### Drug and Renal Function

**Dabigatran (Pradaxa®)**
- **75mg, 150mg BID**
  - CrCl > 50 mL/min
    - t½ = 14-17h
    - Interval: 24 hours
    - Last dose: In PM 2 days prior
  - CrCl 30-50 mL/min
    - t½ = 18-19h
    - Interval: 48 hours
    - Last dose: In PM 3 days prior
  - CrCl < 30 mL/min
    - t½ = unknown
    - Interval: 72 hours
    - Last dose: > 5 days prior

**Rivaroxaban (Xarelto®)**
- **15mg daily, BID, 20mg daily**
  - CrCl ≥ 30 mL/min
    - t½ = 8-9h
    - Interval: 24 hours
    - Last dose: 2 days prior
  - CrCl 15-29 mL/min
    - t½ = 9-10 h
    - Interval: 48 hours
    - Last dose: 3 days prior
  - CrCl < 15 or on HD
    - t½ = unknown
    - Interval: > 96 hours
    - Last dose: > 5 days prior

**Apixaban (Eliquis®)**
- **2.5mg, 5mg, 10mg BID**
  - CrCl > 50 mL/min
    - t½ = 12-15h
    - Interval: 24 hours
    - Last dose: 2 days prior
  - CrCl 30-50 mL/min
    - t½ = 17-18h
    - Interval: 48 hours
    - Last dose: 3 days prior
  - CrCl 15-29 mL/min
    - t½ = 17-18h
    - Interval: > 72 hours
    - Last dose: > 4 days prior
  - CrCl < 15 or on HD
    - t½ = unknown
    - Interval: > 96 hours
    - Last dose: > 5 days prior

**Edoxaban (Savaysa®)**
- **30mg, 60mg daily**
  - CrCl > 50 mL/min
    - t½ = 10-14h
    - Interval: 24 hours
    - Last dose: 2 days prior
  - CrCl ≤50 mL/min
    - t½ = 10-17h
    - Interval: > 96 hours
    - Last dose: > 5 days prior

### Procedural Bleed Risk

<table>
<thead>
<tr>
<th>Drug</th>
<th>Renal Function</th>
<th>LOW Procedural Bleed Risk (~3 half-lives between last dose &amp; procedure)</th>
<th>HIGH Procedural Bleed Risk (~5 half-lives between last dose &amp; procedure)</th>
<th>VERY HIGH Procedural Bleed Risk (e.g. cardiothoracic, intracranial; neuraxial)</th>
<th>Resumption of DOAC</th>
<th>Low bleed risk procedures</th>
<th>High / Very High bleed risk procedures</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dabigatran</td>
<td>CrCl &gt; 50 mL/min</td>
<td>24 hours</td>
<td>60 hours</td>
<td>96 hours</td>
<td>Consider resuming no sooner than 1 day postop AND Discuss timing with proceduralist</td>
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<tr>
<td></td>
<td>CrCl 30-50 mL/min</td>
<td>48 hours</td>
<td>108 hours</td>
<td>120 hours</td>
<td>Consider resuming no sooner than 2-3 days postop AND</td>
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<tr>
<td></td>
<td>CrCl &lt; 30 mL/min</td>
<td>&gt; 96 hours</td>
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<td></td>
<td>Consider resuming no sooner than 6 days postop</td>
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<tr>
<td>Rivaroxaban</td>
<td>CrCl ≥ 30 mL/min</td>
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<td></td>
<td>CrCl 15-29 mL/min</td>
<td>48 hours</td>
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<td>CrCl 30-50 mL/min</td>
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<td>CrCl 15-29 mL/min</td>
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<td>&gt; 96 hours</td>
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</table>

1. No Data. It is not known how long it takes for anticoagulant effect to wear off in ESRD. **Consider**: obtaining drug-specific antiXa level (UCSF only) or LMWH antiXa level (VASF), and consulting with institutional hematology or anticoagulation service.
NOTE: This guideline provides general recommendations that are not intended to replace clinician judgment.

- Individual patient risk profiles, procedure risk, and provider/patient preference may influence recommendations.
- Suggested hold times correspond with low residual anticoagulant effect in low procedural bleed risk, minimal to no residual anticoagulant effect in high procedural bleed risk, and no significant residual anticoagulant effect in very high procedural bleed risk.
- Interval between last dose and procedure derived from recommendations from Pause Trial (3-5 DOAC half-lives), accounts for renal dependence of each DOAC, and assumes PM administration of daily use DOACs.
- See “UCSF Guidelines for the use of antithrombotic agents in the setting of neuraxial procedures” for additional information on neuraxial anesthesia.
- Clearance of anticoagulant effect depends on renal function. Consider reassessing renal function within one month of pre-op planning.
- Full anticoagulant effect occurs within hours of resuming DOAC therapy. Patient must be tolerating orals and have good absorption. Post-procedure resumption of anticoagulation should be done with the approval of the proceduralist.
- DOAC specific antiXa levels not available as STAT at all institutions, please contact Clinical Labs for more info.
- **Bridging with heparin or LMWH is NOT usually recommended for patients on DOACs.** However, bridging may be considered in patients at VERY high risk of thrombosis or with prolonged DOAC hold times (e.g. Afib with TIA/CVA<3 mos, or VTE in past 3 mos). Consultation with a specialist is recommended in complex situations. UCSF: Hematology Consult (415-443-4276) or Anticoagulation Clinic. SFGH: Anticoagulation Pharmacist (415-327-0339). VA Inpatient Anticoagulation Service (415-223-7824).

**Examples of Procedures performed off anticoagulants (Hold/Restart DOAC per Guideline above)**

- Cardiothoracic surgery (such as heart valve replacement, coronary artery bypass graft)
- Neurosurgical/neuraxial procedures
- Major surgery with significant tissue injury (such as orthopedic, abdominal)
- Certain interventional radiologic or endoscopic procedures with biopsy
- Higher risk urologic procedures: TURP, prostate biopsy, lithotripsy, prostatectomy, bladder surgery

**Examples of Procedures performed on anticoagulants (no interruption of DOAC)**

- Endoscopic or urologic procedures without biopsy
- Skin biopsy
- Potentially bloodless surgery (e.g, cataract). Consider risk of anesthesia administration (e.g., retrobulbar administration)
- Simple dental procedures such as cleaning, extractions, endodontics

**References**


Version 2.0 developed by Margaret Fang, MD, Tracy Minichiello, MD, Christina S. Wang, PharmD, Noelle de Leon, PharmD, Cynthia Fenton, MD, Erika Price, MD, Ashley Thompson, PharmD **Version 1.0 Approved by UCSF P&T July 8, 2015; Version 2.0 in development.**