Rapid Resource

Anticoagulation FORUM | ANTICOAGULATION Centers of Excellence

Periprocedural Anticoagulation Management
(for patients on therapeutic intensity anticoagulation undergoing non-emergent procedures)

Periprocedural management of anticoagulation is commonly encountered, with about 15-20% of patients requiring a procedure annually[1]. It is imperative to take into consideration the procedural bleed risk, along with the individual patient's bleed and thrombotic risk when creating a periprocedural plan.

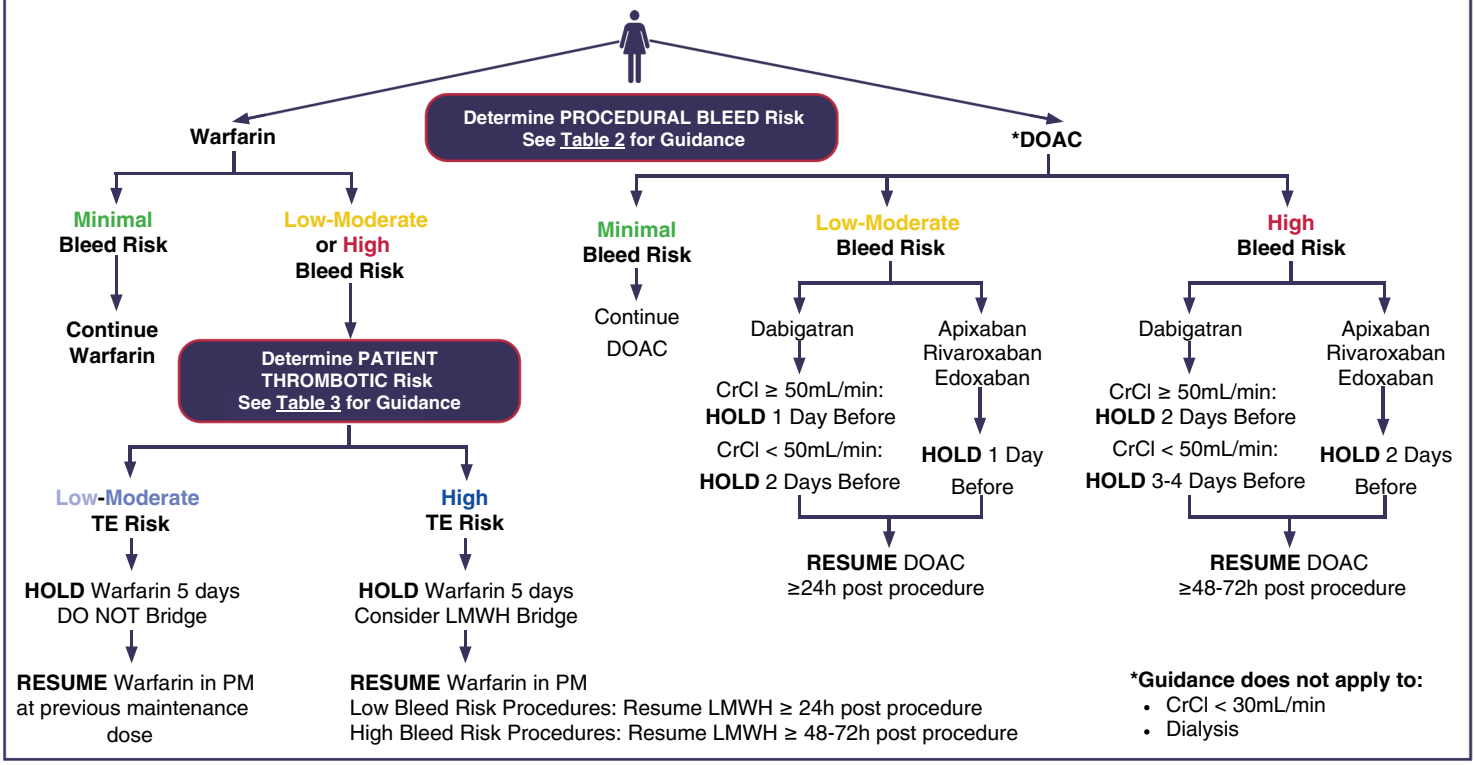
Periprocedural Management Bottom Line

Do	• Utilize an evidence-based approach, including validated bleeding and TE risk assessment tools, along with patient specific factors to perform a comprehensive risk-benefit analysis[1] • Employ an individualized patient centric approach to periprocedural management; apply shared decision making • Document plan in medical record and communicate with primary and surgical teams. Clearly highlight instructions for safe transitions of care • Provide clear verbal and written instructions to patients and caregivers
Don't	• Do not bridge DOACs!* • Do not bridge AF patients unless recent history of CVA/TIA (within 3 mo) or prior perioperative CVA. Note: the CHEST and ACC/AHA/ACCP/HRS AF guidelines have differing recommendations for when to consider bridging in patients with high CHA_2DS_2 -VASc/$CHADS_2$ scores (see Table 3)

