Worcestershire Acute Hospitals NHS Trust

Guidelines for Blood Product Transfusion in Critical Care

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Key Amendments

Date	Amendment	Approved by
8th October 2019	Document extended with no changes as part of Disease Management section in critical care	Dr Nick Cowley/ Dr Andy Burtenshaw
12th October 2021	Extension to encompass transfusion of platelets, FFP and cryoprecipitate. Simultaneous use of the trust transfusion care pathway	Dr Andy Burtenshaw / Dr Sian Bhardwaj
10th September 2024	Consider use of ROTEM as a diagnostic tool in uncontrolled haemorrhage / coagulopathy	Dr A Burtenshaw

RED BLOOD CELL TRANSFUSION

The indication for RBC transfusion in critically ill patients is to improve the oxygen carrying capacity of the blood as part of a strategy to improve oxygen delivery to the tissues.

However, the transfusion of allogeneic blood components carries with it serious implications and the decision to transfuse warrants careful consideration. These include the following.

- In critically ill patients, transfusion of RBC's is independently associated with
    - longer critical care stay,
    - longer hospital stay,
    - increased complication rates,
    - increased mortality.
- Despite education and vigilant practice, the risk of transfusion reaction cannot be eliminated. This may range from life-threatening ABO incompatibility reactions to less serious antibody reactions.
- Exposure to allogeneic blood product transfusion promotes the development of antibodies that may increase the risk of subsequent transfusion reactions and may result in subsequent cross matching becoming more difficult.
- Blood product transfusion carries a risk of infection. Examples include:

- Risk of bacterial contamination of blood products.
- Risk of transmission of viral infection, including HIV and Hepatitis C.
- Prion disease such as vCJD may be tansmissible by blood product transfusion.
- There remains the potential that other, currently unidentified diseases that may be transmissible via blood product transfusion will be discovered.

- There is evidence that blood transfusion can contribute to immunosuppression within ITU patients. For example, RBC transfusion is associated with increased nosocomial infections such as pneumonia, wound infection and may predispose to sepsis.
- Blood product transfusion is an independent risk factor for the development of transfusion related acute lung injury (TRALI) and acute respiratory distress syndrome (ARDS).
- Blood product transfusion is an independent risk factor for the development of multiple organ failure (MOF) and systemic inflammatory response syndrome (SIRS).
- Blood products remain a limited resource.
- Blood products carry a significant financial cost.

TRANSFUSION TRIGGERS AND TARGETS

1. **Haemorrhagic shock:**

   a. The decision to transfuse RBC's in major haemorrhage and haemorrhagic shock is based upon a number of factors over and above simple transfusion triggers. These situations are not subject to the following restrictions and the management of haemorrhagic shock should be guided by the major haemorrhage policy (WAHT-HAE-008).

2. **Critically Ill patients with haemodynamically stable anaemia, in the absence of acute coronary syndrome, subarachnoid haemorrhage, traumatic brain injury with evidence of cerebral ischaemia, and early severe sepsis (<6hrs from onset):**

   a. RBC transfusion should not take place unless Hb concentration falls to < 70 g/L, whereupon **single unit** RBC transfusion should take place to maintain target Hb range 70 – 90 g/L.

3. **Critically Ill patients with acute coronary syndrome:**

   a. Patients with acute coronary syndrome (ACS; acute myocardial infarction or unstable angina) should receive the minimum number of RBC units required to maintain Hb 80-90 g/L.

4. **Critically Ill patients with stable cardiac disease:**

    a. Patients with stable cardiac disease should be transfused if Hb < 70 g/L as per the above guideline. There is no evidence of benefit associated with a more liberal transfusion strategy in these patients.

5. **RBC transfusion in critically ill patients with severe sepsis:**

    a. Patients within the first 6 hours of onset of severe sepsis with evidence of tissue hypoxia should have a Hb target of 90-100 g/L. Beyond 6 hours, the transfusion trigger of 70 g/L should be resumed.

6. **Critically Ill patients with Traumatic Brain Injury (TBI):**

    a. Most patients with TBI should be subject to standard critical care transfusion triggers (70 g/L). Where there is evidence of cerebral ischaemia a target of 90 g/L should be sought.

7. **Critically Ill patients with subarachnoid haemorrhage:**

    a. Target range 80-100 g/L.

