

Perioperative Management of Patients on Oral Anticoagulants Guideline

The objective of this evidence based practice guideline is to provide guidance for the management of oral anticoagulants in the setting of surgery and invasive procedures.

Follow the steps below to manage anticoagulation therapy in the perioperative setting:

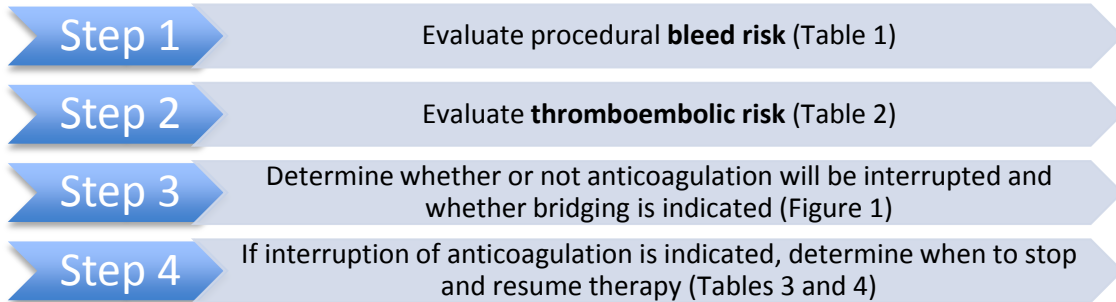


Table 1: Procedural bleed risk^{1,2}

Low Bleed Risk Procedures	Moderate Bleed Risk Procedures	High Bleed Risk Procedures
<p>Dental cleanings, fillings Ophthalmologic, cataract Bronchoscopy, BAL, without biopsy Skin biopsy</p> <p>Cardiovascular/Thoracic Procedures SVT ablation & ICD implant</p> <p>Interventional Radiology Procedures PICC line insertion/removal IVC Filter placement/removal Thoracentesis, paracentesis Tube exchange Superficial fluid collection aspiration/drainage Superficial FNA (lymph node, thyroid)</p> <p>Cancer Surgery Minor dermatologic cancer surgery (ex. excision of melanoma in-situ or other small skin lesions) Breast biopsy (fine needle aspiration or core needle)</p> <p>GI Procedures Colonoscopy, EGD with or without biopsy</p>	<p>Minor dental procedures (ex. Simple extractions)</p> <p>Bronchoscopy with biopsy Pleural biopsy</p> <p>Cardiac/CT Surgery Procedures Cardiac catheterization via radial artery Pigtail catheter and tube thoracostomy</p> <p>Interventional Radiology Procedures Abscess drainage Biopsies -lung, liver, kidney, and deep abdominal Central line placement Cholecystectomy & Nephrostomy tube placement Tumor ablation Radial angiograms</p> <p>Cancer Surgery Skin and soft tissues cancer surgery (ex. wide local excision of melanoma, lumpectomy, mastectomy, etc.)</p> <p>GI Procedures Colonoscopy with polypectomy EGD with banding, sclerotherapy or dilation ERCP with sphincterotomy</p>	<p>Multiple tooth extraction Major Cardiovascular/Thoracic surgery Cardiac catheterization via femoral artery Major Intra-abdominal/pelvic surgery Major Orthopedic surgery Major Trauma surgery Tracheostomy, gastrostomy Neuro surgery Spinal surgery/Lumbar puncture*</p> <p>Interventional Radiology Procedures TIPS Biliary drainage Femoral angiograms Lumbar puncture*</p> <p>Cancer Surgery Major intra-abdominal and pelvic cancer surgery (ex. hepatectomy, pancreaticoduodenectomy, etc.)</p>

*See the Regional Anesthesia Guidelines for Patients Receiving Antithrombotic Therapy posted on the Clinical Pathways and Guidelines page for more information on anticoagulant timing pre and post catheter placement and removal

Table 2: Thromboembolic risk¹⁻⁴

	Low Thromboembolic Risk	Moderate Thromboembolic Risk	High Thromboembolic Risk
Mechanical Heart Valves	Bileaflet aortic valve prosthesis without atrial fibrillation and no other risk factors for stroke	Bileaflet aortic valve prosthesis and ≥ 1 of the following risk factors for stroke: Atrial fibrillation, Prior stroke or transient ischemic attack, Hypertension, Diabetes, Congestive heart failure, Age > 75 years old	<ul style="list-style-type: none"> Any mechanical mitral valve prosthesis Caged-ball or tilting disc aortic valves Recent (within 6 months) stroke or transient ischemic attack
Atrial Fibrillation	<ul style="list-style-type: none"> CHA₂DS₂VASc score ≤ 4 with no history of stroke or TIA 	<ul style="list-style-type: none"> CHA₂DS₂VASc score 5 - 6 Stroke 3 months ago or longer <p>For patients in this category, determine bleed risk based on HAS-BLED score to determine appropriateness of bridging therapy: HAS-BLED score ≥ 3 → do NOT bridge HAS-BLED score ≤ 2 → bridge</p>	<ul style="list-style-type: none"> CHA₂DS₂VASc score 7 - 9 Recent (within 3 months) stroke or transient ischemic attack Rheumatic valvular heart disease
VTE (Venous Thromboembolism)	<ul style="list-style-type: none"> VTE > 12 months ago and no other risk factors 	<ul style="list-style-type: none"> VTE within the past 3-12 months Non-severe thrombophilia (eg, heterozygous factor V Leiden or prothrombin gene mutation) Recurrent VTE Active cancer (treated within 6 mo or palliative) 	<ul style="list-style-type: none"> Recent (within 3 months) VTE Severe thrombophilia (i.e. deficiency of protein C, protein S, or antithrombin; antiphospholipid antibodies; multiple abnormalities)

