Drug Guideline  Heparin

Summary: The following guideline links to the Liverpool Hospital Policy for Heparin Infusion. It also includes the use of Heparin for anticoagulation of the extracorporeal CRRT (Continuous Renal Replacement Therapy) circuit.

Approved by: ICU Medical Director

Publication (Issue) Date: July 2015

Next Review Date: July 2018

Replaces Existing Drug Guideline: January 2009

Previous Review Dates: 2003, 2005

1. Introduction:

   Patient safety

   The Aims / Expected Outcome of this drug guideline:

   Heparin will be administered safely and appropriately without any adverse side effects

   Related Policies
   LH_PD2013_C03.01 Drug Administration
   LH_PD2010_C03.00 Drug Prescribing
   LH_PD2008_C03.12 Administration of IV Medication
   LH_PD2014_C03.27 Heparin Infusion
   SSWAHS Policy:
   SSW_GL2007_010 Anticoagulation: Heparin and Warfarin

2. Drug Guideline: Policy Statement

   • All care provided within Liverpool Hospital will be in accordance with infection control, manual handling and minimisation and management of aggression guidelines.
   • Medications are to be prescribed and signed by a medical officer/authorised nurse practitioner (NP) unless required during an emergency.
   • All drugs administered during an emergency (under the direction of a medical officer/authorised nurse practitioner) are to be documented during the event, then prescribed and signed following the event.
   • Medications are to be given at the time prescribed (as close to the time as is possible when multiple drugs require ‘same time’ administration and, when the nurse is caring for more than one patient, recognition is given to a possible short delay to administration – antibiotics and other lifesaving drugs are to be prioritised) and are to be signed by the administering nurse.
• Parenteral medication prescriptions and the drug are to be checked with a second registered or endorsed enrolled nurse prior to administration. The “rights of drug administration” must be followed: right: patient, drug, dose, route, administration, time, reason for the drug, documentation, education and evaluation/outcome.
• Adverse drug reactions are to be documented and reported to a medical officer.
• Medication errors are to be reported using the hospital electronic reporting system: IIMS.
• Guidelines are for adult patients unless otherwise stated

3. Guideline Actions

Heparin is an anticoagulant.
It increases the effects of antithrombin III, preventing the conversion of prothrombin to thrombin and fibrinogen to fibrin.

Indications
Anticoagulation for:
- Acute Coronary Syndrome (ACS)
- Unstable angina.
- Non-ST elevation myocardial infarction (NSTEMI)
- ST elevation myocardial infarction (STEMI).
- Following PCI
- Atrial fibrillation (AF)
- Venous thromboembolism (VTE).
- Prosthetic heart valves
- Anticoagulation of extracorporeal circuit for CRRT.

Contraindications
• Bleeding disorders, previous ‘heparin induced thrombotic thrombocytopenia syndrome’ (HITTS).
• Cerebral haemorrhage.
• Peptic ulceration.
• Significant liver disease.
• Uncontrolled hypertension.
• Known allergy, adverse reaction to heparin.

Precautions
• Use with caution in patients after recent major surgery, eye or ENT surgery, lumbar puncture, epidural insertion/removal, neurosurgery.

Significant interactions
• Drugs affecting platelet function – aspirin, NSAIDs, dextran and systemic corticosteroids may increase the risk of haemorrhage.
• Probenecid, ethacrynic acid, vitamin K antagonists, valproic acid, high dose penicillin and some contrast mediums may affect coagulation and increase the risk of haemorrhage.
• Thrombolytic agents.

Adverse effects
• Prolonged bleeding times, with increased risk of haemorrhage
• Bruising, haematoma formation around venipuncture sites.
• HITTS - evidenced by dramatic fall in platelet count, multiple clot formation and bleeding.

Presentation
• Sodium heparin, 5000 units in 1mL ampoules.
Administrations Guidelines

- Dilute 15,000 units heparin to 50mL sterile 0.9% sodium chloride to give a final concentration of 300 units/mL.

