Non-Medical Authorisation Course

Wednesday 29th November 2017
Decision to Transfuse

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Areas to cover

- Assessing the patient
- Risks versus benefits
- Transfusion triggers
- Amount to transfuse
Blood Transfusion

- Precious resource
- Liquid transplant
- Quick fix
- Used too freely
Assessing the Patient

Individual assessment – **engage** with the patient
- Good patient history
- Size, weight, age, sex
- Co-morbidities
- Symptoms
- Balance risks and benefits of transfusion
- Alternatives to transfusion
  - Iron / B12 / Folate
  - Diet
  - Cell Salvage
Assessing the Patient

- Assess unstable patients e.g. those with gastrointestinal haemorrhage
- Don’t use outdated results
- Adequate monitoring of Hb increments in an unstable patient
- Low body weight patient
The decision to transfuse should be based on a careful assessment of patient’s clinical state and must be justified as **essential** to prevent major morbidity or mortality.
Risks v Benefits

What is the Greatest Risk of Blood Transfusion?

- Transfusion of ABO-incompatible blood components

Never event- ‘any inadvertent transfusion of ABO-incompatible blood components’
Risks v Benefits

Other risks

- **TACO** - Transfusion associated circulatory overload
- **ATR** - Acute Transfusion Reactions
  - Febrile, allergic, hypotensive
- **TRALI** - Transfusion related acute lung injury
- **vCJD** - Variant Creutzfeldt-Jacob Disease

**Key recommendation 2** – use a TACO checklist

Due to the differences in adult and neonatal physiology, babies may have a different risk for TACO. Calculate the dose by weight and observe the notes above.
Transfusion Triggers and Amounts

Red Blood Cells (RBC)

**Red cell concentrates**
Dose – in the absence of active bleeding, use the minimum number of units required to achieve a target Hb. Consider the size of the patient assume an increment of 70g/l per unit for an average 70kg adult.

R1. **Acute bleeding**
Acute blood loss with haemodynamic instability.
After normovolaemia has been achieved/maintained, frequent measurement of Hb (including by near patient testing) should be used to guide the use of red cell transfusion – see suggested thresholds below.

R2. **Hb ≤ 70g/l stable patient**
Acute anaemia. Use an Hb threshold of 70g/l and a target Hb of 70-90g/L to guide red cell transfusion. Follow local-specific protocols for indications such as post-cardiac surgery, traumatic brain injury, acute cerebral ischaemia.

R3. **Hb ≤ 80g/L if cardiovascular disease**
Use an Hb threshold of 80g/L and a target Hb of 80-100g/L.

R4. **Chronic transfusion dependent anaemia**
Transfuse to maintain an Hb which prevents symptoms. Suggest an Hb threshold of 80g/L initially and adjust as required. Haemoglobinopathy patients require individualised Hb thresholds depending on age and diagnosis.

R5. **Radiotherapy maintain Hb ≥ 110g/L**
There is limited evidence for maintaining an Hb of 110g/L in patients receiving radiotherapy for cervical and possibly other tumours.

R6. **Exchange transfusion**

In continuing haemorrhage resuscitate and manage source of bleeding

In a normovolaemic stable patient;

- In absence of IHD or ACS <70 (70 – 90 g/l)
- In presence of IHD or ACS <80 (80 - 100 g/l)
Transfusion Triggers and Amounts

Red Blood Cells (RBC)

- One adult dose is one bag
- Don’t give two without review
Transfusion Triggers and Amounts

Medical Anaemia – general principles

• Requires a different approach to management than simple surgical anaemia

• May be completely or partially corrected without transfusion

• Triggers should be appropriate to maintain activity levels and quality of life.
Transfusion Triggers and Amounts

Platelets (PLTS)

Platelet concentrates

Dose – for prophylaxis, do not routinely transfuse more than 1 adult therapeutic dose. Prior to invasive procedure or to treat bleeding, consider the size of the patient, previous increments and the target count.

Prophylactic platelet transfusion

- Pt <10 x 10^9/L reversible bone marrow failure
- Not indicated in chronic bone marrow failure
- Pt 10 – 20 x 10^9/L sepsis/haemostatic abnormality

Prior to invasive procedure or surgery

- To prevent bleeding associated with invasive procedures. Platelets should be transfused if:
  - Pt <20 x 10^9/L central venous line
  - Pt <40 x 10^9/L pre lumbar puncture/spinal anaesthesia
  - Pt <50 x 10^9/L pre liver biopsy/major surgery
  - Pt <80 x 10^9/L epidural anaesthesia
  - Pt <100 x 10^9/L pre critical site surgery e.g. CNS.

