<table>
<thead>
<tr>
<th>DRUG</th>
<th>USE WITH INDWELLING EPIDURAL</th>
<th>HOLD BEFORE NEURAXIAL BLOCK</th>
<th>HOLD BEFORE CATHETER REMOVAL</th>
<th>RESTART AFTER NEURAXIAL BLOCK</th>
<th>RESTART AFTER CATHETER REMOVAL</th>
<th>AFTER HEMORRHAGIC BLOCK</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Heparin</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5000 IU SQ BID (total daily dose &lt;10,000 IU)</td>
<td>Yes</td>
<td>No&lt;sup&gt;1,5&lt;/sup&gt;</td>
<td>4 hours&lt;sup&gt;2,3&lt;/sup&gt;</td>
<td>1 hour&lt;sup&gt;2,5&lt;/sup&gt;</td>
<td>1 hour&lt;sup&gt;2,5&lt;/sup&gt;</td>
<td>None</td>
</tr>
<tr>
<td>5000 IU SQ TID (total daily dose &gt;10,000 IU)</td>
<td>Unknown (Probably Safe - monitor)</td>
<td>Unknown (Probably Safe - monitor)</td>
<td>4 hours</td>
<td>1 hour</td>
<td>1 hour</td>
<td>None</td>
</tr>
<tr>
<td><strong>Heparin IV</strong> (Vascular Surgery)</td>
<td>Yes</td>
<td></td>
<td>2-4 hours (check aPTT)</td>
<td>1 hour</td>
<td>1 hour</td>
<td>12-24 hours (not mandatory)</td>
</tr>
<tr>
<td><strong>LMWH</strong>&lt;sup&gt;1&lt;/sup&gt;</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>40 Units SQ qday</td>
<td>Yes</td>
<td>10-12 hours</td>
<td>10-12 hours</td>
<td>6-8 hours (24h after surgery)</td>
<td>2-6 hours</td>
<td>24 hours</td>
</tr>
<tr>
<td>0.5 mg/kg SQ q12h (30 Units SQ q12h)</td>
<td>No&lt;sup&gt;4&lt;/sup&gt;</td>
<td>24 hours</td>
<td>Not Applicable</td>
<td>6-8 hours (24h after surgery)</td>
<td>2-6 hours</td>
<td>24 hours</td>
</tr>
<tr>
<td>1 mg/kg SQ q12h</td>
<td>No</td>
<td>24 hours</td>
<td>24 hours</td>
<td>6-8 hours (24h after surgery)</td>
<td>2-6 hours</td>
<td>24 hours</td>
</tr>
<tr>
<td>1.5 mg/kg SQ q24h</td>
<td>No</td>
<td>24 hours</td>
<td>24 hours</td>
<td>6-8 hours (24h after surgery)</td>
<td>2-6 hours</td>
<td>24 hours</td>
</tr>
<tr>
<td><strong>Warfarin</strong>&lt;sup&gt;1&lt;/sup&gt; (Coumadin)</td>
<td>No&lt;sup&gt;3&lt;/sup&gt;</td>
<td>5 days (+ normal INR)</td>
<td>Check INR ≤ 1.5</td>
<td>Immediately (after single shot)</td>
<td>Immediately</td>
<td>Immediately</td>
</tr>
<tr>
<td><strong>Aspirin</strong></td>
<td>Yes&lt;sup&gt;4&lt;/sup&gt;</td>
<td>No</td>
<td>No</td>
<td>Immediately</td>
<td>Immediately</td>
<td>Immediately</td>
</tr>
<tr>
<td><strong>NSAIDS</strong></td>
<td>Yes&lt;sup&gt;6&lt;/sup&gt;</td>
<td>No</td>
<td>No</td>
<td>Immediately</td>
<td>Immediately</td>
<td>Immediately</td>
</tr>
<tr>
<td><strong>COX-2 Inhibitors</strong></td>
<td>Yes&lt;sup&gt;6&lt;/sup&gt;</td>
<td>No</td>
<td>No</td>
<td>Immediately</td>
<td>Immediately</td>
<td>Immediately</td>
</tr>
<tr>
<td><strong>Clopidogrel</strong> (Plavix)</td>
<td>Yes&lt;sup&gt;6&lt;/sup&gt;</td>
<td>7 days</td>
<td>Not Applicable</td>
<td>Immediately</td>
<td>Immediately</td>
<td>Immediately</td>
</tr>
<tr>
<td><strong>GP IIb/IIIa Inhibitors</strong></td>
<td>No</td>
<td>8-48 hours According to drug&lt;sup&gt;7&lt;/sup&gt;</td>
<td>Not Applicable</td>
<td>Immediately</td>
<td>Immediately</td>
<td>Unknown</td>
</tr>
<tr>
<td><strong>Fondaparinux</strong> (Arixtra)&lt;sup&gt;8&lt;/sup&gt;</td>
<td>No</td>
<td>36-42 hours</td>
<td>Not Applicable</td>
<td>6-12 hours (no catheter)</td>
<td>6-12 hours</td>
<td>Unknown</td>
</tr>
<tr>
<td><strong>Direct Thrombin Inhibitors</strong>&lt;sup&gt;10&lt;/sup&gt; (desirudin, lepirudin, bivalrudin, argatroban)</td>
<td>Unknown (Probably No)</td>
<td>Unknown (78-10 hours)</td>
<td>Unknown</td>
<td>Unknown</td>
<td>Unknown</td>
<td>Unknown</td>
</tr>
<tr>
<td><strong>New Direct Thrombin Inhibitors/Factor Xa Inhibitors</strong> (dabigatran, rivaroxaban)</td>
<td>Unknown</td>
<td>Unknown</td>
<td>Unknown</td>
<td>Unknown</td>
<td>Unknown</td>
<td>Unknown</td>
</tr>
<tr>
<td><strong>Thrombolitics</strong></td>
<td>Contraindicated</td>
<td>Contraindicated</td>
<td>Contraindicated</td>
<td>Contraindicated</td>
<td>Contraindicated</td>
<td>Contraindicated</td>
</tr>
<tr>
<td><strong>Herbal Therapy</strong></td>
<td>No evidence; (Watch for Drug interactions)</td>
<td>Unknown</td>
<td>Unknown</td>
<td>Unknown</td>
<td>Unknown</td>
<td>Unknown</td>
</tr>
</tbody>
</table>