CHA₂DS₂-VASc Score⁵

A clinical prediction tool to estimate the risk of stroke in patients with non-valvular atrial fibrillation.

CHA ₂ DS ₂ -VASc Acronym	Points
Congestive Heart Failure	1 point
Hypertension	1 point
Age ≥ 75 years	2 points
Diabetes mellitus	1 point
Stroke/TIA/TE	2 points
Vascular disease (prior MI, PAD, aortic plaque)	1 point
Age 65-74 years	1 point
Sex category (ie. Female sex)	1 point
Maximum score	9 points

CHA ₂ DS ₂ -VASc Score	Stroke Rate / Year
0	0%
1	1.3%
2	2.2%
3	3.2%
4	4.0%
5	6.7%
6	9.8%
7	9.6%
8	6.7%
9	15.2%

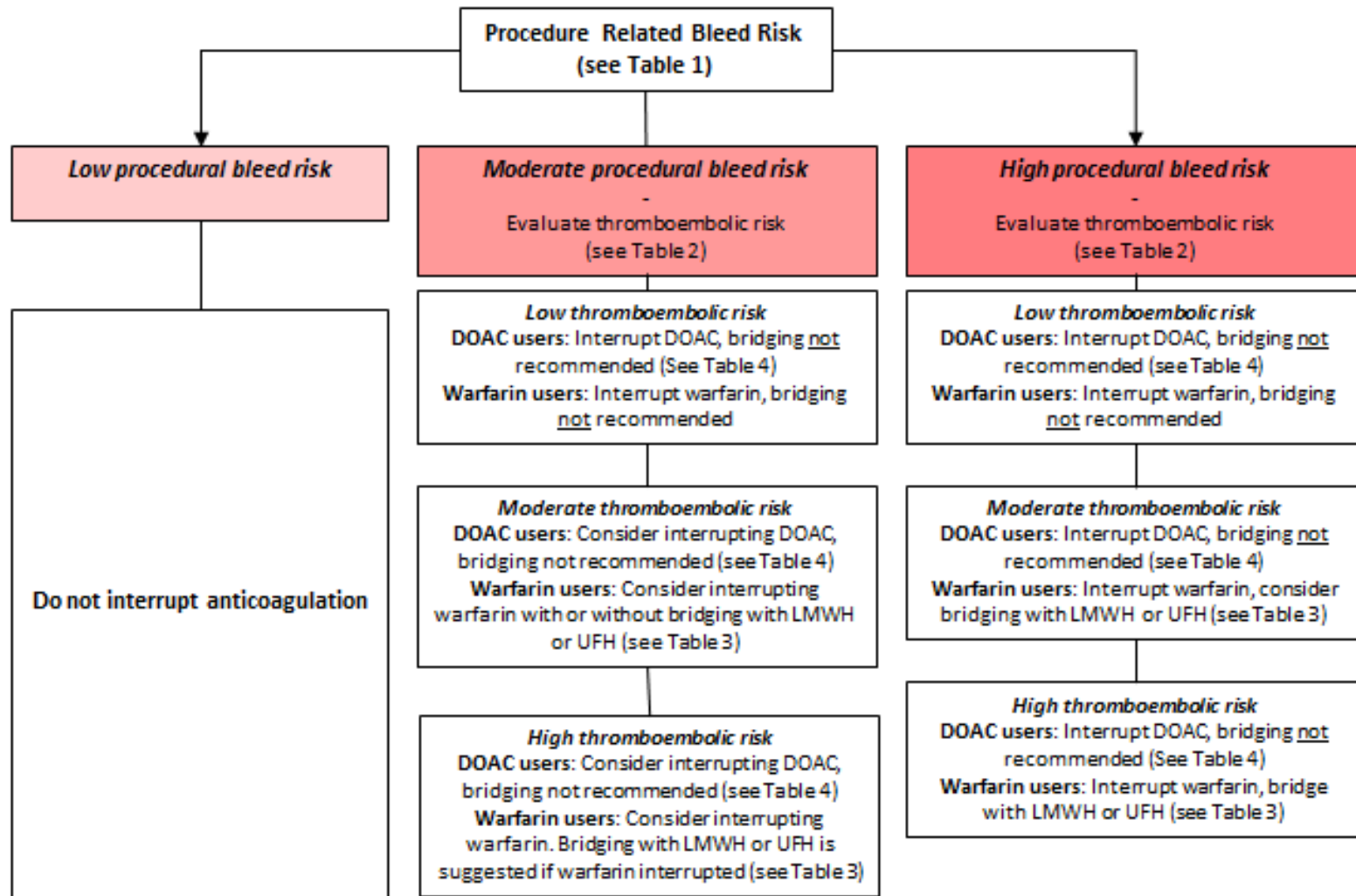
HAS-BLED Score⁵

Bleeding risk score to quantify the 1 year risk for major bleeding in patients with atrial fibrillation.

HAS-BLED acronym	Points
Hypertension (SBP >160mmHg)	1
Abnormal liver or renal function (1 point each)	1 or 2
Stroke history	1
Bleeding history	1
Labile INRs	1
Elderly (>65 years old)	1
Drugs that promote bleeding or excess alcohol use (1point each)	1 or 2

HAS-BLED Score	Bleeds per 100 Patient Years
0	1.13%
1	1.02%
2	1.88%
3	3.75%
4	8.70%
5	12.5%
6	Scores > 5 were too rare to determine risk in validation studies
7	
8	
9	

Figure 1: Algorithm to manage anticoagulant agents in the perioperative setting



DOAC – direct oral anticoagulant, LMWH – low molecular weight heparin, UFH- unfractionated heparin

Table 3: Warfarin interruption and bridging suggestions³

Day	Warfarin Dose	Bridging with LMWH or UFH	INR Monitoring
-6 or -5	Begin to hold warfarin day	No LMWH or UFH	None
-4	No warfarin	No LMWH or UFH	None
-3	No warfarin	Start LMWH at therapeutic or intermediate dose OR Start UFH continuous infusion if INR is subtherapeutic	None
-2	No warfarin	LMWH at therapeutic or intermediate dose OR Start UFH continuous infusion if INR is subtherapeutic	None
-1	No warfarin	Last preprocedural dose of LMWH administered no less than 24h before start of surgery at half the total daily dose	Assess INR before the procedure; proceed with surgery if INR <1.5; if INR >1.5 and <1.8, consider low-dose oral vitamin K reversal (1mg - 2.5mg)
