# Anticoagulation: Peri-Procedural Management

## Site Applicability

St. Paul's Hospital Heart Centre

## Skill Level

**Specialized – Cardiac Catheterization/Electrophysiology/Transcatheter Valve Triage Coordinators:** RNs with specialized training in cardiovascular nursing and experience in cardiac catheterization and/or electrophysiology procedure care.

## Related Documents and Resources

1. Information and Instructions for Patients about Your Heart Procedure and Anticoagulation Medicine
2. Information and Instructions for Family Physicians: Anticoagulation "Bridging" Plan
3. Heart Centre Periprocedural Anticoagulation Monitoring Flowsheet (PHC-HH147)
4. Periprocedural Anticoagulation Bridging Orders (PHC-PH628)

## Clinical Indication

Management of outpatients who are receiving regular anticoagulants and scheduled to undergo an invasive cardiac procedure.

## Policy

A written physician's order is required for the interruption or initiation of any anticoagulant agent.

## Need to Know

- Patients who are receiving regular anticoagulation to prevent thrombo-emboli *may* need to have the anticoagulant interrupted if they are having an invasive procedure
- However, many patients still need thrombo-embolic prophylaxis during this time
- An individualized plan is required, which may include "bridging" with a low molecular-weight heparin

## Expected Outcomes

Patient will undergo procedure and recover without any bleeding or thromboembolic events.


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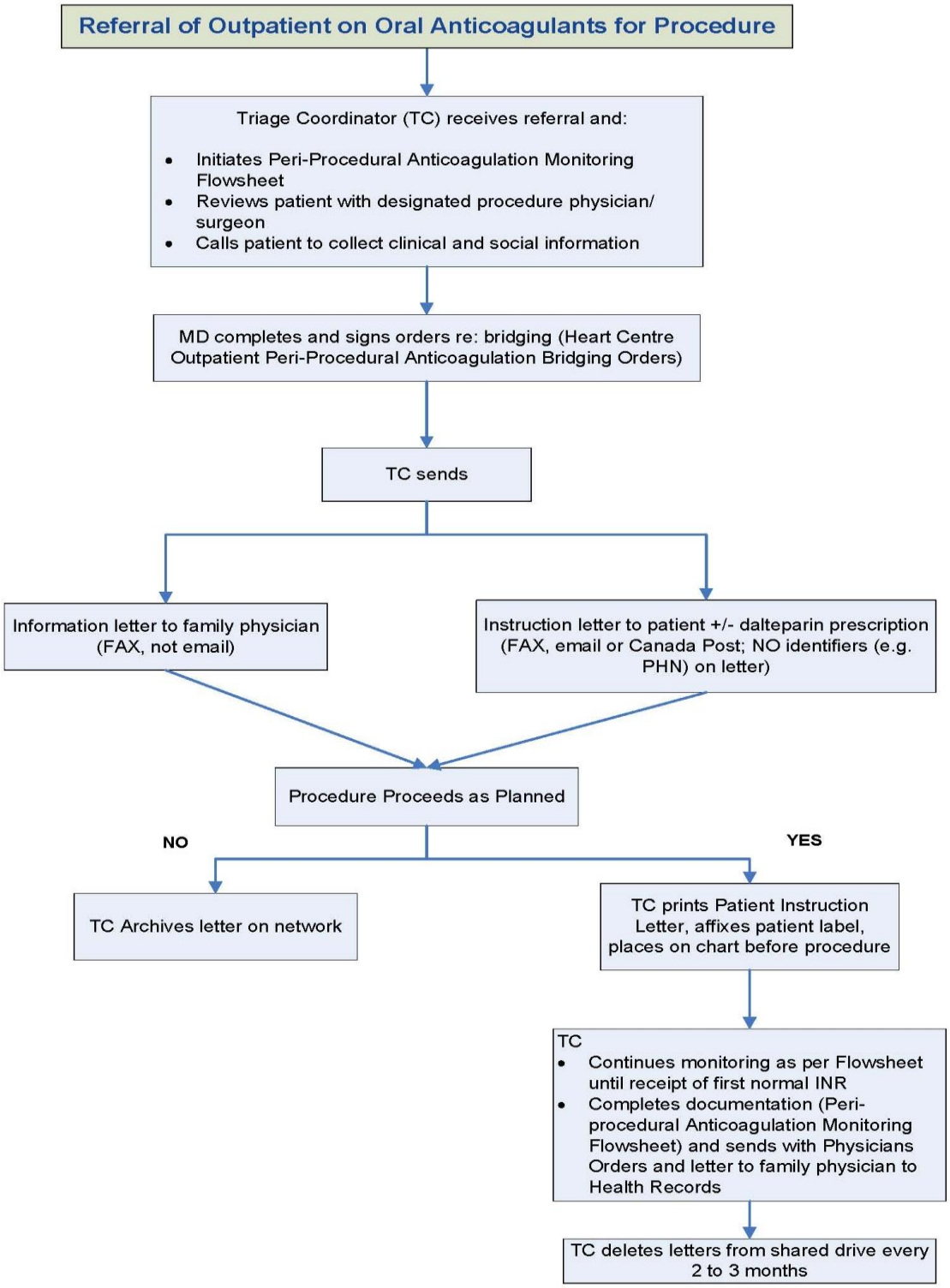




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## Schedule for INR Measurement

Pre-procedure:
Device patients on warfarin: INR 5 days before procedure and on day of scheduled implant
Interventional or transcatheter valve patients on warfarin: INR 1 day before procedure

Post Procedure:

All patients started or restarted on warfarin: INR day after procedure. Repeat INR q days until target INR achieved.

