Peri-Operative Anticoagulation Bridging Guidelines

Anticoagulation Bridging Based on Thrombotic Risk and Indication

Risk of TE	Mechanical Valves	Mechanical Valve Bridge Therapy	AF	AF Bridge Therapy	VTE	VTE Bridge Therapy
High	Any mitral prosthesis Older mechanical aortic valve (caged ball/tilting disk) Recent (< 6 months) CVA or TIA Bileaflet mechanical aortic valve **and** one of the following: a) Atrial fibrillation b) CHF c) HTN d) Age >75 e) Diabetes f) Prior CVA/TIA	• Stop warfarin 5 days prior to procedure • Begin LMWH 3 days (or 36 hrs) pre-op (when INR < 2.0) ○ CrCl >30 mL/min: Enoxaparin 1 mg/kg SC every 12 hrs ○ CrCl <30 mL/min: Enoxaparin 1 mg/kg SC every 24 hrs ○ Last dose 24 hr prior to surgery • Check INR on morning of procedure • Restart warfarin immediately post-op • Remember DVT Px • Hold therapeutic heparin for 48 hrs post-op	CHADS2* score >4 History of CVA or TIA Rheumatic valvular heart disease	• Stop warfarin 5 days prior to procedure • Begin LMWH 3 days (or 36 hrs) pre-op (when INR < 2.0) ○ CrCl >30 mL/min: Enoxaparin 1 mg/kg SC every 12 hrs ○ CrCl <30 mL/min: Enoxaparin 1 mg/kg SC every 24 hrs ○ Last dose 24 hr prior to surgery • Check INR on morning of procedure • Restart warfarin immediately post-op • Remember DVT Px • Hold therapeutic heparin for 48 hrs post-op	Recent (<3 months) VTE Cancer and thrombosis Thrombosis and • Severe antiphospholipid antibody syndrome • PNH • Myeloproliferive syndrome	• Stop warfarin 5 days prior to procedure • Begin LMWH 3 days (or 36 hrs) pre-op (when INR < 2.0) ○ CrCl >30 mL/min: Enoxaparin 1 mg/kg SC every 12 hrs ○ CrCl <30 mL/min: Enoxaparin 1 mg/kg SC every 24 hrs ○ Last dose 24 hr prior to surgery • Check INR on morning of procedure • Restart warfarin immediately post-op • Remember DVT Px • Hold therapeutic heparin for 48 hrs post-op
Moderate			CHADS2 score of 0-3 **and** no prior CVA/TIA	• Hold warfarin for 5 days • Obtain INR on morning of procedure • Restart warfarin post-op • No Bridging therapy necessary	VTE in last 3-12 months Recurrent VTE	• Stop warfarin 5 days prior to procedure • Restart warfarin immediately post-op • Remember DVT Px
Low	Bileaflet mechanical aortic valve **without** atrial fibrillation **and** no other risk factors for stroke	• Hold warfarin for 5 days • Obtain INR on morning of procedure • Restart warfarin post-op • No Bridging therapy necessary			Single VTE occurred >12 months ago **and** no other risk factors	• Stop warfarin 5 days prior to procedure • Restart warfarin immediately post-op • Remember DVT Px

Note: TE – Thromboembolism, VTE – venous thromboembolism, AF – Atrial Fibrillation, CVA – cardiovascular accident, TIA – transient ischemic attack

*CHADS2 score estimates the risk of stroke.

1 point for the following risk factors: CHF, HTN, Age >74, Diabetes

2 points for secondary prevention in patients with a prior ischemic stroke or TIA

If possible, delay elective surgery for 3 months following VTE

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Approved by: P&T Committee
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Consider the bleeding risk from the procedure. For low bleeding risk procedures (i.e. dental extractions, skin biopsy, cataracts and colonoscopy without biopsy), warfarin can continue without interruption. See Table: Procedures that can be Performed on Warfarin

