Recommendations for Red Blood Cell Transfusion
British Columbia Transfusion Medicine Advisory Group
2014

Purpose
The purpose of these recommendations is to support physicians in their clinical decisions related to the appropriate use of red blood cells (RBCs). They are not intended to provide a rigid prescription for care and do not replace the need to consult with an expert in transfusion medicine. The decision to transfuse RBCs should be based on the judgment of the attending physician after careful review of the patient’s condition and clinical situation. The goal is to optimize patient outcomes and to ensure appropriate use of the allogeneic (donor) blood supply.

The recommendations apply to RBC transfusion in adults and children over 4 months of age.

General considerations
1. Informed consent, including discussion of the benefits, risks and alternatives, is required for RBC transfusion.
2. A patient’s hemoglobin level, although important, should not be the sole deciding factor when considering whether to transfuse RBCs. The decision to transfuse should be supported by the need to prevent or alleviate clinical symptoms, signs, or morbidity due to inadequate tissue oxygen delivery as a result of significant anemia. Clinical features that should be considered include: acute coronary syndrome/angina, hypotension and tachycardia unresponsive to fluid replacement, and congestive heart failure. Lethargy and fatigue associated with anemia are nonspecific and are considered insufficient to indicate the need for RBC transfusion.
3. Patient’s co morbidities, such as cardiopulmonary disease, atherosclerotic disease, in addition to the rate of blood loss should be considered when evaluating for the need of RBC transfusion.
4. RBC transfusion should not be used to expand vascular volume when oxygen-carrying capacity is adequate.
5. RBC transfusion should be given only after the risks associated with transfusion have been considered and only when the benefits outweigh the risks, taking into account the expected life span of the patient. It is particularly important to avoid the long-term complications of transfusion in a young patient.
6. Strategies should be undertaken to minimize the need to transfuse RBCs in the perioperative period, for example:
   - assess for history of abnormal bleeding before surgery and investigate accordingly;
   - investigate, diagnose and treat previously recognized anemia;
   - preoperatively assess for anemia (within 28-35 days) prior to surgical intervention with anticipated risk of transfusion (significant blood loss);
   - implement available alternatives, when appropriate, to reduce the risk of allogeneic transfusion, i.e. iron supplement (oral or IV), erythropoietin, autologous blood donation, cell saver, etc.;
   - discontinue anti-coagulants and antiplatelet drugs before planned surgery when safe to do so, and allow at a sufficient time for their effect on coagulation to decline;
   - minimize the frequency and volume of blood sampling for laboratory testing;
   - utilize a surgical technique that minimizes blood loss;
   - utilize appropriate pharmacologic interventions to minimize blood loss (e.g., antifibrinolytics).
7. A patient with acute blood loss should receive effective resuscitation (appropriate volume replacement with crystalloid solutions), while the need for transfusion is assessed.
8. Where indicated, the minimal effective dose of RBCs should be ordered. Transfusion of a single unit of RBCs, followed by clinical reassessment to determine the need for further transfusion, is appropriate in non-urgent settings. This reassessment will also guide the decision on whether to retest the Hb level.

9. Transfusion of blood components should be performed when adequate resources for monitoring are available. Overnight transfusion of blood components should be avoided in non-urgent settings.

10. The rate of transfusion must be specified by the physician.

11. In situations where RBCs are transfused, the reasons for the transfusion should be clearly and accurately recorded in the patient’s chart and in any documentation used in ordering or administering RBCs.

12. Hospital transfusion committees should function at the local level to promote, guide and direct prudent transfusion practice and assist in the dissemination of information pertaining to safe transfusion practice.

13. In all situations where RBCs are transfused, a process for clinical review should be in place and utilized to monitor the appropriateness of RBCs use and to develop systems for the implementation of these recommendations.

Threshold and target hemoglobin levels for RBC transfusion

As a general guide, in normal healthy individuals, a transfusion threshold of 70 g/L is likely to be appropriate and leaves some margin of safety over the critical level of 40-50 g/L. However, transfusion may not be required in well-compensated patients (e.g. chronic iron and B12 deficiency) or where other specific therapy is available.

At a hemoglobin level between 70-100 g/L, RBC transfusion is not associated with reduced mortality. The decision to transfuse should be based on the need to relieve clinical signs and symptoms of anemia, and the patient’s response to previous transfusions.

