Post-Mastectomy breast reconstruction Axillary dissection Breast reduction mammoplasty Body contouring surgery (abdominoplasty, brachioplasty, thighplasty) Liposuction Tonsillectomy/Adenoidectomy Incision and drainage of deep facial or neck space infections Sinus surgery (including nasal polypectomy) Thyroidectomy/Parathyroidectomy Parotidectomy Septoplasty and turbinate reduction
LOW/MODERATE-BLEED-RISK	Cholecystectomy Appendectomy Abdominal hernia repair (umbilical, inguinal) Hemorrhoid banding / Hemorrhoidectomy Incision and drainage (superficial abscess) Lumpectomy Diagnostic laparoscopy Incisional breast biopsy Excisional lymph node biopsy (superficial) Vocal cord injection Cochlear implantation Tympanostomy
MINIMAL-BLEED-RISK	Needle aspiration (superficial cyst or abscess) FNA (superficial tissue or lymph node) Suture of superficial wound

*Any procedure involving neuraxial anesthesia (spinal and/or epidural) should be considered High Bleed Risk.
† Prophylactic heparin is occasionally administered perioperatively starting as early as on induction of anesthesia or intraoperatively to prevent graft/flap thrombosis and resulting compromise. Procedural bleed risk stratification should not affect the decision to administer perioperative low-dose heparin for graft/flap preservation, if otherwise felt to be indicated

by the surgeon.
FNA , fine needle aspiration.

Table B: Orthopedic Surgery – Bleed Risk Stratification

BLEED RISK STRATIFICATION	SURGERY/PROCEDURE TYPE
HIGH-BLEED-RISK*	Any major surgery with anticipated extensive tissue injury Spinal surgery (including laminectomy, discectomy, spinal fusion) Hip arthroplasty (total or partial) Knee arthroplasty (total or partial) Shoulder arthroplasty Elbow arthroplasty Ankle arthroplasty Open reduction and internal fixation/acute fracture repair
LOW/MODERATE-BLEED-RISK	Knee arthroscopy Shoulder arthroscopy Carpal tunnel surgery Minor hand and foot surgery Trigger finger release
MINIMAL-BLEED-RISK	Suture of superficial wound

*Any procedure involving neuraxial anesthesia (spinal and/or epidural) should be considered High Bleed Risk.

Table C: Urologic and Gynecologic Surgery – Bleed Risk Stratification

BLEED RISK STRATIFICATION	SURGERY/PROCEDURE TYPE
HIGH-BLEED-RISK*	Major cancer surgery (solid tumor resection) Pelvic dissection +/- pelvic lymph node dissection Retroperitoneal dissection Cystectomy Prostatectomy TURP TURBT Prostate biopsy (US-guided or transrectal) Kidney biopsy Kidney ablation procedures Nephrostomy tube insertion Nephrectomy Renal enucleation procedure Percutaneous nephroscopy Renal/testicular incisional biopsy Extracorporeal shockwave lithotripsy Urethroplasty Penile prosthesis surgery Hysterectomy +/- salpingo-oophorectomy Myomectomy Vulvectomy Vaginal reconstructive surgery for prolapse Vaginal procedures for urinary incontinence
LOW/MODERATE-BLEED-RISK	Operative laparoscopy (low complexity – ovarian cystectomy, lysis of adhesions) Diagnostic laparoscopy Diagnostic hysteroscopy Bladder biopsy Ureteroscopy with laser lithotripsy Ureteral stenting/exchange (uncomplicated) Dilation and curettage Cone biopsy Cervical LEEP Circumcision
MINIMAL-BLEED-RISK	Vulvar biopsy Cervical biopsy Endometrial biopsy Cystoscopy (without mucosal incision) Ureteroscopy (without mucosal incision) Urodynamic testing (without mucosal incision) Nephrostomy tube exchange Colposcopy/hysteroscopy (without mucosal incision) IUD insertion

*Any procedure involving neuraxial anesthesia (spinal and/or epidural) should be considered High Bleed Risk.
IUD, intrauterine device, LEEP, loop electrosurgical excision procedure; TURBT, transurethral resection of bladder tumor; TURP, transurethral resection of prostate; US, ultrasound

Table D: Endoscopic Procedures – Bleed Risk Stratification

BLEED RISK STRATIFICATION	SURGERY/PROCEDURE TYPE
HIGH-BLEED-RISK	Endoscopic polypectomy (≥ 1 cm) Endoscopic mucosal/submucosal resection ERCP with sphincterotomy Balloon/push enteroscopy with therapeutic intervention Endoscopic dilation of stricture (pneumatic or bougie dilation) PEG/PEJ placement Endoscopic treatment of varices EUS with FNA Endoscopic hemostasis Endoscopic radiofrequency ablation (e.g., Barrett's esophagus) Cystogastrostomy Bronchoscopy with FNA/transbronchial biopsy
LOW/MODERATE-BLEED-RISK	Endoscopic polypectomy (< 1 cm) ERCP without sphincterotomy Esophageal/enteral/colonic stent insertion Argon plasma coagulation Bronchoscopy with endobronchial biopsy
MINIMAL-BLEED-RISK	EGD with*/without mucosal biopsy Colonoscopy with*/without mucosal biopsy EUS without intervention/sampling Balloon/push enteroscopy without therapeutic intervention Capsule endoscopy Bronchoscopy (BAL or brushings, without biopsy)