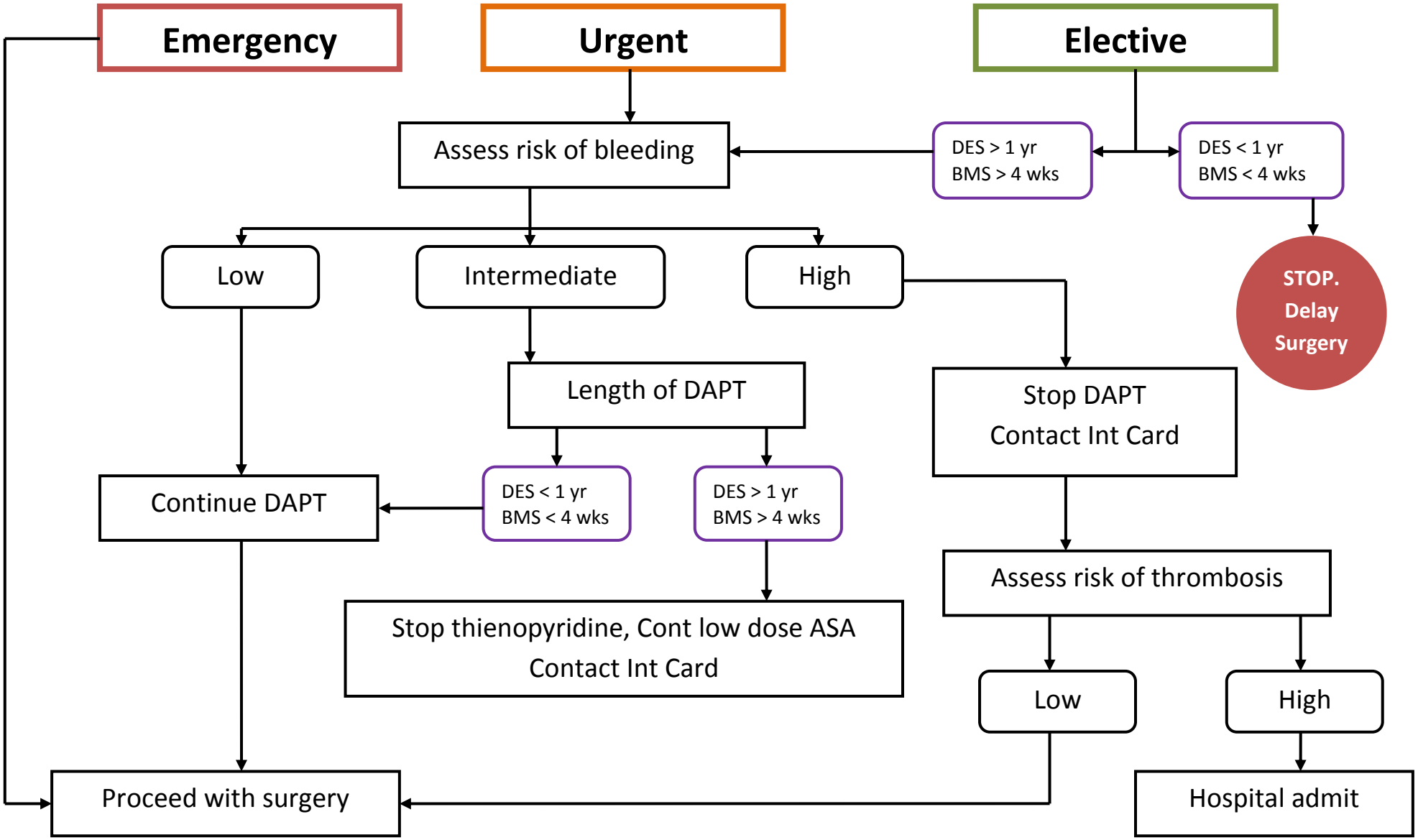
Procedures that can be Performed on Warfarin

Ophthalmic	Dental	Dermatologic	Gastrointestinal
Cataract surgery Trabeculectomy	Restorations Uncomplicated extractions Endodontics Prosthetics Periodontal therapy Dental hygiene	Mohs' surgery Simple excisions	Diagnostic esophagogastroduodenoscopy Colonoscopy without biopsy Diagnostic endoscopic retrograde cholangiopancreatography Biliary stent without sphincterotomy Endoscopic ultrasonography without biopsy Push enteroscopy

Peri-Operative Antiplatelet Management for Major Surgery

Major surgery and	How to proceed	Exception	How to proceed with exception
Aspirin for primary prevention*	Stop aspirin 5 days before surgery*		
Aspirin in high-risk patients* (diabetes, history of CV events, documented CV disease, increased global risk)	Continue aspirin*	Surgery in closed space, expected major bleeding complications	• Stop aspirin 5 days before surgery* • Consider restarting within 24 hours*
Aspirin **plus** clopidogrel in high risk patients	1. Elective surgery: delay until no dual inhibition necessary. 2. Semi-urgent surgery: continue aspirin ± clopidogrel on a case by case basis. 3. Urgent surgery (within 24 hours): continue aspirin and clopidopgrel	Surgery in closed space, expected major bleeding complications	If delaying surgery not possible/semi-urgent surgery necessary: • Stop clopidogrel 5 days before surgery, consider bridging (short acting GPIIb/IIIa antagonist). • Consider stopping also aspirin in particular patients. • Consider resuming dual antiplatelet therapy as soon as possible.
*Extends also to patients on clopidogrel monotherapy.			
Minor Surgery: do not stop antiplatelet therapy. Implement multidisciplinary consult in patients with (potential) bleeding complications. Low molecular weight heparin: NOT a substitute for platelet inhibiting drugs. Avoid plasmatic anticoagulation (LMWH, OAC) during surgery.			

Peri-Operative Antiplatelet Management for Coronary & Carotid Stent Patients



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ASA=aspirin; BMS=bare metal stent; DES=drug eluting stent; DAPT=dual antiplatelet therapy (ASA & thienopyridine); Int Card=interventional cardiologist; Thienopyridines=clopidogrel, prasugrel, ticagrelor
Carotid stents are BMS

PRADAXA® (dabigatran)

Low Bleeding Risk	Med- High Bleeding Risk
Continue dabigatran	Discontinue dabigatran 1-2 days if CrCl ≥ 50ml/min
	Discontinue dabigatran 3-5 days if CrCl < 50 ml/min

Consider longer times for patients undergoing major surgery, spinal puncture, or placement of a spinal or epidural catheter or port, in whom complete hemostasis may be required. Resume Pradaxa® (dabigatran) when safe to do so.

XARELTO® (rivaroxaban)

Low Bleeding Risk	Med- High Bleeding Risk
Continue rivaroxaban	Discontinue rivaroxaban 24 hours if CrCl ≥ 50ml/min
	Discontinue rivaroxaban 36 hours if CrCl < 50 ml/min

Use of Rivaroxaban for Bridging

Patient eligible for consideration:

Patients on warfarin who require bridging for surgical procedures in whom LMWH is contraindicated or cannot be obtained

Contraindications

- Creatinine clearance < 30 mL/min
- Pregnancy

Protocol

1. Stop warfarin 5 days before surgery
2. Day 3 before surgery start rivaroxaban 10 mg BID
3. Give last dose of rivaroxaban on the morning of the day before surgery
4. Use pneumatic compression stockings during OR until ambulating
5. Start prophylaxis 24 hours after surgery if there is surgical hemostasis with rivaroxaban
6. Restart maintenance dose of warfarin night of surgery
7. Restart therapeutic dose of rivaroxaban 48-72 hours after surgery and stop when INR is > 2

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