**Suspected critical bleeding**

**Should I activate Code Red?**

- Major trauma and **2 or more of the following:**
  - Penetrating injury
  - FAST scan positive for intra abdominal fluid
  - HR > 120/min
  - SBP < 90 mmHg

- or Major trauma and
  - Senior clinician’s suspicion of ongoing bleeding and circulatory failure despite volume resuscitation

**Activate CODE RED 2222**

1. **Request Pack A**
   - **Stop the cause of bleeding**
     - **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
   - **Tranexamic acid** 1g if within 3h of injury. Reverse warfarin (give Octaplex). DOACs - seek Haematology advice.

2. **Request Pack B if ongoing bleeding**
   - Repeat ROTEM.
   - Ensure Hb 100g/L and FIBTEM A5 ≥ 10 mm
   - **Give additional products according to ROTEM**

3. **Request Pack C if ongoing bleeding after 6 units of Red cells**
   - Ensure Hb 100g/L; FIBTEM A5 ≥ 10 mm and EXTEM A5 > 35 mm
   - **Give additional products according to ROTEM**

4. **Request Pack D if patient still bleeding or ROTEM unavailable**
   - **Targets**
     - **Bloods**
       - Hb 90-100 g/L
       - FIBTEM A5 > 10 mm
       - EXTEM A5 > 35 mm; CT < 85s
       - Platelets > 50 x 10⁹/L
       - Fibrinogen > 2.0 g/L
     - **Metabolic**
       - Temp > 34 deg C
       - pH > 7.2
       - iCa > 0.9 mmol/L
     - **Haemodynamics**
       - Systolic BP 80-100mmHg.
       - If Traumatic Brain Injury - Mean BP ≥ 80 mmHg
       - Ensure cardiac output is adequate (CI > 2.5)
   - **Excessive transfusion = worse outcomes**
     - Hb 90-100 g/L is enough - Re-check Hb and ROTEM to guide ongoing resuscitation.

**Packs**

- **Pack A**
  - 4 units Red Cells
  - 6g Fibrinogen concentrate
- **Pack B**
  - 4 units Red cells
  - 4 units FFP
- **Pack C**
  - 4 units Red cells
  - 4 units Cryoprecipitate
  - 1 pool Platelets
  - 6g Fibrinogen concentrate
- **Pack D**
  - 4 units Red cells
  - 4 units FFP
  - 1 pool Platelets
  - 6g Fibrinogen concentrate
**Priority tasks**
- 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**
- Send blood for these tests
  - FBC
  - ROTEM
  - Clotting
  - Fibrinogen

**Monitor**
- Arterial blood gas: Hb, Lactate, Base deficit
- Repeat ABG and ROTEM every 30 mins until patient stable
- iCa if available

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

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

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

**Warfarin + major bleeding**
- Request Octaplex if INR > 1.5
- Give 30-50 IU per Kg
- Maximum dose is 3000 IU

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**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>
</thead>
<tbody>
<tr>
<td>FIBTEM ≥ 10mm</td>
<td>Check EXTEM</td>
</tr>
<tr>
<td>EXTEM &lt; 35mm</td>
<td>If FIBTEM A5 &lt;10mm - give 4-6g Fibrinogen concentrate or 4 packs of CRYO</td>
</tr>
<tr>
<td></td>
<td>If FIBTEM A5 ≥10mm - give PLATELETS</td>
</tr>
<tr>
<td>EXTEM ≥ 35mm</td>
<td>No further blood products if FIBTEM A5 ≥10mm and EXTEM CT &lt; 85s</td>
</tr>
</tbody>
</table>

**CT - clotting time (s) for EXTEM**

| EXTEM CT < 85s | No further blood products if FIBTEM A5 ≥10mm and EXTEM A5 ≥ 35mm |
| EXTEM CT ≥ 85s | If FIBTEM A5 <10mm - give 4-6g Fibrinogen concentrate or 4 packs of CRYO |
|               | If FIBTEM A5 ≥10mm - give PLATELETS (EXTEM A5 <35 mm) or FFP (EXTEM A5 ≥35mm) |

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**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

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**Adult Massive Transfusion Protocol v5.0 (July 2019)**

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**ROTEM® - guided intervention in critical bleeding**

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**Brighton and Sussex University Hospitals NHS Trust**

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**Communica3on**
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