*Generally, anticoagulation does not need to be held for simple mucosal biopsy (17). Alternatively, for DOAC-treated patients, the morning DOAC dose can be omitted (16). If the decision is made to proceed with mucosal biopsies without holding anticoagulation therapy, this should be done carefully and sparingly. A mucosal sample should only be obtained when there is a strong indication for biopsy. The smallest number of mucosal biopsies should be collected, using the least invasive method possible (e.g., carefully controlled amount/depth of tissue grasped by forceps, avoiding submucosal vessels, reducing the distance between the mucosa and the tip of the scope to avoid excessive tenting/distortion of the mucosa when the forceps are used to extract the mucosal sample). If anticoagulation is not interrupted, consideration can be given to obtaining a "test" mucosal biopsy, whereby the time required for spontaneous hemostasis is observed after sampling, and if excessive bleeding or a large submucosal hematoma occur further sampling should be avoided.
BAL, bronchoalveolar lavage, EGD, esophagogastroduodenoscopy; ERCP, endoscopic retrograde cholangio-pancreatography; EUS, endoscopic ultrasound; FNA, fine needle aspiration; PEG, percutaneous endoscopic gastrostomy; PEJ, percutaneous endoscopic jejunostomy

Table E: Interventional Radiology and Percutaneous (Non-Vascular) – Bleed Risk Stratification

BLEED RISK STRATIFICATION	SURGERY/PROCEDURE TYPE
HIGH-BLEED-RISK	Lumbar puncture Epidural injection IR deep drainage (intrabdominal, intra-thoracic, spinal, retroperitoneal) IR solid organ biopsy (liver, lung, renal, adrenal) IR deep non-organ biopsy (spine, intrabdominal soft tissue, retroperitoneal, pelvic) IR thermal ablation (solid organs, bone, soft tissue, lung) IR biliary interventions (percutaneous transhepatic cholangiogram, biliary stenting, biliary drainage, cholecystostomy) IR urinary tract interventions (nephrostomy tube insertion, nephrolithotomy, ureteral dilation, stone removal) IR RIG/RIJ placement (gastrostomy, jejunostomy)
LOW/MODERATE-BLEED-RISK	IR gastrointestinal stenting (colon, esophagus, duodenum) IR tunneled abdominal/pleural drain Percutaneous peritoneal dialysis catheter insertion/removal US-guided thyroid core biopsy
MINIMAL-BLEED-RISK	US-guided thyroid FNA IR superficial biopsy (palpable lesion, lymph node, soft tissue, breast, superficial bone) IR superficial drainage (abscess, cyst, lymphocele) IR thoracentesis IR paracentesis IR drainage catheter exchange (gastrostomy, biliary, nephrostomy, abscess) IR non-tunneled abdominal/pleural drain Bone marrow aspiration ± biopsy Joint aspiration/injection Injection (bursa, tendon, soft tissue)

FNA, fine needle aspiration; IR, interventional radiology; RIG, radiologically inserted gastrostomy; RIJ, radiologically inserted jejunostomy; US, ultrasound

Table F: Interventional Radiology and Percutaneous (Vascular) – Bleed Risk Stratification

BLEED RISK STRATIFICATION	SURGERY/PROCEDURE TYPE
HIGH-BLEED-RISK	IR arterial interventions with peripheral sheath ≥ 7F (aortic, pelvic, mesenteric, CNS) IR venous angioplasty and stenting (portal vein, intrathoracic, CNS) IVC filter removal (complex)* TIPS Portal vein interventions
LOW/MODERATE-BLEED-RISK	Transjugular liver biopsy IR arterial embolization† (fibroid, prostate, chemoembolization) IR arterial interventions with peripheral sheath ≤ 6F † (peripheral, mesenteric, carotid) IR venous interventions † (pelvis, extremities, gonadal vein embolization)
MINIMAL-BLEED-RISK	Non-tunneled venous access/removal (including peripherally inserted central catheter) Tunneled venous catheter placement/removal IR dialysis access interventions (including fistulogram ± fistuloplasty) IVC filter insertion/removal Diagnostic arteriography/venography