For administration guidelines please refer to the Liverpool Hospital Guideline by right clicking on the hyperlink:

LH_PD2014_C03.27  Heparin Infusion

<table>
<thead>
<tr>
<th>Heparin Anticoagulation for CRRT (Continuous Renal Replacement Therapy).</th>
<th>Assess if the patient is at an increased risk of bleeding:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Elderly patients</td>
<td>Liver dysfunction</td>
</tr>
<tr>
<td>Platelets &lt; 60</td>
<td>Platelet dysfunction</td>
</tr>
<tr>
<td>Recent surgery</td>
<td>Pre-existing coagulopathy</td>
</tr>
<tr>
<td>Head injury</td>
<td>If any of the above, seek medical opinion prior to anticoagulation of the circuit.</td>
</tr>
</tbody>
</table>

**PRIMING**

- Add 5,000 units heparin to each of the 1,000mL flasks of sterile 0.9% normal saline used during priming.

**INFUSION**

- Dilute 15,000 units heparin to 50mL sterile 0.9% sodium chloride, to give a final concentration of 300 units/mL.
- Administer via the designated anticoagulant line on the circuit.
- Commence the infusion at 5 to 10 units/kg/hr (approximately 1.1 mL/hr - 2.3 mL/hr for 70 kg patient).
- Blood results are checked as per Steps 1 - 3:

**Step 1**

- Check patients APTT 4 hours after commencing CRRT (and then 6 hours thereafter routinely) and adjust to maintain:
  - Patients APTT near normal at 35 seconds (30 - 40 seconds). This is if there is no risk of bleeding. Blood for APTT is drawn from arterial line.

**Step 2**

- If the initial APTT result is > 120 seconds, stop infusion for 60 minutes and decrease the heparin infusion rate by half and re-check the APTT in 4 hours and thereafter routinely at 6 hourly intervals.
- **If there is clinical evidence of bleeding, the infusion should be stopped.**

**Step 3**

- Titrate APTT according to the scales below: Patients APTT must be checked routinely 6 hourly.

<table>
<thead>
<tr>
<th>APTT (seconds)</th>
<th>Stop infusion for (X) minutes</th>
<th>Rate Change (ml/hr)</th>
<th>Repeat APTT</th>
</tr>
</thead>
<tbody>
<tr>
<td>20-30</td>
<td>0</td>
<td>↑ by 0.3</td>
<td>6 hours</td>
</tr>
<tr>
<td>31-40</td>
<td>0</td>
<td>0</td>
<td>6 hours</td>
</tr>
<tr>
<td>41-60</td>
<td>0</td>
<td>↓ by 0.2</td>
<td>6 hours</td>
</tr>
<tr>
<td>61-80</td>
<td>0</td>
<td>↓ by 0.3</td>
<td>6 hours</td>
</tr>
<tr>
<td>81-120</td>
<td>0</td>
<td>↓ by 0.7</td>
<td>6 hours</td>
</tr>
<tr>
<td>&gt;120</td>
<td>60</td>
<td>Half the rate</td>
<td>4 hours</td>
</tr>
</tbody>
</table>
Clinical Considerations

- Routinely monitor patients APTT at six hourly intervals.
- If APTT > 200 STOP infusion and do NOT restart the Heparin infusion until after review by a senior member of the ICU medical team.
  - The APTT must be rechecked prior to restarting the heparin infusion.
  - The heparin infusion should be recommenced ONLY once the APTT is at an acceptable level.
- Perform daily full blood count and coagulation profile.
- Observe for signs and symptoms of bleeding. If patient actively bleeding, cease infusion and check immediately with the medical team. If necrosis is noted at site of infusion, cease infusion and report immediately – this may indicate hypersensitivity to the heparin.
- Perform daily urinalysis and check for presence of blood in urine/faeces.
- The specific antidote to heparin is protamine sulphate.

4. Performance Measures
All incidents are documented using the hospital electronic reporting system: IIMS and managed appropriately by the NUM and staff as directed.

5. References / Links
1. MIMS Online, CIAP: NSW Health Department, Copyright MIMS Australia Pty Ltd. February 2012. http://www.use.hcn.com.au

Author: CNC (S. Shunker)
Endorsed by: A Prof. Michael Parr, ICU Director