Perioperative Management of Anticoagulant Therapy Clinical Pathway (Draft Only)

Island Health Anticoagulation Therapy Clinic

These recommendations are based on guidelines from ACCP, ACC, Thrombosis Canada, CCS, as well as primary literature and pharmacokinetic /pharmodynamic principles. They do not replace clinical judgement.

See case examples in Appendix

Check which medications your patient is currently taking:

- Warfarin (Coumadin) – see Section 1
- Direct Oral Anticoagulants (DOACs)
  - Rivaroxaban (Xarelto)/Apixaban (Eliquis)/Edoxaban (Lixiana) – see Section 2
  - Dabigatran (Pradaxa) – see Section 3
- Chronic low molecular weight heparin (LMWH) – see Section 4
  - Dalteparin (Fragmin)
  - Tinzaparin (Innohep)
  - Enoxaparin (Lovenox)
- Antiplatelets – see Section 5
  - Clopidogrel (Plavix), Ticagrelor (Brilinta), Prasugrel (Effient), ASA (Aspirin)

Section 1

Warfarin

Very low (not clinically important) bleed risk procedure – continue warfarin uninterrupted

LOW bleed risk procedure

Last dose: pre-op Day 6

First dose post procedure: evening of procedure

HIGH bleed risk procedure/Neuraxial anesthesia

Last dose: pre-op Day 6 (Consider last dose pre-op Day 7 if INR target is usually 2.5-3.5)

First dose post procedure: post-op day 1 or as per Pain Service if epidural

Check Patient Referral For Periprocedural Warfarin Management form to determine if referral should be made for assessment for perioperative bridging with LMWH

island health

Section 2

Rivaroxaban (Xarelto) /Apixaban (Eliquis) / Edoxaban (Lixiana)

Pharmacokinetics	Rivaroxaban	Apixaban	Edoxaban
Half life	9-13 hours	8-15 hours	10-14 hours
Elimination	66% renal	27% renal	50% renal
Time to Peak onset	2-4 hours	2-4 hours	1-2 hours

Very low (not clinically important) bleed risk procedure – continue apixaban/rivaroxaban/edoxaban uninterrupted, but time procedure at apixaban/rivaroxaban/edoxaban trough (ie. just prior to next dose)

LOW bleed risk procedure

Last dose: pre-op Day 2 (ie. do not take Pre-op day 1)

First dose post procedure: post-op day 1 (if no bleeding complications and patient can tolerate oral medications)

HIGH bleed risk procedure/Neuraxial anesthesia

Last dose: pre-op Day 3 (ie. do not take Pre-op day 2 and Pre-op day 1)

First dose post procedure: post-op day 2 or 3 or as per Pain Service if epidural (if no bleeding complications and patient can tolerate oral medications). For VTE prophylaxis immediately post-op, consider prophylactic LMWH or heparin before rivaroxaban/apixaban/edoxaban restarted (no overlap required nor recommended)

Do not bridge DOAC patients with LMWH. Current evidence suggests increase bleed risk and no added thromboembolic benefit with bridging with LMWH in these patients. Consider low dose LMWH (eg. Dalteparin 5000 units SQ daily) post-op until safe to resume therapeutic anticoagulation with rivaroxaban/apixaban/edoxaban. Do not overlap rivaroxaban/apixaban/edoxaban and LMWH

Section 3

Dabigatran (Pradaxa)

Pharmacokinetics	Dabigatran
Half life	14-17 hours (prolonged if renal failure)
Elimination	80% renal, 20% biliary
Time to Peak onset	2 hours

Very low (not clinically important) bleed risk procedure – continue dabigatran uninterrupted, but time procedure at dabigatran trough (ie. just prior to next dose)

LOW or HIGH bleed risk/Neuraxial anesthesia

Last dose pre-op:

Dabigatran 110 mg or 150 mg PO BID	**Half-life (hours)**	**Timing of last dose**	
Renal Function		**Low bleed risk procedure**	**High bleed risk procedure**
eGFR greater than 50 ml/min	14-17 hours	Pre-op day 2	Pre-op day 3
eGFR 30- 50 ml/min	13-23 hours	Pre-op day 3	Pre-op day 5
eGFR less than 30 ml/min *(Drug is contraindicated; do not restart dabigatran in this patient if eGFR less than 30 ml/min)*	Greater than 20 hours	Pre-op day 5	Pre-op day 6

First dose post procedure:

Low bleed risk: post-op day 1 (if no bleeding complications and patient can tolerate oral medications)

