Adult Unfractionated Heparin Infusion Protocol

Objective: To standardize heparin anticoagulation therapy at University Hospital. It has been recognized in the literature that patients in whom heparin infusion therapy is dosed according to weight-based nomograms achieve earlier therapeutic range, shorter length of stay, and fewer thromboembolic recurrences than patients who received “fixed-dose” therapy. This protocol was updated in June 2009 to include dosage adjustments based on the results of a heparin assay test.

Population: Adult patients requiring IV unfractionated heparin anticoagulation therapy. (For use when anticoagulation therapy with Low Molecular Weight Heparins or Fondaparinux is not indicated)

Dosing and Monitoring Guidelines

I. Baseline Labs (within 24 hrs prior to initiation of therapy)
   a. CBC (Hgb, Hct, platelet count)

II. Dosing
   a. Determine initial bolus dose and infusion rate
      i. Initial Bolus dose is indication specific, see tables on page 2
      ii. Initial max infusion rate is indication specific, see tables on page 2
   b. Total body weight (TBW as dry weight) will be used to calculate doses
   c. Be sure not to exceed max doses in obese patients

III. Routine Labs and Monitoring
   a. Heparin assay 6 hours after initiating heparin
   b. Heparin assay 6 hours after each dosage change, until 2 consecutive therapeutic levels are reached at a constant rate of infusion, then can begin monitoring once daily
   c. Target therapeutic heparin level by Anti Xa assay is 0.3-0.7 unit/mL
   d. Order CBC at least every other day and more frequently if deemed medically necessary
   e. Monitor for signs of HIT (Platelet drop by > 50% OR decrease < 150 K/µL)
      i. Treatment of HIT
         a. Stop all sources of heparin
         b. Refer to Guidelines for the use of Argatroban, are posted on the Clinical Pathways and Guidelines page.
Venous Thromboembolism Treatment* (Target AntiXa 0.3 - 0.7 unit/mL)\textsuperscript{1,2}

<table>
<thead>
<tr>
<th>Initial Bolus: 80 units/kg (Max Bolus 10,000 units)</th>
<th>Initial Infusion Rate: 18 unit/kg/hr (Max initial rate 2,000 units/hr)</th>
<th>Monitor: Heparin Assay at least 6 hours after initiation and 6 hours after each dosage change</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Heparin Assay</strong> AntiXa (unit/mL)</td>
<td><strong>Action</strong></td>
<td></td>
</tr>
<tr>
<td>&lt; 0.15</td>
<td>80 unit/kg bolus, then increase by 4 units/kg/hr</td>
<td></td>
</tr>
<tr>
<td>0.15 – 0.29</td>
<td>40 unit/kg bolus, then increase by 2 units/kg/hr</td>
<td></td>
</tr>
<tr>
<td>0.3 - 0.7</td>
<td><strong>No Change</strong></td>
<td></td>
</tr>
<tr>
<td>0.71 - 1</td>
<td>Decrease by 2 units/kg/hr</td>
<td></td>
</tr>
<tr>
<td>&gt; 1</td>
<td>Stop infusion 1 hr then decrease by 3 units/kg/hr</td>
<td></td>
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</tbody>
</table>

Indications - DVT, PE, Atrial fibrillation

Heparin assay of 0.3-0.7 currently corresponds to an aPTT range of 60-100 seconds. Therapeutic aPTT range may change based on the aPTT reagent used in lab. Heparin assay therapeutic range will not change.

Acute Coronary Syndrome Cardiology (Target AntiXa 0.3 - 0.7 unit/mL)\textsuperscript{2-4}

<table>
<thead>
<tr>
<th>Initial Bolus: 60 units/kg (Max Bolus 4,000 units)</th>
<th>Initial Infusion Rate: 12 units/kg/hr (Max initial rate 1,000 units/hr)</th>
<th>Monitor: Heparin Assay at least 6 hours after initiation and 6 hours after each dosage change</th>
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Indications - Non-STEMI, Unstable Angina, STEMI

IV. Warfarin Bridging
a. Overlap heparin and warfarin for at least 5 days and until 2 therapeutic INRs are achieved 24 hours apart
b. If patient will be discharged prior to 4 days, use LMWH to bridge
c. **IV heparin to SQ LMWH conversion** - give first LMWH injection, then discontinue heparin immediately after

V. Treatment of IV Heparin Overdose
a. Protamine sulfate injection – 1 mg of protamine sulfate neutralizes 100 heparin units
b. Only the heparin dose given over the last 3-4 hours needs to be included in the protamine dose calculation. (Based on heparin half-life 45-60 min)
c. Give dose by slow IV push, never to exceed 50 mg over a 10-minute period

References
2. Hirsh J, Bauer KA, Donati MB et al. Chest 2008;133(suppl)141S-155S.