

24. RESTRICTIVE TRANSFUSION STRATEGY

Restrictive transfusion thresholds (triggers) are an effective method of reducing and conserving red blood cell (RBC) use. RBC transfusion should not be dictated by a haemoglobin 'trigger' alone.¹⁻⁴

Key messages

- The Patient Blood Management Guidelines support restrictive transfusion in patients who are not critically bleeding.¹⁻³
- Restrictive transfusion strategies reduce the risk of receiving a RBC transfusion and reduce the volume of RBCs transfused.⁵
- There is extensive evidence supporting restrictive transfusion strategies without impacting on patient morbidity or mortality, with some studies showing improved outcomes.⁶⁻⁹

Clinical implications

- In critically ill patients, a restrictive transfusion strategy should be employed (CC-R1).³
- RBC transfusion should not be dictated by a haemoglobin 'trigger' alone, but should be based on assessment of the patient's clinical status (PO-PP2, MED-PP1, CC-PP1).¹⁻⁴
- Where indicated, transfusion of 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 Hb level (PO-PP3, MED-PP2, MED-PP3, CC-PP2).¹⁻³
- The Patient Blood Management Guidelines provide guidance on Hb 'triggers' where appropriate (but always in the context of the patient's clinical status).¹⁻³
- Evidence in patients with acute upper gastrointestinal bleeding show that a restrictive transfusion strategy significantly improves patient outcomes.⁶

Background

The threshold for RBC transfusion in both medical settings and in the postoperative surgical period has evolved over the years. There is now extensive evidence from the literature supporting restrictive transfusion strategies. For example:

[TRICC](#), a large multicentre randomized, controlled trial comparing a restrictive (Hb < 70 g/L) to a liberal (Hb < 100 g/L) RBC transfusion strategy in ICU patients found no difference in 30-day mortality regardless of the Hb threshold employed. They did find lower rates with the restrictive strategy in patients who were acutely ill and among those < 55 years of age. The mortality rate during hospitalisation was significantly lower in the restrictive group.⁷

[TRACS](#), a large single unit, prospective, non-inferiority, randomized, controlled trial comparing a restrictive (HCT ≥ 24%) to a liberal (HCT ≥ 30%) RBC transfusion strategy in cardiac surgery patients found non-inferior rates of the combined 30-day all-cause mortality and severe morbidity in the restrictive group.⁸

[FOCUS](#), a large, randomized, controlled trial comparing a restrictive (Hb < 80 g/L) to a liberal (Hb < 100 g/L) RBC transfusion strategy in patients who had undergone surgery for hip fracture and who had a history or risk factors for cardiovascular disease, found that a liberal transfusion strategy, as compared with a restrictive strategy, did not reduce rates of death or inability to walk independently on 60-day follow-up or reduce in-hospital morbidity in elderly patients at high cardiovascular risk.⁹

[Transfusion thresholds and other strategies for guiding allogeneic red blood cell transfusion](#), a Cochrane review, found that restrictive transfusion strategies reduced the risk of receiving a RBC transfusion by 39%; reduced the volume of RBCs received; did not impact on the rate of adverse events or reduce functional recovery, hospital or ICU length of stay; and were associated with a statistically significant reduction in hospital mortality (but not 30-day mortality).⁵

[Transfusion strategies for acute upper gastrointestinal bleeding](#), a large randomised controlled trial comparing restrictive (Hb < 70 g/L) to a liberal (Hb < 90 g/L) RBC transfusion strategy in patients admitted with gastrointestinal bleeding, found that a restrictive strategy significantly improved patient outcomes, including significantly lower mortality at 45 days; lower risk of death in some patient subgroups (eg. cirrhosis, peptic ulcer); lower rates of further bleeding, lower rates of rescue therapy, lower overall complication rates, and shorter length of hospital stay. Fifty-one percent of patients in the restrictive strategy group did not receive a transfusion, compared with 14% in the liberal group. The mean number of units transfused was significantly lower in the restrictive group.⁶

Recommendations and practice points with Hb 'triggers' from the Patient Blood Management Guidelines

Perioperative

In the absence of acute myocardial or cerebrovascular ischaemia, postoperative transfusion may be inappropriate for patients with a haemoglobin level of >80 g/L.¹

Patients should not receive a transfusion when the haemoglobin level is ≥ 100 g/L.

In postoperative patients with acute myocardial or cerebrovascular ischaemia and a haemoglobin level of 70–100 g/L, transfusion of a single unit of RBC, followed by reassessment of clinical efficacy, is appropriate (PO-PP3).¹

Medical

Direct evidence is not available in general medical patients. Evidence from other patient groups and Clinical Reference Group (CRG) consensus suggests that, with a:

- **Hb concentration <70g/L**, RBC transfusion may be associated with reduced mortality and is likely to be appropriate. However, transfusion may not be required in well-compensated patients or where other specific therapy is available.
- **Hb concentration of 70–100g/L**, RBC transfusion is not associated with reduced mortality. The decision to transfuse patients (with a single unit followed by reassessment) should be based on the need to relieve clinical signs and symptoms of anaemia, and the patient's response to previous transfusions. No evidence was found to warrant a different approach for patients who are elderly or who have respiratory or cerebrovascular disease.
- **Hb concentration > 100g/L**, RBC transfusion is likely to be unnecessary and is usually inappropriate. Transfusion has been associated with increased mortality in patients with acute coronary syndrome (ACS) (MED-PP3).²

In ACS patients with a:

- **Hb concentration <80 g/L**, RBC transfusion may be associated with reduced mortality and is likely to be appropriate (MED-PP5, CC-PP4).^{2,3}

- **Hb concentration of 80 – 100 g/L**, the effect of RBC transfusion on mortality is uncertain and may be associated with an increased risk of recurrence of MI (MED-PP6, CC-PP4).^{2,3}
- **Hb concentration >100 g/L**, RBC transfusion is not advisable because of an association with increased mortality (MED-R1, CC-PP4).^{2,3}

In patients with thalassaemia, the evidence does not support any change to the current practice of maintaining a pretransfusion Hb concentration of 90 – 100 g/L, with transfusions at about monthly intervals (MED-PP23).²

In patients with myelodysplasia who are regularly and chronically transfused, there is no evidence to guide particular Hb thresholds. Decisions around appropriate triggers and frequency of transfusion need to be individualised, taking into account anaemia-related symptoms, functional or performance status, and the patient's response to previous transfusions (MED-PP24).²

Critically ill

In critically ill patients, a restrictive transfusion strategy should be employed (CC-R1).³

In critically ill patients, expert clinical consensus suggests that, with a:

- **Hb concentration <70 g/L**, RBC transfusion is likely to be appropriate; however, transfusion may not be required in well-compensated patients or where other specific therapy is available.
- **Hb concentration of 70–90 g/L**, RBC transfusion is not associated with reduced mortality. The decision to transfuse patients (with a single unit followed by reassessment) should be based on the need to relieve clinical signs and symptoms of anaemia.
- **Hb concentration >90 g/L**, RBC transfusion is generally unnecessary.

References

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