High bleed risk: post-op day 2 or 3 or as per Pain Service if epidural (if no bleeding complications, and patient can tolerate oral medications). Consider prophylactic LMWH or heparin before dabigatran restarted for VTE prophylaxis (no overlap required or recommended)

Do not bridge DOAC patients with LMWH. Current evidence suggests increase bleed risk and no added thromboembolic benefit with bridging with LMWH in these patients. Consider low dose LMWH (eg. Dalteparin 5000 units SQ daily) post-op until safe to resume therapeutic anticoagulation with dabigatran. Do not overlap dabigatran and LMWH

island health

Section 4

Low Molecular Weight Heparin Eg. Dalteparin, tinzaparin, enoxaparin

last dose 24-36 hours pre procedure

Low bleed risk

First therapeutic dose post-procedure: 24 hours post-op

High bleed risk

First therapeutic dose post-procedure: 48-72 hours post-op; consider prophylactic dosing starting 24 hours post-op for VTE prophylaxis until therapeutic LMWH resumed

Section 5

Antiplatelets

Very low (not clinically important) bleed risk procedure – continue antiplatelet uninterrupted

Drug	Last dose before procedure		First dose post-procedure	
	Low bleed risk	High bleed risk	Low bleed risk	High bleed risk
ASA	Continue[a]	Continue[a] or last dose Pre-op Day 8	Post-op Day 1	Post-op Day 1
Clopidogrel (Plavix)	Last dose Pre-op Day 6[b,c]	Last dose Pre-op Day 8[b,c]	Post-op Day 1	Post-op Day 1 or 2 or as per Pain Service
Ticagrelor (Brilinta)	Last dose Pre-op Day 6[c]	Last dose Pre-op Day 6[c]	Post-op Day 1	Post-op Day 1 or 2 or as per Pain Service
Prasugrel (Effient)	Last dose Pre-op Day 8[c]	Last dose Pre-op Day 8[c]	Post-op Day 1	Post-op Day 1 or 2 or as per Pain Service

[a] Many procedures, including some high bleed risk procedures, can be done without interrupting ASA in significant cardiovascular or neurovascular risk patients. Consider discussing with surgeon/proceduralist/anesthetist to determine if ASA can be continued periprocedurally

[b] Procedure may need to be delayed if cerebral vascular accident within 6 months; recommend neurology input

[c] Procedure may need to be delayed if drug-eluting stent placement within 6-12 months, or bare metal stent placement within 3 months; recommend cardiology input

Appendix – Case Examples

Warfarin

LOW or HIGH bleed risk procedure

Example:

Sun	Mon	Tues	Wed	Thurs	Fri	Sat
					2 LAST DOSE Warfarin	3 NO WARFARIN
4 NO WARFARIN	5 NO WARFARIN	6 NO WARFARIN	7 NO WARFARIN	8 PROCEDURE DAY Warfarin (usual dose) in the evening	9 Warfarin (usual dose)	10 Warfarin (usual dose)
11 Warfarin (usual dose)	12 Warfarin (usual dose)	13 Warfarin (usual dose)	14 INR Test Take warfarin dose as directed by GP	15	16	17

Rivaroxaban (Xarelto) /Apixaban (Eliquis)

LOW bleed risk procedure Example:

Sun	Mon	Tues	Wed	Thurs	Fri	Sat
					2	3
4	5	6 Last dose rivaroxaban/apixaban	7	8 PROCEDURE DAY	9 Resume usual dose rivaroxaban/apixaban	10
11	12	13	14	15	16	17

HIGH bleed risk procedure Example:

Sun	Mon	Tues	Wed	Thurs	Fri	Sat
4	5 Last dose rivaroxaban/apixaban	6	7	8 PROCEDURE DAY	9 Dalteparin 5000 units SQ daily	10 Resume usual dose rivaroxaban/apixaban (or wait until POD#3) or as per Pain Service
11	12	13	14	15	16	17

Dabigatran (Pradaxa)

LOW bleed risk procedure Example:

Sun	Mon	Tues	Wed	Thurs	Fri	Sat
					2	3
4	5	6 Last dose dabigatran	7	8 PROCEDURE DAY	9 Resume usual dose dabigatran	10
11	12	13	14	15	16	17

HIGH bleed risk Example (High bleed risk, eGFR 60 ml/min):

Sun	Mon	Tues	Wed	Thurs	Fri	Sat
4	5 Last dose dabigatran	6	7	8 PROCEDURE DAY	9 Dalteparin 5000 units SQ daily	10 Resume usual dose dabigatran (or wait until POD#3) or as per Pain Service
11	12	13	14	15	16	17