Non-Medical Authorisation Course

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Decision to Transfuse

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Areas to cover

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

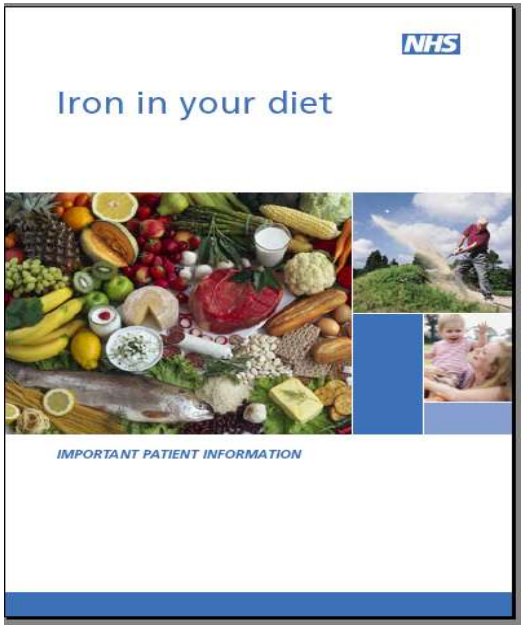
Blood Transfusion

- Precious resource
- Liquid transplant
- Quick fix
- Used too freely

Assessing the Patient

Individual assessment – **engage** with the patient

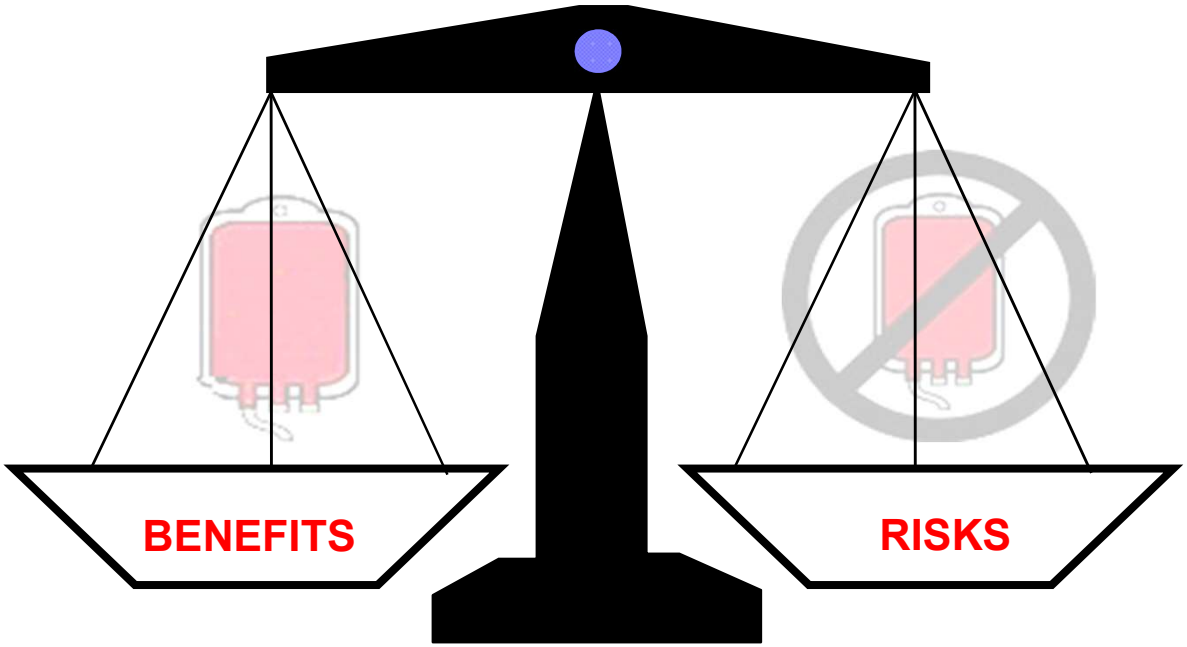
- Good patient history
- Size, weight, age, sex
- Co-morbidities
- Symptoms
- Balance risks and benefits of transfusion
- Alternatives to transfusion
  - Iron / B12 / Folate
  - Diet
  - Cell Salvage



Assessing the Patient

- Assess unstable patients e.g. those with gastro-intestinal haemorrhage
- Don’t use outdated results
- Adequate monitoring of Hb increments in an unstable patient
- Low body weight patient

Risks v Benefits



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

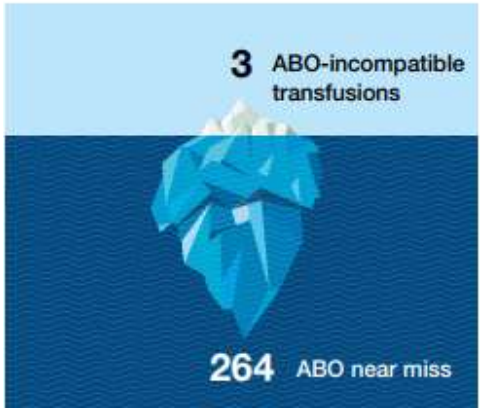
What is the Greatest Risk of Blood Transfusion?

- **Transfusion of ABO-incompatible blood components**

➢ **Never event- ‘ any inadvertent transfusion of ABO-incompatible blood components’**

Key SHOT Message

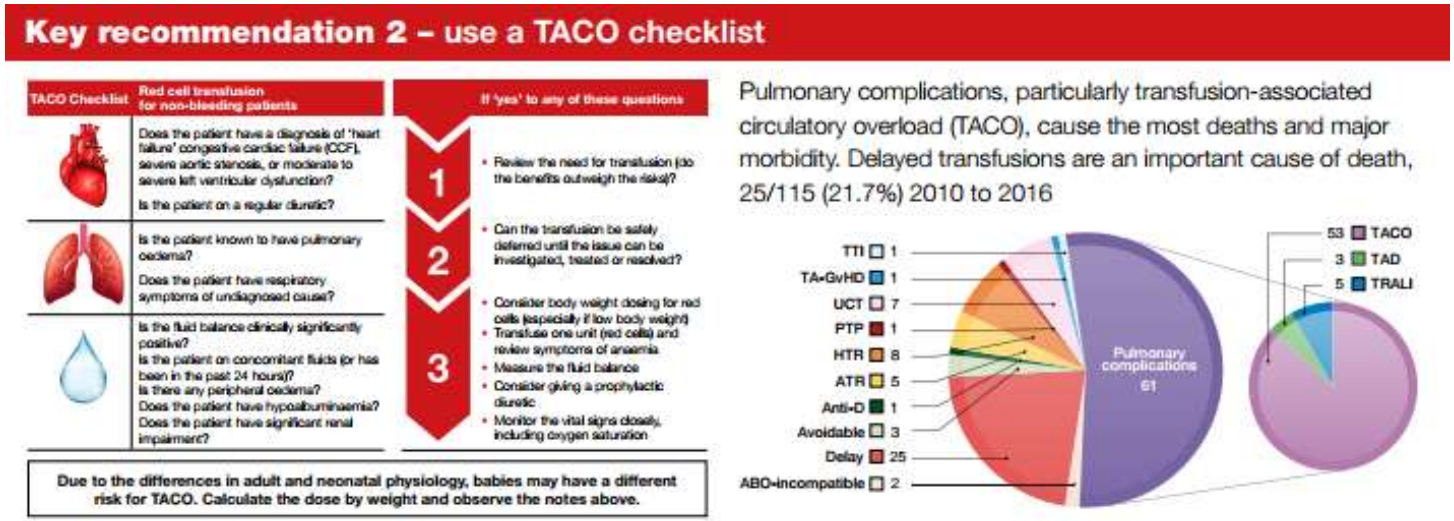
ABO-incompatible transfusions are the tip of the iceberg; they most commonly result from failure to identify the patient at the time of blood sampling (wrong blood in tube) or administration to the wrong patient.

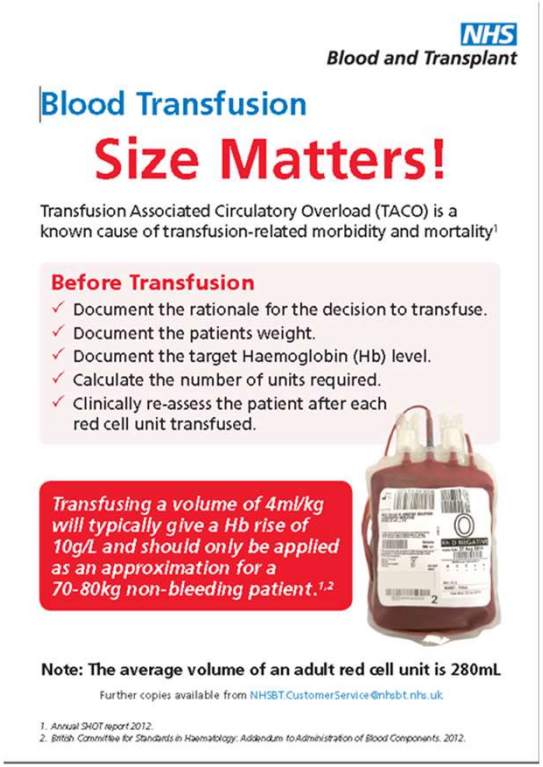


Risks v Benefits

Other risks

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





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 10g/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*

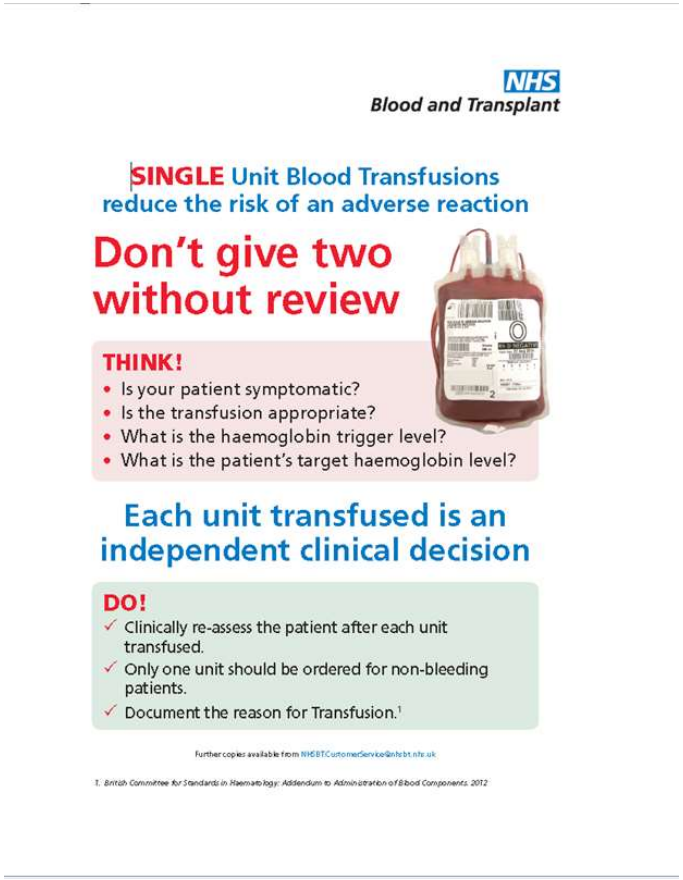
In continuing haemorrhage resuscitate and manage source of bleeding

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

P1. Plt <10 x 10^9/L reversible bone marrow failure
Not indicated in chronic bone marrow failure

P2. Plt 10 – 20 x 10^9/L sepsis/haemostatic abnormality

Prior to invasive procedure or surgery

P3. To prevent bleeding associated with invasive procedures.
Platelets should be transfused if:

- P3a Plt <20 x 10^9/L central venous line
- P3b Plt <40 x 10^9/L pre lumbar puncture/spinal anaesthesia
- P3c Plt <50 x 10^9/L pre liver biopsy/major surgery
- P3d Plt <80 x 10^9/L epidural anaesthesia
- P3e Plt <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)

P4a Major haemorrhage Plt <50 x 10^9/L

P4b Critical site bleeding e.g. CNS/traumatic brain injury Plt <100 x 10^9/L

P4c Clinically significant bleeding Plt <30 x 10^9/L.

Specific clinical conditions

P5a DIC pre procedure or if bleeding.

P5b Primary immune thrombocytopenia (emergency treatment pre-procedure/severe bleeding).

Platelet dysfunction

P6a Consider if critical bleeding on anti-platelet medication.

P6b 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

Transfusion Triggers and Amounts

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
- Importation of plasma for fractionation (1998) and selected clinical use (2003)
- Born after 01/01/1996 = Octaplas
- Mild fever/alergic 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 pre emergency surgery

Transfusion Triggers and Amounts

Fresh Frozen Plasma (FFP)

Calculations for One Adult Therapeutic Dose FFP		
Patient Weight (kg)	FFP dose – Volume/Units†	
	15mL/kg	Units FFP
50kg	750mL	3
55kg	825mL	
60kg	900mL	
65kg	975mL	4
70kg	1,050mL	
75kg	1,125mL	
80kg	1,200mL	
85kg	1,275mL	5
90kg	1,350mL	
95kg	1,425mL	
100kg	1,500mL	

†Volume of FFP in a unit is variable, mean FFP unit volume = 273mLs[3].

Transfusion Triggers and Amounts

Cryoprecipitate (Cryo)

Cryoprecipitate

Dose – 2 pooled units, equivalent to 10 individual units, will increase fibrinogen by approximately 1g/L. Cryoprecipitate is usually used with FFP unless there is an isolated deficiency of fibrinogen.

- 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**

Contains Fibrinogen

Pooled bag from 5 donors

2 pooled units = 1 adult dose

Born after 01/01/1996 = MB treated cryo