*Prolonged dwell time, tilted or embedded filter, filter migration, significant caval wall penetration, filter fracture, prior failed retrieval attempts.
† It may be reasonable to consider these procedures as Minimal Bleed Risk procedures, without interruption of anticoagulation, if performed by an experienced operator at a high-volume center.
IR, interventional radiology; IVC, inferior vena cava; TIPS, transjugular intrahepatic portosystemic shunt

Table G: Cardiology Procedures – Bleed Risk Stratification

BLEED RISK STRATIFICATION	SURGERY/PROCEDURE TYPE
HIGH-BLEED-RISK	Pericardiocentesis Ablation (epicardial VT) Lead extraction TAVI Aortic valvuloplasty Mitral valvuloplasty Left atrial appendage occlusion
LOW/MODERATE-BLEED-RISK	Coronary angiogram (femoral approach) PCI (femoral approach) Pacemaker insertion / ICD insertion (complex)* Percutaneous mitral valve repair (Mitraclip) Ablation (endocardial/structural VT)
MINIMAL-BLEED-RISK	Coronary angiogram (radial approach) PCI (radial approach) Right heart catheterization Diagnostic electrophysiology study Ablation (AF/pulmonary vein isolation†, PVCs, SVT, atrial flutter) Pacemaker insertion / ICD insertion Loop recorder implantation

*Complex pacemaker/ICD insertion includes submuscular implants and subcutaneous ICD implantation. The BRUISE-CONTROL 2 trial [30] found that continued DOAC anticoagulation was non-inferior to holding DOAC anticoagulation for 1 day before pacemaker or ICD insertion. Simple pacemaker and ICD implantation can be carried out without interruption of anticoagulation therapy (i.e., minimal bleed risk), whereas a short interruption (i.e., low bleed risk) could be considered in DOAC-treated patients undergoing procedurally complex pacemaker or ICD implantation (e.g., submuscular).
† Pulmonary vein isolation is a low bleed risk intervention, but the risk of thromboembolism is elevated during the procedure and thereafter. Therefore, minimal interruption of DOAC therapy (i.e., morning dose of the day of intervention) is recommended.
AF, atrial fibrillation; ICD, implantable cardioverter-defibrillator; PCI, percutaneous coronary intervention; PVC, premature ventricular contraction; SVT,= supraventricular tachycardia; VT, ventricular tachycardia; TAVI, transcatheter aortic valve implantation

Table H: Neuraxial and Pain Procedures – Bleed Risk Stratification

BLEED RISK STRATIFICATION	SURGERY/PROCEDURE TYPE
HIGH-BLEED-RISK	Neuraxial blocks (spinal/epidural)† Deep/noncompressible plexus blocks* Deep/noncompressible peripheral nerve blocks* IR lumbar puncture IR kyphoplasty† IR vertebroplasty† IR epidural injection† IR facet joint injection (cervical)† Visceral sympathetic block Spinal cord stimulator implantation (including trial) Spinal cord stimulator pocket revision Epiduroscopy
LOW/MODERATE-BLEED-RISK	---
MINIMAL-BLEED-RISK	Superficial/compressible plexus blocks* Superficial/compressible peripheral nerve blocks* IR sacral joint injection IR facet joint injection (thoracic or lumbar) IR trigger point injection (including piriformis)

*Neuraxial and deep nerve blocks may induce clinically significant bleeding with potentially catastrophic consequences. Management of bleeding might be difficult because the site is deep and/or noncompressible. Invasive interventions may be required to control bleeding. Superficial nerve blocks might lead to superficial hematomas of lesser clinical significance. Management of bleeding using compression is feasible and is less likely to require invasive interventions.
† Procedures with a high risk of spinal or epidural hematoma.
§ Patients undergoing minimal bleed risk procedures but who are otherwise considered to be at high risk of bleeding because of concurrent comorbidities (e.g., advanced age, history of bleeding tendency, cirrhosis, advanced kidney disease) or concurrent medications (e.g., antiplatelet therapy) should be managed as if undergoing a high bleed risk procedure. The decision to proceed with a minimal bleed risk procedure without interrupting anticoagulation therapy requires a careful discussion with the patient on the benefits/risks of not interrupting anticoagulation.
IR, interventional radiology

Table I: Dermatologic Procedures – Bleed Risk Stratification

BLEED RISK STRATIFICATION	SURGERY/PROCEDURE TYPE
HIGH-BLEED-RISK	Dermatologic surgery involving multiple layers (fascia, muscles, periosteum, cartilage, bone) Wide excision Local skin flap/graft repair Excision with healing by secondary intention
LOW/MODERATE-BLEED-RISK	Excision/incision biopsy (< 10 cm) Dermatologic surgery involving vascularized tissues (scalp, nose, lips, periorbital)
MINIMAL-BLEED-RISK	Minor dermatologic procedures (excision + direct closure of small < ~ 1cm lesions not covered above)* Curettage Punch biopsy