For patients with hemoglobin > 100 g/L, RBC transfusion is likely to be unnecessary and is usually inappropriate. Transfusion at this threshold has been associated with increased mortality in patients with acute coronary syndrome (ACS)\(^1\)\(^4\).

For peri-operative patients

Preoperatively, for stable patients without cardiovascular disease, and especially younger patients, transfusion may be considered at a Hb threshold of 70 g/L. Lower hemoglobin levels may be tolerated without transfusion in younger patients without signs or symptoms of impaired oxygen transport.

This general guidance also applies to prescribing a postoperative transfusion. In the absence of acute myocardial infarction (MI) or cerebrovascular ischemia, it is recommended to use a restrictive transfusion strategy. In patients with known history of cardiovascular disease (but not acute MI), prescribing transfusions for a Hb threshold of 80 g/L or less, or for symptoms, is appropriate\(^5\). In otherwise healthy postoperative patients, considering RBC transfusion for a Hb level of 70 g/L, or less, or for symptoms, may be a preferred approach.

In postoperative patients with acute MI or cerebrovascular ischemia and a Hb level of 70-100 g/L, transfusion of a single unit of RBCs, followed by reassessment of clinical efficacy is appropriate.

For patients with acute blood loss

Maintaining adequate intravascular volume (using crystalloid solutions) is critical to management of patients with acute major blood loss. Transfusion is likely to be appropriate to maintain hemoglobin above 70 g/L during active bleeding. Using a hemoglobin threshold of 70 g/L is associated with better outcomes in comparison with a hemoglobin threshold of 90 g/L in patients with upper gastrointestinal bleeding with rapid access to endoscopic treatment\(^6\). Consider the rate of bleeding, co-morbidities, assess hemodynamic parameters, observe for evidence of tissue ischemia, and take into account the institutional challenges of providing appropriate blood products and laboratory testing in the decision to transfuse.

Patients with hemoglobin above 100 g/L are unlikely to benefit from transfusion.
For critically ill patients with anemia

Patients with critical illness frequently develop anemia. Transfusion may be appropriate to control anemia-related symptoms if the hemoglobin falls below 70 g/L (within the range of 70-90 g/L). A possible exception to this guideline is patients with acute coronary ischemia, where a Hb threshold of 80 g/L may be more appropriate.7,9

For patients with chronic anemia

Determine the cause of anemia so that, where appropriate, treatment other than RBC transfusion may be used. Patients with chronic transfusion dependent anemia secondary to bone marrow disorders should receive transfusions at the lowest hemoglobin level that provides adequate quality of life.10 Assess patients that are expected to have long-term transfusion-dependent survival for iron overload and treat if appropriate.

Patients with severe chronic anemia typically develop intravascular volume expansion and could be prone to transfusion associated circulatory overload (TACO). The risk could be minimised by carefully considering the number of units, the rate of transfusion and ordering diuretics where appropriate.

For patients with cardiac disease

Literature indicates that patients with past history of ischemic heart disease are able to tolerate a restrictive transfusion strategy (transfusion for symptoms or for hemoglobin of 80 g/L or lower).5 On the other hand, good quality evidence is lacking in regards to transfusion strategies in patients with acute coronary syndrome. Transfusion for hemoglobin <80 g/L may be associated with reduced mortality.11 The effect of transfusion on mortality in patients with ACS and a Hb level of 80-100 g/L is uncertain and may be associated with an increased risk of recurrence of myocardial infarction. Any decision to transfuse should be made with caution and based on careful consideration of the risks and benefits. RBC transfusion is not recommended in patients with ACS and hemoglobin >100 g/L because of an association with increased mortality.10

Source

These recommendations have been developed through the consensus of the British Columbia Transfusion Medicine Advisory Group (TMAG), which consists of transfusion medicine physicians, technologists and nurses from hospitals across BC. The recommendations are based on existing guidelines for transfusion medicine practice, in particular the UK Blood Transfusion and Tissue Transplantation Guidelines (UK Handbook of Transfusion Medicine, Fourth Edition 2007) and the Australian National Blood Authority’s Patient Blood Management Guidelines (2012), and the best available published research regarding the clinical indications for transfusion.

For more information

For more information, consult the following:

  http://www.cmaj.ca/content/suppl/2002/04/05/156.11.DC1/Guide_RedBlood_E.pdf

References