Intraoperative Management of Device Patient with HIT using ROTEM Analysis

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Disclosures

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Overview

• Case report
• HIT
• Current methods of monitoring HIT
• Intraoperative management
• Advantages of ROTEM assays
Case History

- 35y/o male
- Active military personnel
- Dilated cardiomyopathy
- LVEF 5%
- Refractory cardiogenic shock
- Acute respiratory distress syndrome
- Septic shock
Tandem Heart Placement
Central Cannulation

- LVAD Centrimag
- Thoratec 34 Fr outflow
- 24 Fr inflow cannula
Thrombocytopenia

- Persistent thrombocytopenia
- Increased Heparin PF4 levels
- Optical density of 0.785 and 1.857
- Positive serotonin release assay
- HIT diagnosis
- Bivalirudin administered
HIT-1
Diagnostic Assays

- PF4-H ELISA
- Optical density
- Serotonin Release Assay
Intraoperative Bolus Administration of Bivalirudin During Wean Trial

ACT (seconds)

Bivalirudin Bolus (mg/kg)

ROTEM

ROTEM

baseline Bolus 1 (0.15) Bolus 2 (0.1) Bolus 3 (0.05)
ROTEM Kinetics

- Oscillating axis (+/- 4.75°)
- LED light source
- Mirror
- Counterforce spring
- Ball bearing
- Detector
- Sensor pin
- Cuvette + sample
- Temperature controlled
- Cuvette holder
- Clot formation

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Device Decannulation

- TEE and mini ramp study - decreased LV size
- thin septum
- LVEF 15%
- Bivalirudin stopped
- Decrease in optical density and PF4 IgG
- Centrimag decannulated
- ROTEM analysis
Intrinsic Effect of Bivalirudin on Coagulation Time

![Graph showing the effect of bivalirudin dose on clotting time.](graph.png)
Analysis of Pre- and Post-Bivalirudin Bolus

<table>
<thead>
<tr>
<th>Time</th>
<th>Clot Firmness</th>
</tr>
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<tbody>
<tr>
<td>POD 22</td>
<td></td>
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<tr>
<td>Pre POD 29</td>
<td></td>
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<tr>
<td>Post POD 29</td>
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<td>POD 30</td>
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LVAD

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Case Results

1. Reflected decreases in ACT values
2. Guided bolus administration
3. Correlate to INTEM function
4. No administration of FFP or platelet intraoperatively
5. Monitoring bivalirudin anticoagulation therapy
6. Device patients with complex thrombotic disorders
Benefits of ROTEM

- Prothrombotic and proembolic patients
- Sensitive information:
  - Hyper or hypofibrinolysis
  - Hypercoagulability due to clot firmness
  - Platelet aggregation
- Short time frame- A10
- Downstream thrombin activation
Benefits of ROTEM

- Decreased transfusion requirements
- Reduced transfusion adverse events
- Superior sensitivity to aPTT and ACT
- Decreased length of hospital stay
- Decreased 6 month mortality

Device Patient Population

• Von Willebrand syndrome
• Factor XIII deficiency
• Gastrointestinal bleeding
• Thromboembolic events
• ROTEM:
  • Clot lysis index
  • MCF
Conclusion

• Intraoperative management of device patients
• Critical data unaccounted in ACT or aPTT
• DTI anticoagulation monitoring
• Allogeneic blood transfusions
• Prophylactic use in clinical setting
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