# Peri-Operative Anticoagulation Bridging Guidelines

## Anticoagulation Bridging Based on Thrombotic Risk and Indication

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

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

OHSU Anticoagulation Bridging Guidelines
Reviewed by: OHSU Anticoagulation Sub-Committee of P&T Committee
Approved by: P&T Committee
Date: 1/30/12
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

<table>
<thead>
<tr>
<th>Ophthalmic</th>
<th>Dental</th>
<th>Dermatologic</th>
<th>Gastrointestinal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cataract surgery Trabeculectomy</td>
<td>Restorations</td>
<td>Mohs’ surgery</td>
<td>Diagnostic esophagastroduodenoscopy</td>
</tr>
<tr>
<td></td>
<td>Uncomplicated extractions</td>
<td>Simple excisions</td>
<td>Colonoscopy without biopsy</td>
</tr>
<tr>
<td></td>
<td>Endodontics</td>
<td></td>
<td>Diagnostic endoscopic retrograde cholangiopancreatography</td>
</tr>
<tr>
<td></td>
<td>Prosthetics</td>
<td></td>
<td>Biliary stent without sphincterotomy</td>
</tr>
<tr>
<td></td>
<td>Periodontal therapy</td>
<td></td>
<td>Endoscopic ultrasonography without biopsy</td>
</tr>
<tr>
<td></td>
<td>Dental hygiene</td>
<td></td>
<td>Push enteroscopy</td>
</tr>
</tbody>
</table>

### Peri-Operative Antiplatelet Management for Major Surgery

<table>
<thead>
<tr>
<th>Major surgery and</th>
<th>How to proceed</th>
<th>Exception</th>
<th>How to proceed with exception</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aspirin for primary prevention*</td>
<td>Stop aspirin 5 days before surgery*</td>
<td></td>
<td>● Stop aspirin 5 days before surgery*</td>
</tr>
<tr>
<td>Aspirin in high-risk patients*</td>
<td>Continue aspirin*</td>
<td>Surgery in closed space, expected major bleeding complications</td>
<td>● Consider restarting within 24 hours*</td>
</tr>
</tbody>
</table>
| 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 clopidogrel | 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

**Emergency**
- Assess risk of bleeding
  - Low
    - Continue DAPT
  - Intermediate
    - Length of DAPT
      - DES < 1 yr BMS < 4 wks
        - Proceed with surgery
      - DES > 1 yr BMS > 4 wks
        - Stop thienopyridine, Cont low dose ASA
          - Contact Int Card
  - High
    - Stop DAPT
      - Contact Int Card

**Urgent**
- Assess risk of bleeding
  - Low
    - Continue DAPT
  - Intermediate
    - Length of DAPT
      - DES < 1 yr BMS < 4 wks
        - Proceed with surgery
      - DES > 1 yr BMS > 4 wks
        - Stop thienopyridine, Cont low dose ASA
          - Contact Int Card
  - High
    - Stop DAPT
      - Contact Int Card

**Elective**
- DES > 1 yr BMS > 4 wks
- DES < 1 yr BMS < 4 wks
- DES < 1 yr BMS < 4 wks
- DES > 1 yr BMS > 4 wks
- Stop DAPT
- Hospital admit

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)**

<table>
<thead>
<tr>
<th>Low Bleeding Risk</th>
<th>Med- High Bleeding Risk</th>
</tr>
</thead>
<tbody>
<tr>
<td>Continue dabigatran</td>
<td>Discontinue dabigatran 1-2 days if CrCl ≥ 50ml/min</td>
</tr>
<tr>
<td></td>
<td>Discontinue dabigatran 3-5 days if CrCl &lt; 50 ml/min</td>
</tr>
</tbody>
</table>

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)**

<table>
<thead>
<tr>
<th>Low Bleeding Risk</th>
<th>Med- High Bleeding Risk</th>
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<tbody>
<tr>
<td>Continue rivaroxaban</td>
<td>Discontinue rivaroxaban 24 hours if CrCl ≥ 50ml/min</td>
</tr>
<tr>
<td></td>
<td>Discontinue rivaroxaban 36 hours if CrCl &lt; 50 ml/min</td>
</tr>
</tbody>
</table>

**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
References for anticoagulation and antiplatelet therapy management guidelines:

- McBane, Robert D., M.D. Personal communication.
• Preoperative Algorithms- Antiplatelet Agents and Cardiac Stents. Legacy UHealth Preoperative Assessment Center, University of Miami. (Based on American College of Chest Physicians 2008 practice Guidelines).