THE ANTICOAGULATED TRAUMA PATIENT

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DISCLOSURES

- No financial disclosures
- Some slides provided by Octapharma
OBJECTIVES

- Define which trauma patients are anticoagulated
- How to reverse the “common” anticoagulated states
- What is Octaplex?
CASE

- 74 year old male significant fall

- In ED, stable but extensive bruising, GCS 15

- Pain right chest, hip and pelvis

- Extensive cardiovascular history

- On Coumadin...
CASE

- What now???
- Wait for INR?
- Administer Vitamin K?
- Start Fresh Frozen Plasma empirically?
- Give Platelets?
- Order Octaplex?

- Wait for imaging and CT scans before treating?
INTRODUCTION

- Antiplatelet agents – ASA, Plavix, NSAID’s
- Oral anticoagulants – Coumadin/Warfarin
- Injectable anticoagulants – Low Molecular Weight Heparin
PLATELET FUNCTION

- Key role in maintaining vascular integrity by sealing vessels with damaged endothelium & initiating repair process
ANTIPLATELET AGENTS

Plavix
ANTIPLATELET AGENT REVERSAL

- Effects of Aspirin and Plavix (clopidogrel) last 5-7 days

- No pharmacological reversing agent

- **Reversal Options:**

  - Adult Dose Platelets (pack of pooled platelets)
  - ? DDAVP (desmopressin) ?
**ORAL ANTICOAGULANTS**

Intrinsic Hemostasis (XII,XI)

Extrinsic Hemostasis (Tissue factor)

Warfarin inhibits Vitamin K dependent clotting Factors II, VII, IX & X
WARFARIN REVERSAL

- Warfarin half life 40 hours
- Once stopped, INR should return to normal in 4-10 days

**Reversal Options (Goal INR<1.5):**

- Vitamin K (10 mg IV) ➔ takes 6-24 hrs
- Fresh Frozen Plasma (4 units; approx 1L) ➔ few hours
- Prothrombin Complex Concentrates (PCC)
  - Octaplex (approx 100cc) ➔ 10 minutes


**OCTAPLEX**

- **Fast onset of action (less than 10 minutes)** – enables rapid correction of the prothrombin complex balance

- **Well balanced** - contains FII, FVII, FIX, FX in the ratio of approx. 1:1:1:1

- **Highly tolerable** – Contains Heparin, Protein C and Protein S; Balanced product – may reduce risk of thrombosis

- **Double virus inactivated** – SD treatment and nano-filtration

- One presentation size: 500 IU FIX (20cc)

- Room temperature approved: Store at 2C to 25C for 2 years

- Licensed prothrombin complex concentrate (available in Canada through CBS and HQ)

- **Human derived blood product** – informed consent required
OCTAPLEX

- In Canada, licensed for:

- Treatment of bleeding and perioperative prophylaxis of bleeding in acquired deficiency of the prothrombin complex coagulation factors, such as deficiency caused by treatment with vitamin K antagonists…

- Primary use is for the emergent reversal of warfarin where there is major bleeding or urgent surgery in < 6 hours – **WARFARIN ANTIDOTE**.
OCTAPLEX – LHSC INDICATIONS

- Emergency reversal of warfarin therapy in patients:
  - Exhibiting serious or life-threatening bleeding
  - Requiring unplanned (<6hrs) procedure/intervention that may cause bleeding
  **AND** an INR ≥ 1.5

- Recommend Vitamin K 10 mg IV after Octaplex
## OCTAPLEX – LHSC DOSING

<table>
<thead>
<tr>
<th>Patient Weight (kg)</th>
<th>Octaplex (IU)</th>
<th>Octaplex volume (mL)</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; or = 40</td>
<td>1000</td>
<td>40</td>
</tr>
<tr>
<td>41 – 60</td>
<td>1500</td>
<td>60</td>
</tr>
<tr>
<td>61 - 80</td>
<td>2000</td>
<td>80</td>
</tr>
<tr>
<td>81 – 100</td>
<td>2500</td>
<td>100</td>
</tr>
<tr>
<td>&gt;100</td>
<td>3000</td>
<td>120</td>
</tr>
</tbody>
</table>

Weight based dose is calculated by the BTL staff. Solution reconstituted by BTL staff.
OCTAPLEX - CONTRAINDICATIONS

- Should not be given to patients with HIT or with known allergies to heparin.

- Relative contraindications, due to high risk of thrombotic complications, include acute coronary syndrome, DIC, severe liver disease, and liver transplant.

- Should not be administered:
  - in massive transfusion
  - in coagulopathy associated with liver dysfunction
  - at same time as recombinant factor VIIa
INJECTABLE ANTIMOAGULANTS

- Low molecular weight heparin
LOW MOLECULAR WEIGHT HEPARIN
HEPARIN REVERSAL

- Unfractionated heparin → Protamine Sulphate

- Protamine binds to heparin and inhibits anticoagulant activity

- **BUT**....does not work well against LMWH
  - has little effect on anti-Xa effect from LMWH
HEPARIN REVERSAL

- LMWH package inserts recommend protamine sulphate
- Tinzaparin and daltaperin have higher degrees of sulfonation and appear to be more susceptible to protamine

**Reversal Options:**

- Protamine sulphate IV (max dose 50mg)
- Dose depends on time from last LMWH injection
- Enoxaparin – 1mg protamine/mg enoxaparin
- Daltaperin/tinzaparin – 1mg/100 anti Xa units
BOTTOM LINE

Everything is dictating on patient factors and risk of life threatening bleeding…

- If **HIGH** risk (especially intracranial bleeds) then reversal options include:
  - **Antiplatelets** – adult dose of platelets
  - **Warfarin** – Octaplex & vitamin K or Fresh Frozen Plasma
  - **LMWH** – Protamine sulphate
THE CASE

- Currently stable and GCS 15
- High risk of bleeding – chest and pelvis/hip
- ?Occult traumatic brain injury?

Recommendation:

- Emergent reversal of INR – Octaplex & Vitamin K or FFP
# LHSC EXPERIENCE

<table>
<thead>
<tr>
<th>Variable</th>
<th>Died n = 161</th>
<th>Lived n = 194</th>
<th>Univariate p-value</th>
<th>OR (95% CI)</th>
<th>Multivariate p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean age (years)</td>
<td>77 (6.6)</td>
<td>74 (7.1)</td>
<td>&lt; 0.01</td>
<td>1.07 (1.03-1.11)</td>
<td>&lt; 0.01</td>
</tr>
<tr>
<td>Male gender</td>
<td>97 (60.2)</td>
<td>118 (60.8)</td>
<td>0.91</td>
<td>1.04 (0.61-1.77)</td>
<td>0.88</td>
</tr>
<tr>
<td>Mean ISS</td>
<td>29 (12.1)</td>
<td>24 (10.5)</td>
<td>&lt; 0.01</td>
<td>1.05 (1.03-1.08)</td>
<td>&lt; 0.01</td>
</tr>
<tr>
<td>Median CCI Score</td>
<td>2 (1 Š 2)</td>
<td>2 (1 Š 2)</td>
<td>0.74</td>
<td>0.98 (0.86-1.10)</td>
<td>0.71</td>
</tr>
<tr>
<td>Therapeutic anticoagulation**</td>
<td>40 (27.8)</td>
<td>14 (8.8)</td>
<td>&lt; 0.01</td>
<td>3.55 (1.74-7.24)</td>
<td>&lt; 0.01</td>
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