Effect of enoxaparin dosing on initial peak anti-Xa levels in solid organ transplant (SOT) recipients

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Background

- Post-transplant courses can be complicated by thromboembolic events including venous thromboembolism and the development of post-operative atrial fibrillation.1,2
- Enoxaparin is generally preferred for treatment in this patient population due to ease of administration, predictable pharmacokinetics, minimal drug-drug interactions, and more rapid onset of effect.3
- The development of renal impairment following SOT is well documented in the literature.4 Clinically, however, estimating creatinine clearance is challenging because the degree of renal dysfunction is difficult to determine.
- Previous studies have shown supratherapeutic peak anti-Xa levels with the recommended dose of enoxaparin (1 mg/kg twice daily).

Methods

Table 1. Literature Summary5,6

<table>
<thead>
<tr>
<th>Trial</th>
<th>N</th>
<th>Type of transplant</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Singer et al. (2010)</td>
<td>26</td>
<td>Lung</td>
<td>67% of patients treated with enoxaparin 1 mg/kg twice daily had supratherapeutic peak anti-Xa levels.</td>
</tr>
<tr>
<td>Moten et al. (2013)</td>
<td>96</td>
<td>Kidney, heart, lung, or liver</td>
<td>Majority of doses 1.085 mg/kg twice daily resulted in supratherapeutic peak anti-Xa levels</td>
</tr>
</tbody>
</table>

Primary Objective

- Determine the effect of empiric enoxaparin dosing on the first peak anti-Xa level drawn among all SOT groups

Secondary Objectives

- Determine factors that are predictive of subtherapeutic, therapeutic, or supratherapeutic peak anti-Xa level among all SOT groups
- Determine factors that are predictive of subtherapeutic, therapeutic, or supratherapeutic peak anti-Xa level among individual SOT groups
- Determine the effect of empiric enoxaparin dosing on the first peak anti-Xa level drawn among individual SOT groups
- Identify mean enoxaparin dose (mg/kg/dose) initiated among individual SOT groups

Endpoints

Primary Endpoint

- Category of first peak anti-Xa level drawn appropriately (obtained 3-5 hours after at least three doses) following enoxaparin initiation among all SOT groups
  - Subtherapeutic (<0.6 units/mL)
  - Therapeutic (0.6 – 1 units/mL)
  - Supratherapeutic (>1 unit/mL)

Secondary Endpoints

- Category of first peak anti-Xa level drawn appropriately following enoxaparin initiation among individual SOT groups
  - Subtherapeutic (<0.6 units/mL)
  - Therapeutic (0.6 – 1 units/mL)
  - Supratherapeutic (>1 unit/mL)

- Mean enoxaparin dose (mg/kg/dose) initiated in each SOT group (kidney, liver, pancreas, heart, lung, small bowel, and multispecial)

Data Collection & Analysis

- Data will be collected to include demographic and clinical data related to solid organ transplant, dosing of enoxaparin, and peak anti-Xa levels.
- Data collection is currently in process

Statistical Analysis

- Descriptive statistics will be used to summarize demographical and clinical characteristics of the entire sample as well as within each SOT group
- Chi-squared tests will be used to determine statistical significance across the three categories of peak anti-Xa levels
- ANOVA or Wilcoxon tests will be used to determine if there is a significant difference in mean dose of enoxaparin (mg/kg/dose) initiated in each SOT group

- Multinominal logistic regression analysis with backward elimination variable selection method will be employed to determine factors that affect the anti-Xa level (subtherapeutic, therapeutic, supratherapeutic). Potential variables for this model include:
  - Age
  - Race
  - Weight (kg)
  - Gender
  - Organ transplanted
  - Postoperative days following transplantation
  - Enoxaparin dose (mg/kg) for which initial peak anti-Xa level was obtained
  - Calculated CrCl at initiation of enoxaparin therapy (Cockcroft-Gault)

Data Collection

- Data will be collected to include demographic and clinical data related to solid organ transplant, dosing of enoxaparin, and peak anti-Xa levels.
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Disclosures: Authors have no conflicts of interests regarding personal or financial relationships with commercial entities that may have influenced the content or subject matter of this presentation.

References