0 or +1	Resume warfarin maintenance dose on evening of or morning after procedure	None	None
+1	Maintenance dose	Moderate-bleeding risk: restart LMWH or UFH at previous dose High-bleeding risk: no LMWH or UFH administration	Per clinician judgment
+2 or +3	Maintenance dose	Moderate-bleeding risk: LMWH or UFH administration continued High-bleeding risk: restart LMWH or UFH at previous dose	Per clinician judgment
+4	Maintenance dose	Discontinue LMWH or UFH if INR is within target range	Check INR
+7 to +10	Maintenance dose	Discontinue LMWH or UFH if INR is within target range	Check INR

INR- international normalized ratio, LMWH – low molecular weight heparin, UFH- unfractionated heparin

Table 4: Anticoagulant Timing Pre and Post- Op^{3,6}

Anticoagulant	Half-life	Time to Hold Prior to Surgery	Time to Restart Post-operatively
Apixaban (Eliquis®)	8 – 15 hours	At least 24 hours Mod-High Bleed Risk Surgery: 48 hours	<p>Moderate Bleed Risk Surgery: 24 hours</p> <p>High Bleed Risk Surgery: 48 – 72 hours</p>
Rivaroxaban (Xarelto®)	5 – 9 hours Elderly 11-13 hours	At least 24 hours Mod-High Bleed Risk Surgery or CrCl < 50 mL/min or elderly: 48 hours	
Edoxaban (Savaysa®)	10 – 14 hours	At least 24 hours CrCl < 50 mL/min or elderly: 48 hours	
Betrixaban (Bevyxxa®)	19 – 27 hours	At least 4 days	
Dabigatran (Pradaxa®)	12 – 17 hours	CrCl >50mL/min: at least 24 hours CrCl <50mL/min: at least 72 hours >5 days if major surgery	
Enoxaparin (Lovenox®)	4.5 – 7 hours	12 hours (prophylaxis) 24 hours (treatment)	
Unfractionated Heparin	1 – 2 hours	4 – 6 hours	
Fondaparinux (Arixtra®)	17 – 21 hours	4 – 5 days	
Warfarin (Coumadin®)	20 - 60 hours	5 days (see table 3)	
Argatroban	39 – 51 minutes	3-4 hours	

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Anticoagulation Safety Committee Approval: 3/2019

P&T Committee Approval: 5/2019

References:

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