## Suspected critical bleeding

**Should I activate Code Red?**

<table>
<thead>
<tr>
<th>Trauma</th>
<th>Non-trauma</th>
</tr>
</thead>
<tbody>
<tr>
<td>Emergency Department</td>
<td>Other locations</td>
</tr>
</tbody>
</table>

Major trauma and **2 or more of the following:**
- Penetrating injury
- FAST scan positive for intra abdominal fluid
- HR > 120/min
- SBP < 90 mmHg
- Major trauma and
  - Senior clinician’s suspicion of ongoing bleeding and circulatory failure despite volume resuscitation

- Bleeding > 150 ml/min
- Blood loss > 1500ml
- Loss of half the circulating blood volume in less than 2 hours
- Rapid blood loss leading to circulatory failure despite volume resuscitation

### Activate CODE RED 2222

**Request Pack A**

Stop bleeding - apply physical methods. **Damage Control Resuscitation.** Identify occult source of bleeding.

Send bloods for baseline tests and ROTEM.

**Transfuse Red Cells and up to 6 g Fibrinogen concentrate:** Aim for Hb 100g/L and FIBTEM A5 ≥ 10 mm

**Drugs**

- **Tranexamic acid** 1g if within 3h of injury. Reverse **warfarin** (give Octaplex). DOACs - seek Haematology advice.

if ongoing bleeding **Request Pack B**

Repeat ROTEM.

Transfuse Red Cells and up to 6 g Fibrinogen concentrate. Ensure Hb 100g/L and FIBTEM A5 ≥ 10 mm

**Give additional products according to ROTEM**

if ongoing bleeding after 6 units of Red cells **Request Pack C**

Give Platelets (Pack C). Ensure Hb 100g/L; FIBTEM A5 ≥ 10 mm and EXTEM A5 > 35 mm

**Give additional products according to ROTEM**

if patient still bleeding or ROTEM unavailable **Request Pack D**

### Targets

<table>
<thead>
<tr>
<th>Bloods</th>
<th>Metabolic</th>
<th>Haemodynamics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hb 90-100 g/L,</td>
<td>Temp &gt; 34 deg C</td>
<td>Systolic BP 80-100mmHg.</td>
</tr>
<tr>
<td>FIBTEM A5 &gt; 10 mm</td>
<td>pH &gt; 7.2</td>
<td>If Traumatic Brain Injury - Mean BP ≥ 80 mmHg</td>
</tr>
<tr>
<td>EXTEM A5 &gt; 35 mm;</td>
<td>iCa &gt; 0.5 mmol/L</td>
<td>Ensure cardiac output is adequate (CI &gt; 2.5)</td>
</tr>
<tr>
<td>EXTEM CT &lt;85s</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Platelets &gt; 50 x 10^9/L</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fibrinogen &gt; 2.0 g/L</td>
<td></td>
<td></td>
</tr>
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</table>

### Packs

<table>
<thead>
<tr>
<th>Pack A or Pack B</th>
<th>Pack C</th>
<th>Pack D</th>
</tr>
</thead>
<tbody>
<tr>
<td>Red cells - 4 units</td>
<td>Platelets - 1 pool</td>
<td>Red cells - 4 units</td>
</tr>
<tr>
<td>Fibrinogen concentrate - 6g</td>
<td></td>
<td>Platelets - 1 pool</td>
</tr>
<tr>
<td></td>
<td></td>
<td>FFP - 4 units</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Cryoprecipitate - 4 units</td>
</tr>
</tbody>
</table>

### Excessive transfusion = worse outcomes

Hb 90-100 g/L is enough - Re-check Hb and ROTEM to guide ongoing resuscitation.
**Ring Transfusion**

**Personnel**
- Call for senior clinician and assistance
- Appoint a Transfusion Coordinator
- Identify dedicated blood porter
- Inform Theatres if appropriate

**Patient care**
- Immediate physical methods to stop bleeding
- Give Tranexamic acid
- Warm patient; warm fluids; warm room
- Monitor blood pressure directly

**Investigate**
- FAST scan if trauma
- Look for occult source of bleeding
- Monitor cardiac function by ECHO or ODM

**Other tasks**

<table>
<thead>
<tr>
<th>Send blood for these tests</th>
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<tbody>
<tr>
<td>FBC</td>
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**Priority tasks**

1. Check EXTEM and CT
2. Repeat FIBTEM and EXTEM

**Rings**

- CT < 85
- CT ≥ 85

**Communication**
- Agree telephone extensions to call
- Deviate from MTP advisory packs if ROTEM suggests alternative treatment required

**Hypocalcemia**
- Consider treating hypocalcemia if ionised [Ca] < 0.9 mmol/L

**A5 - amplitude (mm) at 5 min for FIBTEM and EXTEM**

<table>
<thead>
<tr>
<th>FIBTEM &lt; 10mm</th>
<th>Give 4-6g Fibrinogen concentrate or 4 packs of CRYO</th>
</tr>
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<tbody>
<tr>
<td>FIBTEM ≥ 10mm</td>
<td>Check EXTEM</td>
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<table>
<thead>
<tr>
<th>EXTEM &lt; 35mm</th>
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<tr>
<td>If FIBTEM A5 &lt;10mm - give 4-6g Fibrinogen concentrate or 4 packs of CRYO</td>
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<td>If FIBTEM A5 ≥10mm - give PLATELETS</td>
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<th>EXTEM ≥ 35mm</th>
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<tr>
<td>No further blood products if FIBTEM A5 ≥10mm and EXTEM CT &lt; 85s</td>
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<th>CT - clotting time (s) for EXTEM</th>
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<td>EXTEM CT &lt; 85s</td>
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<tr>
<td>No further blood products if FIBTEM A5 ≥10mm and EXTEM A5 ≥ 35mm</td>
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<tr>
<td>Extem CT ≥ 85s</td>
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<tr>
<td>If FIBTEM A5 &lt;10mm - give 4-6g Fibrinogen concentrate or 4 packs of CRYO</td>
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<tr>
<td>If FIBTEM A5 ≥10mm - give PLATELETS (EX A5 &lt;35 mm) or FFP (EX A5 ≥35mm)</td>
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**Warfarin + major bleeding**
- Request Octaplex if INR > 1.5
- Give 30-50 IU per Kg
- Maximum dose is 3000 IU

**STOP the cause of bleeding!**
- Physical
- Surgical

**Tranexamic acid**
- Targets
  - Hb 90-100 g/L if bleeding
  - Platelets > 50 x10^9/L
  - Systolic BP 80-100 mmHg
  - Mean BP > 80 if brain injury
  - Temperature 35 - 37°C
  - pH > 7.2
- Doses
  - Cryoprecipitate (5u/bag)
  - 4 bags ~ 6g Fibrinogen
  - 3 bags ~ 4.5g
  - 2 bags ~ 3g
  - Fibrinogen 25-50 mg/kg
  - FFP 20 ml/kg
  - Platelets ~ 1 pool
  - Tranexamic acid 2g (10-30 mg/kg)
  - Dual anti-platelet drugs or DOAC – ask specialist help

**Ring Transfusion**

**Give patient information**
1. Name
2. Gender
3. Age
4. Date of Birth
5. Weight - estimate
6. Hospital number

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