8. **Other notes:**

    a. Erythropoietin is not currently recommended for the treatment of anaeamia in critically ill patients.

    b. Iron supplementation is not currently recommended for the treatment of anaeamia in iron deficient critically ill patients.

    c. There is no evidence to support the use of RBC transfusion as a tool to facilitate weaning from mechanical ventilation.

    d. Given the likelihood of further deterioration in patients with bone marrow failure (haematological malignancy, myelodysplasia or post-chemotherapy), a transfusion trigger of 8.0 g/dL may be considered. (Local recommendation)

    e. Where more than one of the above criteria apply to the same patient the higher Hb trigger or target range should apply.

    f. Single unit transfusion: Except in acute haemorrhage or critical anaemia (failure of compensatory responses to preserve adequate tissue oxygenation), RBC transfusion should be given as single units, or the minimum number of units expected to raise the Hb above the relevant transfusion threshold followed by reassessment prior to considering further transfusion.

    g. Consider the use of ROTEM as a diagnostic tool in uncontrolled haemorrhage / coagulopathy

These recommendations are summarised by the following flowchart taken from the BCSH guidelines[1].

PLATELETS

Indication	Transfusion threshold or target
Non-bleeding patients without severe sepsis or haemostatic abnormalities	Not indicated
Prophylaxis in non-bleeding patients with severe sepsis or haemostatic abnormalities	Threshold 20×10^9/L
DIC with bleeding	Maintain $>50\times10^9$/L
Platelet dysfunction with non-surgically correctable bleeding (e.g. post-cardiopulmonary bypass or potent antiplatelet drugs)	May bleed despite a normal platelet count. Transfusion of one adult therapeutic dose and repeat according to clinical response
Major haemorrhage and massive transfusion	Maintain $>75\times10^9$/L ($>100\times10^9$/L if multiple trauma or trauma to the central nervous system or inner eye)

*(ref JPAC, accessed 7/10/21)

FRESH FROZEN PLASMA

- Indicated for the treatment of bleeding in patients with deranged coagulation due to deficiency of multiple clotting factors (e.g. DIC).
- Minimum dose 12–15 mL/kg (equivalent to four units in an average adult).
- Not indicated for prophylaxis in non-bleeding patients with abnormal clotting tests.
- Not indicated for the immediate reversal of warfarin (PCC should be used).

- In liver disease, there is no benefit to FFP transfusions in patients with an INR less than 1.7.

CRYOPRECIPITATE

- Adult dose is two pooled units (ten donor units – approximately 3 g fibrinogen).
- Indications include:
  - acute DIC with bleeding and fibrinogen <1.5 g/L
  - severe liver disease with bleeding
  - prophylaxis for surgery when fibrinogen <1.5 g/L
  - hypofibrinogenaemia associated with massive transfusion (maintain >1.5 g/L).

USE OF THE TRUST TRANSFUSION CARE PATHWAY

The trust care pathway should be used in ICU in addition to the ICU chart.

Page one should be completed by the prescriber. This includes indication, consent and the TACO checklist.

The blood should then be prescribed on ICCA. With reference being made on the documentation that that is where it has been prescribed.

The nurses should then complete the accountability, bedside check and post transfusion checklist sections with the patient.

To avoid duplication, observations should be recorded on the ICU observation chart and do not need to be repeated on the transfusion pathway. Observations are requested more frequently on the care pathway than the ICU chart but in practice this difference is mitigated by 1:1 or 1:2 nurse to patient ratios in ICU together with advanced monitoring.

References

1. Guidelines on the management of anaemia and red cell transfusion in adult critically ill patients. Br J haematol, 2012 vol. 160 (4) pp.445-464.
2. Guidelines for the provision of intensive care services. ICS. http://www.ics.ac.uk/ics-homepage/latest-news/guidelines-for-the-provision-of-intensive-care-services/ Accessed 27/04/2015.
3. Hebert PC, Wells G, Blajchman MA, et al. A multicentre, randomized, controlled clinical trialof transfusion requirements in critical care. *N Engl J Med* 1999;340:409-17

4. https://www.transfusionguidelines.org/transfusion-handbook/7-effective-transfusion-in-surgery-and-critical-care/7-2-transfusion-in-critically-ill-patients (accessed 07/10/2021)