Consider	• If minimal periprocedural bleeding is expected, the anticoagulant may not require interruption
	• In patients with a recent TE (<3 mo) event, consider delaying non-urgent or routine procedures
	• If a procedure needs to be delayed for a short amount of time (i.e. days), may consider initiating a short acting parenteral anticoagulant or LMWH for patients with a high thrombotic risk
	• Drug elimination may be delated due to patient specific factors including notable drug interactions. In addition:
	  ◦ Patients with renal insufficiency, or severe renal insufficiency (CKD stage V) may require a longer holding period
	  ◦ Patients on warfarin with advanced age and taking low daily doses of warfarin may require a longer holding period for the INR to be within the acceptable procedural range

Caution	• Timing of post-procedure DOAC resumption may vary depending on hemostasis; if DOAC resumption is delayed due to bleeding concerns, prophylactic dose LMWH may be considered until hemostasis is achieved • Neuraxial procedures may require a longer pre-procedure hold (see Table 4) • Suggestions within empiric risk stratification tables should not supersede clinical judgment; incorporate individual patient & surgery/procedure-related factors *Consider multidisciplinary discussion & planning for complex cases. In rare cases where there is a very high risk for thrombosis, bridging may be warranted

Periprocedural Care Planning for Oral Anticoagulants[1]



***Guidance does not apply to:**
- CrCl < 30mL/min
- Dialysis

Table 1: Hold Times for Parenteral Agents

	Argatroban/Bivalirudin	Fondaparinux	Heparin	LMWH
Low-Moderate Procedural Bleed Risk	≥ 2hr or aPTT < 30 sec	48 hr	4-6 hr	24 hr
High Procedural Bleed Risk	≥ 2hr or aPTT < 30 sec	4-5 days	4-6 hr	24 hr
Time to Resume	≥24hr after Low-Moderate Bleed Risk Procedures and ≥48-72hr after High Bleed Risk Procedures			

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Table 2: Procedure Bleed Risk Classification[1,2,3]

Minimal Bleed Risk Procedures (30-day risk of major bleed 0%)	Low to Moderate Bleed Risk Procedures (30-day risk of major bleed 0–2%)	High Bleed Risk Procedures (30-day risk of major bleed ≥2%)
• **Minor dermatologic procedures:** Excision of basal cell and squamous cell cancers, actinic keratoses, and premalignant or cancerous skin nevi • **Minor dental procedures:** Extractions, restorations, prosthetics, endodontics, dental cleanings, fillings. Consider the use of oral pro-hemostatic agent with simple dental procedures • **Ophthalmologic (cataract) procedures** • **Pacemaker or cardioverter defibrillator implantation**	• Arthroscopy • Cutaneous/lymph node biopsies • Foot/Hand Surgery • Coronary Angiography • GI endoscopy +/- biopsy • Colonoscopy +/- biopsy • Abdominal hysterectomy • Laparoscopic cholecystectomy • Abdominal hernia repair • Hemorrhoidal Surgery • Bronchoscopy +/- biopsy	• Major surgery with extensive tissue injury • Cancer surgery, especially solid tumor resection • Major orthopedic surgery • Reconstructive plastic surgery • Major thoracic surgery • Urologic or GI surgery, especially anastomosis • Transurethral prostate resection, bladder resection, or tumor ablation • Nephrectomy, kidney biopsy • Colonic polyp resection • Bowel resection • Percutaneous endoscopic gastrostomy placement, endoscopic retrograde cholangiopancreatography • Surgery in highly vascular organs (kidneys,liver,spleen) • Cardiac, intracranial, or spinal surgery • Any major operation (duration >45 min) • Neuraxial anesthesia & Epidural injections (see ASRA guidelines)

Table 3: Patient Thrombotic Risk Stratification with Bridge Recommendation for Warfarin[a,1,2]

