Resources and Guidelines for Peri-Procedural Management of Anticoagulation or Anti-platelet Therapy

I. Assessment of Patient-Related Thrombosis Risk	
$CHADS_2$ ∗	Score
CHF	1
Hypertension	1
Age 75 years or older	1
Diabetes Mellitus	1
Stroke/TIA/Thromboembolism	2

II. Assessment of Procedure-Related BLEEDING Risk
CIED (pacemaker, implantable defibrillator), coronary angiography or PCI **considered LOW or STANDARD RISK** (CCS Guidelines. *Can J. Cardiol* 2014;30:1114-1130)

∗ $CHADS_2$ 1 or less = **LOW risk**
$CHADS_2$ 2 to 3 = **MODERATE risk**
$CHADS_2$ 4 = **HIGH risk**
$CHADS_2$ 4 or more or mechanical valve or previous stroke = **VERY HIGH risk**

III. Contraindications to Low Molecular Weight Heparin (LMWH)	
Active bleeding or recent major bleeding	History of heparin-induced thrombocytopenia (HIT)
Severe renal failure (eGFR below 30 mL/min) *consult pharmacist	Severe hepatic failure
Hemorrhagic stroke within last 3 months	Planned or recent eye, ear, CNS surgery/injury
Allergy/hypersensitivity to heparin or LMWH	Less than 18 years old
History of thrombocytopenia and/or platelets below 100	Other:

GUIDELINES

1. For procedures with **low or standard risk of bleeding** (CIED, coronary angiography, PCI), continue ASA if significant cardiovascular risk.
2. Patients taking warfarin with a $CHADS_2$ score of 3 or more, previous stroke, mechanical heart valve, rheumatic heart disease, or VTE within 3 months before surgery should be assessed for **bridging LMWH** if warfarin is being held. Check INR just prior to procedure.
3. In patients at **very high risk of thrombosis** (e.g. mechanical heart valve, VTE within past 30 days), may give a half-therapeutic dose of LMWH 24 hours before procedure.
4. Post-operatively, renal function should be checked before restarting any NSAIDS, LMWH, fondaparinux, dabigatran, rivaroxaban or other agents that are dependent on renal clearance.
5. Start **therapeutic doses** of any anticoagulant ONLY AFTER hemostasis is achieved. Full anticoagulant effect peaks at: approximately 2 hours after administration of dabigatran, rivaroxaban, and apixaban; approximately 3 to 4 hours after LMWH; and when PTT is therapeutic for intravenous heparin. If therapeutic dosing start is delayed, consider using prophylactic doses of LMWH (if indicated).

Interruption of Novel Oral Anticoagulants (NOACs) before invasive procedures or surgery.[1] Day 0=day of procedure.

Renal Function (eGFR or CrCl) (mL/min)	**Half-life** (hours)	**Last Dose *Before* Morning of Procedure**
		Low or Standard risk of bleeding
Dabigatran (Pradaxa®) 150 mg or 110 mg BID		
Greater than 50	15 (12 to 34)	Procedure Day -2
Greater than 30 to 50 or more	18 (13 to 23)	Procedure Day -3
Rivaroxaban (Xarelto®) 20 mg daily or 15 mg BID		
Greater than 30	9 (5 to 13)	Procedure Day -2
Apixaban (Eliquis®) 5 mg BID		
Greater than 30	12 (10 to 15)	Procedure Day -2

*Avoid NOACs in patients with severe renal insufficiency with CrCl less than 30 mL/min. The last dose should not be taken any later than the above recommended times. Bridging with LMWH is not recommended or necessary for these agents unless a longer period of interruption occurs.

These general recommendations do not replace clinical judgement. Physicians must consider relative risks and benefits in each patient in applying these recommendations and should refer to reference guidelines for more details and information.

[1] Excerpted from Thrombosis Canada http://thrombosiscanada.ca/?page_id=18# Accessed April 11 2016.