## Patient/Resident Education

Information and Instructions for Patients about Your Heart Procedure and Anticoagulation Medicine (letter sent to patients) the template for this letter is located on shared network drive.

## Documentation

- Complete fillable fields in "Information and Instructions for Patients about Your Heart Procedure and Anticoagulation Medicine" and "Information and Instructions for Family Physicians: Anticoagulation "Bridging" Plan". Send to patient and to family physician as per Guideline.
- Print a copy of patient's letter and add to patient's chart prior to procedure.
- Save copies of each letter in clearly identified folders on network drive. Delete documents as per guideline.
- Document INR results and instructions to patient on Heart Centre Periprocedural Anticoagulation Monitoring Flowsheet.

## References

1. Canadian Cardiovascular Society. (2014). 2014 Focused Update of the Canadian Cardiovascular Society Guidelines for the Management of Atrial Fibrillation. *Canadian Journal of Cardiology, 30*, 1114-1130.
2. Lee, A. (2015). Summary of Recommendations for the Interruption of Anticoagulation or Antiplatelet Therapy for Elective Invasive Procedures or Surgery. Author: Vancouver, BC.

## Persons/Groups Consulted

Interventional Cardiologists
Cardiac Electrophysiologist
Cath Lab, Electrophysiology and Transcatheter Valve Triage Coordinators
Patient/Nurse Educators, Ventricular Assist Device Program
Heart Centre Pharmacist
Privacy Officer, Providence Health Care


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## Appendix A: Pre Printed Orders (Sample)

**IF YOU RECEIVED THIS FAX IN ERROR, PLEASE CALL 604-806-8886 IMMEDIATELY**

**PRESCRIBER'S ORDERS**

NO DRUG WILL BE DISPENSED OR ADMINISTERED WITHOUT A COMPLETED

**CAUTION SHEET**

ALLERGY/INTOLERANCE STATUS FORM (PHC-PH047)

DATE AND TIME

**CARDIOLOGY - ANTICOAGULANT BRIDGING ORDERS (OUTPATIENTS)**

(Items with check boxes must be selected to be ordered) **(Page 1 of 1)**

**Indication for anticoagulation:** _____ **Target INR:** _____

**Planned procedure:** _____ **Target procedure INR:** _____

**MD's assessment of thrombosis risk:** ☐ Very High/High ☐ Intermediate ☐ Low

**PRE-PROCEDURE anticoagulant medication instructions (MUST choose one):**

☐ On Novel Oral Anticoagulant (NOAC), no bridging required. Last dose of _____ (specify NOAC) ____ days before procedure

☐ Continue warfarin up to procedure day, no bridging required. ☐ Same dose ☐ different dose (specify) _____ mg daily starting _____, INR as per protocol

☐ Stop warfarin, no bridging required. Last dose of warfarin _____ days before procedure. INR as per protocol

☐ Stop warfarin, bridging required. Last dose of warfarin _____ days before procedure. INR as per protocol

***See reverse for resources and guidelines for risk assessment, LMWH contraindications and dosing.***

**DALTEPARIN DOSAGE INSTRUCTIONS:** (if bridging required)

1. Complete Special Authority documentation (Ministry of Health)
2. Determine dosage for dalteparin: Patient's eGFR _____ mL/min (date) _____

| eGFR (mL/min) | Recommended | Comments |
|---|---|---|
| Above 60 | 200 units/kg once daily | Regular dose |
| 30 to 59 | 100 units/kg once daily | May use dalteparin, but may need renal dosing. **Consider consultation with pharmacist** |
| Below 30 | Assess | Determine if dalteparin contraindicated or if renal dosing required. **Consider consultation with pharmacist** |

dalteparin: ☐ 200 units x _____ weight (kg) = _____ units (Round dose to nearest pre-filled syringe available: 2500, 5000, 10,000, 12,500, 15,000, 18,000 units) ✱OR✱

☐ 100 units x _____ weight (kg) = _____ units (Round dose to nearest pre-filled syringe available: 2500, 5000, 10,000, 12,500, 15,000, 18,000 units) ✱OR✱

☐ contraindicated

3. **If dalteparin required, instruct patient (or caregiver) as follows:**

Administer dalteparin _____ units once daily for _____ days, starting 2 days after last warfarin dose

NO dalteparin on procedure day

NO REFILL

☐ Prescription faxed to community pharmacy (name) _____ Faxed by: _____ initials

**POST-PROCEDURE anticoagulant medication instructions (MUST choose one):**

**Instruct patient (or caregiver) as follows:**

☐ Resume NOAC (specify) _____ on Day _____ post-procedure

☐ Resume warfarin on Day _____ post-procedure

☐ Continue warfarin (if wasn't interrupted) ☐ same dose

☐ different dose (specify) _____ mg daily starting _____

Printed Name | Signature | College ID | Contact Number

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**ALL NEW ORDERS MUST BE FLAGGED**

FAX COMPLETED ORDERS TO PHARMACY PLACE ORIGINAL IN PATIENT'S CHART

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

| I. Assessment of Patient-Related Thrombosis Risk | |
|---|---|
| $CHADS_2$ * | Score |
| **C**HF | 1 |
| **H**ypertension | 1 |
| **A**ge 75 years or older | 1 |
| **D**iabetes Mellitus | 1 |
| **S**troke/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.

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