	Mechanical Valves	Atrial Fibrillation	VTE	Recommendations
Low (<4%/yr risk of ATE or <2%/mo risk of VTE)	- Bileaflet Aortic Valve **without** major risk factors for stroke[b]	- $CHA_2DS_2VASc \leq 4$ or $CHADS_2$ 0-2 **AND** NO history of TIA/Stroke	- Single VTE > 12 mo ago **AND** NO other risk factors	**DO NOT BRIDGE**
Moderate (4-10%/yr risk of ATE or 4-10%/mo risk of VTE)	- Mitral Valve **without** major risk factors for stroke[b] - Bileaflet Aortic Valve with major risk factors for stroke[b]	- CHA_2DS_2VASc 5-6 OR $CHADS_2$ 3-4 - History of TIA/Stroke (>3mo)	- VTE within the past 3-12 months - Recurrent VTE - Single non-severe thrombophilia (Heterozygous FVL or prothrombin gene G20210A mutation) - Active or recent history of cancer	**BRIDGE NOT RECOMMENDED** - Increased bleed risk without clear benefit - May consider bridge with a history of TIA/stroke AND low bleeding risk
High (>10%/yr risk of ATE or >10%/mo risk of VTE)	- Mitral Valve **with** major risk factors for stroke[b] - Any caged-ball or tilting disc valve - Recent (within 3mo) stroke, TIA or systemic embolism	- CHA_2DS_2VASc 7-9 OR $CHADS_2$ 5-6 - Recent (within 3 mo) stroke, TIA or systemic embolism - Rheumatic valvular heart disease - History of stroke during prior interruption	- Recent VTE (within 3mo and especially <1mo) - Active cancer with a high VTE risk[c] - **Severe thrombophilia & history of unprovoked VTE** (e.g. Protein C or Protein S deficiency; ATIII deficiency; APS, Prothrombin G20210A mutation or multiple abnormalities)	**CONSIDER BRIDGE**[d] - Bridge should be considered for High-Thrombotic Risk patients - Expert consultation recommended if patient is HIGH bleed risk as well

a Empiric risk stratification that is a starting point for assessing perioperative TE risk; should be combined with clinical judgement that incorporates individual patient- and surgery/procedure-related factors.
b Includes: AF, prior stroke/TIA during interruption of anticoagulation or other prior stroke/TIA, prior valve thrombosis, rheumatic heart disease, HTN, DM, CHF, age ≥ 75 years.
c Includes: pancreatic cancer, myeloproliferative disorders, primary brain cancer, gastric cancer, and esophageal cancer.
d See CHEST guidelines figure 1 for example bridge plan

STOP Table 4: Hold Times for Neuraxial Blocks[3,4] STOP

	Apixaban/ Rivaroxaban/ Edoxaban	Dabigatran	Warfarin	Fondaparinux	LMWH
Single Neuraxial Block	3 Days	4 Days if CrCl ≥ 50mL/min 5 Days if CrCl 30-49 mL/min Contraindicated if CrCl < 30mL/min	4-5 Days or Until INR ≤ 1.4	4 days	> 24hr
Time to Resume[a]	After 24hr	After 24hr	Can take PM Dose	After 24hr	After 24hr

[a] When neuraxial anesthesia is used for surgical procedures, the time to resume anticoagulation should be delayed to align with surgical procedure bleed risk

Abbreviations: AF - atrial fibrillation; APS – Antiphospholipid Antibody Syndrome; ATE - arterial thromboembolism; ATIII – Antithrombin III; CHADS2 –CHF, HTN, age ≥ 75, DM, prior stroke or TIA; CHA2DS2VASc - CHF, HTN, age ≥ 75, DM, prior stroke or TIA, vascular disease history, age ≥ 65, female sex; CHF- congestive heart failure; CrCl - creatinine clearance; CVA - cerebrovascular accident; DM- diabetes mellitus; DOAC - direct-acting oral anticoagulant; FVL – Factor V Leiden; HTN – hypertension; LMWH - low molecular weight heparin; PE - pulmonary embolism; PPX – prophylaxis; TE - thromboembolism; TIA - transient ischemic attack; VTE - venous thromboembolism

Relevant Playbook: The Procedure Playbook: A Guide for Patients Who Take Medicines to Prevent Blood Clots and Need a Procedure or Operation

References: 1. Douketis JD, et al. Chest 2022;162:e207-e243. 2. Joglar, J, et al. JACC 2024;83:109–279. 3. Horlocker TT, et al. Reg Anesth Pain Med 2018;43:263-309. 4. Narouze S, et al. Reg Anesth Pain Med. 2018;43:225-262.

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