How to use unfractionated heparin

Index: Anticoagulation

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Unfractionated heparin (heparin sodium) is commonly used in the acute care setting as an anticoagulant. Importantly, it does not contain any fibrinolytic activity so you cannot use it to break down clots (e.g., in lines).

Heparin is used for two purposes:

1. Prophylaxis against venous thromboembolic disease (prophylactic dose);
2. Full anticoagulation for treatment of thrombotic or thromboembolic disease (therapeutic dose).

Prophylactic dose

Many if not most inpatients in a teaching hospital with an acute medical or surgical condition are at increased risk of developing deep venous thrombosis (DVT) and venous thromboembolic disease (VTE).

| heparin sodium 5000 units subcutaneously bd (tds in high risk) |

See stratification of risk here

(1).

Prior to commencement of subcutaneous heparin, baseline aPTT (activated partial thromboplastin time), PT (prothrombin time) and platelet count should be performed. There is no need for monitoring aPTT in patients receiving the prophylactic dose of heparin though regular monitoring of the platelet count (every 4-7 days) for heparin induced thrombocytopaenia is recommended.

Therapeutic dose

The following is a way of giving heparin if a weight-based heparin infusion protocol is unavailable (2). Use it only as a last resort.

Step 1: Baseline bloods

Get baseline aPTT, PT and platelet count. If there are abnormalities, I would recommend consulting with a haematologists prior to commencing heparin.

Step 2: Prepare the heparin
5 mL of heparin sodium (25,000 units per 5 mL) in a 500 mL bag of 0.9% NaCl (normal saline).

This gives a concentration of heparin 50 units/mL.

**Step 3: Loading dose**

**heparin sodium 5000 units intravenously infused over 10 minutes**

**Step 4: Start infusion**

**Start infusion at 30 mL/h (heparin 1500 units/h)**

**Step 5: Check aPTT in 4-6 hours**

Check the aPTT and adjust according to the normogram.

<table>
<thead>
<tr>
<th>aPTT (seconds)</th>
<th>Bolus (units/kg)</th>
<th>Hold (minutes)</th>
<th>Rate change (units/hr)</th>
<th>Repeat aPTT</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 50</td>
<td>50</td>
<td>0</td>
<td>Increase 20%</td>
<td>4-6 hours</td>
</tr>
<tr>
<td>50-59</td>
<td>0</td>
<td>0</td>
<td>Increase 10%</td>
<td>4-6 hours</td>
</tr>
<tr>
<td>60-85</td>
<td>0</td>
<td>0</td>
<td>No change</td>
<td>24 hours</td>
</tr>
<tr>
<td>86-95</td>
<td>0</td>
<td>0</td>
<td>Reduce 10%</td>
<td>4-6 hours</td>
</tr>
<tr>
<td>96-120</td>
<td>0</td>
<td>30</td>
<td>Reduce 10%</td>
<td>4-6 hours</td>
</tr>
<tr>
<td>&gt;120</td>
<td>0</td>
<td>60</td>
<td>Reduce 15%</td>
<td>4-6 hours</td>
</tr>
</tbody>
</table>

**Step 6: Remember to check for HITS**

A full blood count (or a simple platelet count) should be ordered every few (3-4) days to observe for evidence of heparin induced thrombocytopenia.

**Comments:**
Most hospitals have available a weight-based heparin infusion protocol. Certainly if they don't, they should. If at all possible, you should always use the protocol. It is easy to use (especially for the nursing staff) and mistakes are less likely to happen.

Furthermore, it has been clearly demonstrated that you are much more likely to attain a therapeutic level of anticoagulation (as measured by aPTT) within 24 hours (3) with a weight-based protocol compared to a "standard" (an anachronism for "non-weight based" since the "standard" has changed in the past decade) dosing regimen (97% vs 77%) (4). As such, recurrent thromboembolism is less likely under a weight-based protocol, though having an aPTT above the therapeutic range is more likely too.

If you are working at a small rural emergency department that does not have a weight-based heparin infusion protocol, I would call a major teaching hospital to have one faxed across in preference to the above method.

Hints and tips

- Being flexible and pragmatic with the heparin infusion protocol cannot be overstated. Consider whether a patient who has otherwise been relatively stable on their heparin doses really needs to be woken up and have an aPTT performed in the middle of the night. Remember that it was only recently that 24 hour pathology became readily available.
- Although many protocols would suggest performing an aPTT after 4 hours after a change in dose, I personally think that 6 hours is a better time. At 4 hours, the aPTT may only be just reaching steady state levels while at 6 hours, it definitely should have.
- Avoid venepuncture for a blood sample for an aPTT proximal to the line insertion site. Generally, venepuncture distal to the line, even in the same limb, will give adequate results.
- Any intravenous line that has had heparin run through (used for a heparin infusion or heparin used to prevent line thrombosis - especially CVCs) cannot be used to collect blood for coagulation studies, including aPTT. Even trace amounts of heparin can markedly affect the result.
- Remember the purpose of full anticoagulation. By 4-6 hours after the cessation of a heparin infusion, the patient is essentially back to "normal" with regards to the coagulation status. Re-insertion of an intravenous cannula after line failure is an "urgent" task if it is required for a heparin infusion.
- Avoid unnecessary medications that can affect coagulation while the patient is on a heparin infusion (e.g., aspirin, NSAIDs).
- I personally find heparin infusions annoying for both the patient and the staff. Consider using a low molecular weight heparin (e.g., enoxaparin) if there are no contraindications.
- Be aware that many hospitals have several non-compatible versions of infusion protocols for unfractionated heparin with different "rates" for the same dosage of heparin. Don't assume that you have the correct form without checking.
- Knowing how to reverse unfractionated heparin (5) in an emergency is a useful skill.

Reference articles


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