<sup>1</sup> Concurrent use of other anticoagulants can increase risk of bleeding. Check patient's order for intravenous heparin for ≥ 4 days (DVTs).

<sup>2</sup> May be preferable to give heparin SQ after neuraxial block especially if patient is critically ill or has specific contraindications.

<sup>3</sup> Waiting is that long a wait is necessary.

<sup>4</sup> Contraindicated. Some people feel comfortable maintaining epidural with LMWH.

<sup>5</sup> Get on epidural with reduced dose of heparin if there is no other way to avoid effect of heparin.

<sup>6</sup> Increased risk of spontaneous bleeding sites and in conjunction with other anticoagulants.

<sup>7</sup> Continue anticoagulation for 24-48 hours (6-12 hours) after neuraxial block.

<sup>8</sup> American College of Chest Physicians recommends waiting 6-12 hours after last dose of SQ heparin before placing epidural and starting 24 hour block in a patient without any bleeding before inserting.

<sup>9</sup> UHPIF < 20 hours.

<sup>10</sup> LMWH does not recommend using sequential techniques with these drugs.
1. Introduction: Preop Mgmt:
   a. For pts w/ coronary stern or parasternal, prophylactic invasive surgery if possible:
      i. 4 hks, base mets tests
   b. 12 hks, drug-style stents
   c. If surgery can’t be postponed, consider bridging w/ ASA
   d. Other high risk coronary pts. cont ade ASA periop.

2. Thrombolytic Therapy: (P, tPA, streptokinase, urokinase)
   a. Avoid RA
   b. Avoid tPA, x 10d after vessel puncture/procedure

3. Unfractionated Heparin:
   a. 60:
      i. 5000 biq: no contraindications. Timing of heparin and placement/removal of catheter is not critical as the risk does not appear significant.
      ii. 10,000iu: try to change to bd dosing or time placement/consider waiting 7-8h before placement/removal around heparin doses (reduce heparin 1 h prior removal).
   b. IV:
      i. For vascular pts, wait > 8hrs after central neuraxial block (CNB) before giving IV heparin. Dcc cath at least 2-4 h after heparin and check PT/INR. Not necessary to monitor after thrombotic event.
      ii. For cardiac surgery, place catheter ideally day before. Remove cath only with no coagulation.
      iii. Avoid CNB with Heparin inf.

4. LMWH:
   a. Preop:
      i. Wait 12h before placing CNB if 40mg/diag.
      ii. LMWH haj = 40mg/diag if bd dosing or (200u/kg dose every 12h) prevents.
   b. Postop:
      i. 40mg/diag dosing: may start 6-9 h postop. Dcc cath > 72h after LMWH and wait 2h before next dose. Observe closely.
      ii. 40mg bd dosing: avoid CNB.
      iii. Pts with PT/INR > 1.5 for 2-3h.

5. Warfarin (Coumadin):
   a. Preop:
      i. (Stop 5 days prior to surgery, check INR, must be normal before starting Coumadin.)
      ii. Single dose given < 5h preop, do not need to check INR.
   b. Postop:
      i. Check INR/PT/INR daily. Put catheter within 48hrs, ideally within 12h (level at which INR/PT is 40%)
      ii. If INR/PT is 1-1.5, consider VK (1mg qid/24h) or FFP prior to removing cath, although 1.5-2.0 INR when initiating Coumadin is relatively safe as there are adequate levels of Factor X still.

6. ASA/NSAIDs:
   a. No significant risk unless combined with other coagulation defects.

7. Other Anticoagulants:
   a. Thrombolytic derivatives: hq thrombopt 1d and ticlopidine 14d prior to CNB
   b. Gp IIb/IIIa antagonists: wait 4 weeks after surgery to restart.
   c. Eptifibatide 24h.
   d. Tirofiban, wait 24h.

8. Herbal Meds (ginkgo, garlic, ginseng): no significant risk w CNB, no need to hold proph.

9. Thoracic Anesthesia:
   a. Avoid CNB
   b. Fentanyl (Hypnics) 1/2-2h

10. Perioperative Nerve Block (PNB) or Continuous PNB:
    a. Cost benefit review:
       i. PNB vs. neuraxial: 11 reports of hematoma in it

11. References: