RDH site specific

PROCESS 1

WHEN TO TRANSFUSE BLOOD COMPONENTS (ADULTS)

1) RED BLOOD CELLS (RBC)

Thresholds and targets:

Use restrictive red blood cell transfusion thresholds for patients who need red blood cell transfusions and who do not:

- have major haemorrhage or
- have acute coronary syndrome or
- need regular blood transfusions for chronic anaemia.

When using a restrictive red blood cell transfusion threshold, consider a threshold of 70 g/litre and a haemoglobin concentration target of 70–90 g/litre after transfusion.

Consider a red blood cell transfusion threshold of 80 g/litre and a haemoglobin concentration target of 80–100 g/litre after transfusion for patients with acute coronary syndrome.

Consider setting individual thresholds and haemoglobin concentration targets for each patient who needs regular blood transfusions for chronic anaemia.

Doses

- Consider single-unit red blood cell transfusions for adults (or equivalent volumes calculated based on body weight for children or adults with low body weight) who do not have active bleeding.
- After each single-unit red blood cell transfusion (or equivalent volumes calculated based on body weight for children or adults with low body weight), clinically reassess and check haemoglobin levels, and give further transfusions if needed.

Indication codes for red cell transfusion:

Each indication has been assigned a number, to permit reproducible coding, when requesting blood or for documentation purposes. Specific details regarding the patient's diagnosis and any relevant procedures to be undertaken should also be provided at request.

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Red cell concentrates Dose - in the absence of active bleeding, use the minimum number of units required to achieve a target Hb. Assume an increment of 10g/l per unit for an average 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. Consider a Hb threshold of 70g/l and a target Hb of 70-90g/l to guide red cell transfusion. There are different recommendations (based on weak evidence) from other organisations e.g. Association of Anaesthetists.

R3 Hb ≤ 80g/L stable patient and acute coronary syndrome 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 > 100g/L There is some evidence for maintaining an Hb of 100g/l in patients receiving radiotherapy for cervical and possibly other tumours.

R6 Exchange transfusion

2) PLATELETS (PLTS)

Platelets are given to correct a low platelet count or to compensate for poorly functioning platelets. These cells form part of the coagulation system and will help the body to combat bleeding.

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.

P1 Plt <10 x 10*9/L in reversible bone marrow failure
Not indicated in chronic bone marrow failure if not on intensive treatment, and not bleeding.

P2 Plt 10-20 x 10*9/L with sepsis / haemostatic abnormality, or other additional risk factor for bleeding
Prior to invasive procedure or surgery

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P3 To prevent bleeding associated with invasive procedures

To raise the platelet count above the following thresholds for these procedures:

- P3a Plt >20 x 10*9/L - central venous line
- P3b Plt >40x10*9/L - lumbar puncture/spinal anaesthesia
- P3c Plt >50x10*9/L - pre-percutaneous liver biopsy / major surgery
- P3d Plt >80x10*9/L - epidural anaesthesia
- P3e Plt >100x10*9/L - critical site surgery e.g. CNS / eye

Transfusion prior to bone marrow biopsy is not required.

P4 Therapeutic use to treat bleeding (WHO bleeding grade 2 or above)

P4a Major haemorrhage - Plt <50 x 10*9/L or as indicated by the ROTEM results
P4b Empirically in a Major Haemorrhage Pack / Protocol
P4c Critical site bleeding e.g. CNS - Plt < 100 x 10*9/l
P4d Clinically significant bleeding - Plt < 30 x 10*9/l

P5 Specific clinical conditions

P5a DIC pre-procedure or if bleeding
P5b Immune thrombocytopenia (emergency treatment pre-procedure / severe bleeding)

P6 Platelet dysfunction

P6a Consider if critical bleeding on anti-platelet medication
P6b Inherited platelet disorders directed by specialist in haemostasis

Ideally platelets should be ABO and Rh D compatible with the patient. If it is not possible to supply Rh D negative platelets to Rh D negative women below 50 years of age medical advice should be sought about the provision of prophylactic anti-D.

3) FRESH FROZEN PLASMA (FFP)

Indication codes for FFP transfusion:

Fresh frozen plasma (FFP) is given primarily for three indications: to prevent bleeding (prophylaxis), stop bleeding (therapeutic) or for plasma exchange.

Dose – 15-20 ml/kg body weight, often equivalent to 3-4 units in adults.

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F1 Major haemorrhage
In the trauma setting transfuse empirically in a 1:1 ratio with red cells. Other settings give FFP in at least a 1:2 ratio with red cells until results from coagulation monitoring are available or as guided using viscoelastic haemostatic assay (ROTEM).

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, or local protocol range for near-patient viscoelastic assays.

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.

F4 Liver disease with PT Ratio/INR > 2 and pre-procedure
FFP not usually required before invasive procedure if PT ratio/INR is <2 and if there is no significant risk of bleeding.

F5 TTP / plasma exchange.

F6 Replacement of single coagulation factor.

FFP should not be used for the reversal of Warfarin therapy. The first treatment choice should be Vitamin K, unless actively bleeding in which case a Prothrombin Complex Concentrate should be used (follow local protocol or seek advice from the Haematology registrar/consultant on-call).

Ideally FFP should be ABO compatible with the patient. Emergency FFP (if patient blood group is unknown/not valid sample available) is group A (HT negative for Anti-B antibodies).

All Rh D negative patients can receive RhD positive FFP without the need for anti-D prophylaxis.

4) OCTAPLAS

Octaplas is pooled human plasma that has been virally inactivated. It is supplied direct from the manufacturer and not from NHSBT, it must be ordered in advance by Blood Bank. Blood Bank may refer the clinician making the request to the Clinical Haematologist.

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Conditions which may require Octaplas transfusions to correct coagulation defects are:

- Complex deficiencies of coagulation factors such as coagulopathy due to severe hepatic failure or massive transfusion.
- Thrombotic Thrombocytopenic Purpura (TTP), usually in conjunction with plasma exchange.
- Haemorrhage due to coagulation abnormalities resulting from intensive plasma exchange procedures.

Dosage = 15mls per kg

Ideally Octaplas should be ABO compatible with the patient. Octaplas is not tested for Anti-D and therefore does not have an Rh positive or Rh negative status.

5) CRYOPRECIPITATE (CRYO)

Cryoprecipitate boosts fibrinogen levels to enable formation of a stable blood clot.
Dose – 2 pooled units, equivalent to 10 individual units, will increase fibrinogen by approximately 1g/l in an average-sized adult.
Cryoprecipitate should be used with FFP wherever there is a requirement for volume, except in the rare setting of isolated deficiency of fibrinogen and if indicated by ROTEM results in bleeding patient.

Indication codes:

C1 Clinically significant bleeding and fibrinogen <1.5g/L or <2.0g/L in obstetric bleeding or as indicated by ROTEM results.

C2 Fibrinogen <1g/L and pre-procedure, with a risk of bleeding.

C3 Bleeding associated with thrombolytic therapy.

C4 Inherited hypofibrinogenaemia - fibrinogen concentrate not available.

Cryoprecipitate should be ABO matched to the patient. Emergency Cryoprecipitate is group A (tested HT negative for Anti-B antibodies). RhD negative patients can have RhD positive Cryoprecipitate transfused without need for prophylactic anti - D.

RDH site specific

6) LEUCOCYTES, BUFFY COAT (ALSO KNOWN AS GRANULOCYTES)

This product is only used under the advice of the Consultant Haematologist and after agreement with the Consultant at NHSBT.

Leucocytes/buffy coat may need to be given to patients who have neutropenic sepsis (extremely low or absent neutrophil count with fever) who have not responded to appropriate antibiotics, anti fungal and/or anti viral drugs.

Leucocytes/buffy coat must be:

- Irradiated
- ABO and Rh D compatible with the patient
- Cross-matched and negative for any red cell antigens to which the patient has antibodies
- Stored at room temperature not agitated
- CMV seronegative granulocytes should be considered for CMV seronegative recipients

The standard adult dose of buffy coats is 10 packs.
The standard paediatric dose is 1 pack per 10kg.

If you are unsure about correct transfusion management for your patient or want to transfuse blood components outside of above indication codes, please contact consultant haematologist.

References:

2020 NBTC indication codes: NBTC indication codes - Final - Jan 20 (004).pdf (transfusionguidelines.org)

British Society of Haematology Guidelines on the spectrum of fresh frozen plasma and cryoprecipitate products: their handling and use in various patient groups in the absence of major bleeding: British Journal of Haematology | Wiley Online Library

1.1. Blood transfusion NICE guideline [NG24]: Recommendations | Blood transfusion | Guidance | NICE