

23. SINGLE UNIT

TRANSFUSION

Single unit red blood cell (RBC) transfusion is the practice of prescribing only one unit at a time, with clinical reassessment of the patient prior to prescribing a subsequent unit.

Key messages

- The Patient Blood Management Guidelines support restrictive transfusion and a single unit transfusion guideline in patients who are not critically bleeding.1-3

- RBC transfusion is associated with increased morbidity, mortality, ICU and hospital length of stay.1

- Transfused blood carries risks in a dose-dependent manner.4,5

- Limited studies to date have shown that a single unit strategy reduces RBC usage without adverse effects.

Clinical implications

- Traditionally, single-unit red blood cell transfusions were believed to be insufficient to treat anaemia, but recent data suggest that they may lead to a safe reduction of transfusion requirements.6

- Each RBC transfusion should be an independent clinical decision based on the risk, benefits and alternatives.

- Transfuse to alleviate patient signs and symptoms of anaemia.

- Where transfusion is indicated, a single unit of RBC, followed by clinical reassessment to determine the need for further transfusion, is appropriate. This reassessment will also guide the decision on whether to retest the haemoglobin level.1-3

- Each unit of RBCs contains enough haemoglobin to raise the haemoglobin concentration in an average sized adult by approximately 10 g/L.7

Background

Transfusion is a live tissue transplant. Risks associated with transfusion are dose dependent.4,5

A study of almost 12,000 coronary artery bypass graft patients showed that RBC transfusion was

associated with a risk-adjusted increased risk for every postoperative morbid event: mortality,

renal failure, prolonged ventilator support, serious infection, cardiac complications and neurologic

events. Each unit of RBCs transfused was associated with incrementally increased risk for adverse

outcome.4 The transfusion requirements after cardiac surgery (TRACS) study showed that the

number of transfused red blood cell units was an independent risk factor for clinical complications

including respiratory, cardiac, renal and infectious complications and for death at 30 days.5

Transfusion Associated Circulatory Overload (TACO) is among the highest risks associated with

RBC transfusion, estimated at up to 1 in 100 per unit transfused.2, 8-9 This is of particular concern in

patients with chronic heart failure.2

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Several recent studies have shown that single-unit RBC transfusions remain rare, despite lack of evidence for prescribing multiple units in response to a haemoglobin trigger.10 Berger and colleagues changed from a double to a single-unit red blood cell transfusion policy in patients with hematologic malignancies receiving intensive chemotherapy or hematopoietic stem cell transplantation resulting in a 25% reduction in RBC usage, equating to 2.7 RBC units, per therapy cycle. Overall survival was similar in both cohorts.6

Joseph and colleagues found that in a large UK tertiary referral centre and teaching hospital,

74% of RBCs were transfused to patients with medical diagnoses, rather than surgical patients.

For medical and surgical patients, respectively, 31 and 10% of all RBC units were transfused for

anaemia without evidence of bleeding, and 38 and 12% were transfused for non–life-threatening

bleeding. Eight-five percent of all patients who received transfusions had stable vital signs before

transfusion.10 Their model suggested that 11% of RBCs would be conserved by cancellation of

major surgery, whereas 23% to 47% of all RBCs could be conserved by controlling transfusions to

medical patients. Their data strongly support focusing on target haemoglobin values and using

single-unit transfusions as an effective method of reducing and conserving RBC use.

Ma and colleagues used retrospective data to examine the impact of using single unit transfusions in an institution with a high rate of at least 2-unit RBC transfusions and estimated that RBC savings of between 0.21 and 0.82 RBC units per transfused patient.11

References

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2. National Blood Authority Patient blood management guidelines: Module 3 – Medical. Australia, 2013.

3. National Blood Authority Patient blood management guidelines: Module 4 – Critical Care. Australia, 2013.

4. Koch CG Duncan AI et al, L. L. Morbidity and mortality risk associated with red blood cell and blood-component

transfusion in isolated coronary artery bypass grafting. Crit Care Med 2006 34, 1608–1616 (2006).

5. Hajjar LA, Vincent JL et al., Transfusion requirements after cardiac surgery: the TRACS randomised controlled trial.

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6. Berger MD, Gerber B, Arn K, Senn O, Schanz U, Stussi G. Significant reduction of red blood cell transfusion requirements by changing from a double-unit to a single-unit transfusion policy in patients receiving intensive chemotherapy or stem cell transplantation. Haematologica. 2012;97:116-22.

7. Australian Red Cross Blood Service. Blood Component Information Circular of Information – An extension of blood

component labels. Australia 2012.

8. Popovsky, M. Transfusion-associated circulatory overload. ISBT Science Series2008;3:166–169.

9. Roback, J. D. Non-infectious complications of blood transfusion. AABB Technnical Manual, 17th edition. AABB, Bethesda, 2011.

10. Joseph BG, Hendry C, Walsh TS. Red blood cell use outside the operating theatre: a prospective observational study

with modelling of potential blood conservation during severe blood shortages. Transfusion 2009;49:2060-2069

11. Ma M, Eckert K, Ralley F, Chin-Yee I. A retrospective study evaluating single-unit red blood cell transfusions in

reducing allogeneic blood exposure. Transfus Med 2005;15:307-12. Additional Resources

- Refer to the National Blood Authority Single Unit Transfusion Guide for further information and resources to assist

with implementation.

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