Table J: Dental + Maxillofacial Procedures – Bleed Risk Stratification

BLEED RISK STRATIFICATION	SURGERY/PROCEDURE TYPE
HIGH-BLEED-RISK	Reconstructive procedures Corrective jaw surgery Incision and drainage of deep facial or neck space infections Facial fracture repair
LOW/MODERATE-BLEED-RISK	Extraction of > 3 teeth or complex dental extractions Extraction of impacted teeth Oral soft tissue biopsy Incisional and drainage of dental abscess Dental implant surgery
MINIMAL-BLEED-RISK	Extraction of 1-3 teeth* Dental cleaning Periodontal surgery

Table K: Ophthalmic Procedures – Bleed Risk Stratification

BLEED RISK* STRATIFICATION	SURGERY/PROCEDURE TYPE
HIGH-BLEED-RISK	Orbital and periorbital surgery Nasolacrimal surgery (dacryocystorhinostomy)
LOW/MODERATE-BLEED-RISK	Vitreoretinal surgery Eyelid surgery posterior to the septum Retrobulbar injections Trabeculectomy Strabismus surgery Intraocular injections Corneal transplant (full thickness) Eyelid procedures (tarsorraphy, chalazion incision and curettage)
MINIMAL-BLEED-RISK	Cataract procedures Corneal transplant (partial thickness) Retinal laser photocoagulation

*Bleed risk stratification in the context of ophthalmic procedures considers both the potential volume of blood loss, as well as the potential risk of vision-threatening bleeding (ie, critical site ocular bleeding).

Other Relevant Thrombosis Canada Clinical Guides

- Acetylsalicylic acid (ASA)
- Clopidogrel (Plavix®)
- Perioperative Management of Antiplatelet Therapy
- Prasugrel (Effient®)
- Ticagrelor (Brilinta®)
- Unfractionated Heparin, Low Molecular Weight Heparin and Fondaparinux
- Warfarin

Relevant Patient Education Materials

- Warfarin
- Patient Guide for People with Thrombosis and Those who Care for Them

Help sustain trusted thrombosis guidance

Ongoing expert review and regular updates ensure Thrombosis Canada's clinical guides remain current and reliable. Your support helps protect the quality and continuity of these resources for clinicians nationwide. https://thrombosiscanada.ca/hcp/Donate-2

References:

Douketis JD, Spuyropoulos AC. Perioperative management of anticoagulant and antiplatelet therapy. NEJM Evidence. 2023;2(6).

Barnes GD, et al. Periprocedural bridging anticoagulation in patients with venous thromboembolism: a registry-based cohort study. J Thromb Haemost. 2020;18(8): 2025-2030.

Douketis JD, et al. Perioperative bridging anticoagulation in patients with atrial fibrillation. N Engl J Med 2015;373(9):823-833.

Douketis JD, Et al. Perioperative management of antithrombotic therapy. An American College of Chest Physician Clinical Practice Guideline. Chest. 2022:S0012-3692(22)01359-9.

Kovacs MJ, et al. Postoperative low molecular weight heparin bridging treatment for patients at high risk of arterial thromboembolism (PERIOP2): double blind randomised controlled trial BMJ. 2021;373:n1205.

Manchikanti, L. Responsible, safe, and effective use of antithrombotics and anticoagulants in patients undergoing interventional techniques: American Society of Interventional Pain Physicians (ASIPP) Guidelines. Pain Physician 2019;22(22;1s): s75–s128.

Porto GBF, et al. Anticoagulation and spine surgery. Global Spine J 2020;10(1 suppl): 53S-64S.

Shaw JR, et al. Surgical and procedural bleed risk stratification for anticoagulated patients undergoing planned surgery: guidance from the ISTH SSC Subcommittee on Perioperative and Critical Care Thrombosis and Hemostasis. J Thromb Haemost. 2026:S1538-7836(26)00055-3. doi:10.1016/j.jtha.2025.12.031

Shaw JR, et al. Perioperative interruption of direct oral anticoagulants and vitamin K antagonists in patients with atrial fibrillation: A comparative analysis. Res Pract Thrombos Haemostas 2020;4(1):131–140.

Spyropoulos AC, et al. Periprocedural management of patients receiving a vitamin K antagonist or a direct oral anticoagulant requiring an elective procedure or surgery. J Thromb Haemost. 2016;14:875-85.

Date of version: 24June2026

Please note that the information contained herein is not to be interpreted as an alternative to medical advice from your doctor or other professional healthcare provider. If you have any specific questions about any medical matter, you should consult your doctor or other professional healthcare providers, and as such you should never delay seeking medical advice, disregard medical advice or discontinue medical treatment because of the information contained herein. AI or AI-assisted technologies may have been used in the research, development, or editing of this guide. The authors and reviewers take responsibility for accuracy and integrity of the content.