Evaluation of pharmacy to dose heparin protocol in neurological conditions

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Evaluation of pharmacy to dose heparin protocol in neurological conditions

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OBJECTIVE

• The objective of this study was to assess the safety and efficacy of the current pharmacy to dose heparin protocol for neurological conditions.

BACKGROUND

• Heparin remains controversial in neurological patients, and there is no universally accepted dosing regimen.
• A recent study has shown a benefit in ischemic stroke lesion size with heparin use. This protocol had a median time to therapeutic aPTT was 14 hours.
• A review of Parkview's heparin protocols for non-neurological conditions showed a delay in achieving therapeutic aPTT in obese patients.
• Parkview's heparin protocol for neurological patients uses weight-based dosing and does not use bolus dosing.
• Starting infusion rate: 11 units/kg/hour
• Heparin drip is titrated by aPTT to a goal of 40-55 (rate may be changed up to 2 units/kg/hour).

METHODS

• Study Design: Retrospective chart analysis for all patients who received the pharmacy-to-dose heparin protocol for neurological conditions between June 2019 – June 2020
• Inclusion criteria:
  • At least 18 years of age
  • Received at least 1 aPTT while on therapeutic heparin
• Exclusion criteria:
  • Prescribed any pharmacy-to-dose heparin protocol for non-neurological conditions during the same admission
  • Any deviations from the pharmacy-to-dose heparin protocol for neurologic conditions
  • Heparin initiated outside of Parkview's Health
• Primary outcome: Frequency of initially therapeutic aPTT 6 hours post-heparin initiation
  • Secondary outcomes:
    • Percent of initial therapeutic aPTT by BMI class as defined by the World Health Organization (WHO)
    • Mean time to cross therapeutic threshold
    • Mean heparin rate when first therapeutic aPTT achieved.
• Safety outcomes:
  • Frequency of hemoglobin drop over 3 g/dL post-heparin initiation
  • Frequency of major and minor bleed defined by the Bleeding Academic Research Consortium (BARC) 1
  • Frequency of hemorrhagic conversion
  • Frequency of new thrombosis after heparin initiation

RESULTS

Table 1

<table>
<thead>
<tr>
<th>Table 1</th>
<th>aPTT 6 Hours Post-Heparin Initiation (n=68)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Class I</td>
<td>15.4 (n=34)</td>
</tr>
<tr>
<td>Class II</td>
<td>19.3 (n=16)</td>
</tr>
<tr>
<td>Class III</td>
<td>22.8 (n=8)</td>
</tr>
</tbody>
</table>

Table 2

<table>
<thead>
<tr>
<th>Table 2</th>
<th>Average Time to Therapeutic Threshold (n=68)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Underweight</td>
<td>7.7 ± 2.9 hours</td>
</tr>
<tr>
<td>Normal</td>
<td>23.4 ± 3.6 hours</td>
</tr>
<tr>
<td>Overweight</td>
<td>31.4 ± 9.3 hours</td>
</tr>
</tbody>
</table>

Table 3

<table>
<thead>
<tr>
<th>Table 3</th>
<th>Percent of Initial Therapeutic aPTT by BMI Class</th>
</tr>
</thead>
<tbody>
<tr>
<td>Underweight</td>
<td>61.5%</td>
</tr>
<tr>
<td>Normal</td>
<td>66.1%</td>
</tr>
<tr>
<td>Overweight</td>
<td>56.6%</td>
</tr>
</tbody>
</table>

Graph 1

Graph 2

DISCUSSION & CONCLUSIONS

• The current protocol at Parkview Health is relatively conservative; this may place patients at increased risk of clot expansion.
• Risk of clot expansion may be driven by the delay in achieving therapeutic anticoagulation.
• Mean heparin rate at first therapeutic aPTT was 13.6 units/kg/hour, but this value is likely understated as it did not include patients that never achieved therapeutic anticoagulation.
• There were no reports of new thrombotic events. However, these patients were likely screened out since this study excluded patients that received heparin under a different protocol.
• Bleeding frequency was relatively low, but 13.2% of patients experience a hemoglobin drop greater than 3 g/dL.
• There is an opportunity for Parkview's pharmacy-to-dose protocol for neurological conditions to be adjusted to achieve therapeutic anticoagulation more rapidly.

REFERENCES