- Transfusion prior to bone marrow biopsy is not required.

Therapeutic use to treat bleeding (WHO bleeding grade 2 or above)

- Major haemorrhage Pt <50 x 10^9/L
- Critical site bleeding e.g. CNS/traumatic brain injury Pt <100 x 10^9/L
- Clinically significant bleeding Pt <30 x 10^9/L.

Specific clinical conditions

- DIC pre procedure or if bleeding.
- Primary immune thrombocytopenia (emergency treatment pre-procedure/severe bleeding).

Platelet dysfunction

- Consider if critical bleeding on anti-platelet medication.
- Inherited platelet disorders directed by specialist in haemostasis.

To prevent spontaneous bleeding in patients on treatment that affects their bone marrow

To help stop bleeding in trauma / obstetric haemorrhage / theatre

1 bag = 1 adult dose (platelet increase of approx. 40x10^9/L)

Trigger values

- For prophylaxis in reversible BMF <10
- Prophylaxis if septic 10-20
- In major surgery / trauma <50
- In neurosurgery / head trauma <100
- Major haemorrhage <50
Fresh Frozen Plasma (FFP)

**Fresh frozen plasma (FFP)**
- Dose = 15ml/kg body weight, often equivalent to 4 units in adults.

**F1. Major haemorrhage**
- Early infusion of FFP is recommended in a ratio of 1 unit FFP:1 unit red cells for trauma and at least 1 unit FFP:2 units red cells in other major haemorrhage settings. Once bleeding is under control, FFP use should be guided by timely tests for coagulation as indicated below.

**F2. PT Ratio/INR >1.5 with bleeding**
- Clinically significant bleeding without major haemorrhage. FFP required if coagulopathy. Aim for a PT and APTT ratio of ≤1.5.

**F3. PT Ratio/INR >1.5 and pre-procedure**
- Prophylactic use when coagulation results are abnormal e.g. disseminated intravascular coagulation and invasive procedure is planned with risk of clinically significant bleeding.

**F4. Liver disease with PT Ratio/INR >2 and pre-procedure**
- FFP should not be routinely administered to non-bleeding patients or before invasive procedures when the PT ratio/INR is >2.

**F5. TTP/plasma exchange**

**F6. Replacement of single coagulation factor**

- Increasing concern because of vCJD risk
- Born after 01/01/1996 = Octaplas
- Mild fever/allergic reactions
- Not to reverse warfarin

**Prothrombin complex concentrate**
- Dose should be determined by the situation and INR. Local guidelines should be followed.

**PCC1.** Emergency reversal of VKA for severe bleeding or head injury with suspected intracerebral haemorrhage.

**PCC2.** Emergency reversal of VKA for emergency surgery
## Transfusion Triggers and Amounts

### Fresh Frozen Plasma (FFP)

<table>
<thead>
<tr>
<th>Patient Weight (kg)</th>
<th>FFP dose – Volume/Units^†</th>
<th>Units FFP</th>
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</thead>
<tbody>
<tr>
<td>50kg</td>
<td>750mL</td>
<td>3</td>
</tr>
<tr>
<td>55kg</td>
<td>825mL</td>
<td></td>
</tr>
<tr>
<td>60kg</td>
<td>900mL</td>
<td></td>
</tr>
<tr>
<td>65kg</td>
<td>975mL</td>
<td>4</td>
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<tr>
<td>70kg</td>
<td>1,050mL</td>
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</tr>
<tr>
<td>75kg</td>
<td>1,125mL</td>
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</tr>
<tr>
<td>80kg</td>
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<tr>
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</tr>
<tr>
<td>100kg</td>
<td>1,500mL</td>
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</tbody>
</table>

*Volume of FFP in a unit is variable, mean FFP unit volume = 273mL*. 

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East Midlands Regional Transfusion Committee
Transfusion Triggers and Amounts

Cryoprecipitate (Cryo)

Cryoprecipitate

Contains Fibrinogen
Pooled bag from 5 donors
2 pooled units = 1 adult dose
Born after 01/01/1996 = MB treated cryo

C1. Clinically significant bleeding and fibrinogen <1.5g/L (<2g/L in obstetric bleeding)
C2. Fibrinogen <1g/L and pre procedure
C3. Bleeding associated with thrombolytic therapy
C4. Inherited hypofibrinogenaemia, fibrinogen concentrate not available

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