



Government of Newfoundland and Labrador

Department of Health and Community Services
Provincial Blood Coordinating Program

SINGLE RED BLOOD CELL UNIT TRANSFUSION (ADULTS)	NLBPCP-050
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Overview

Current best practice in transfusion medicine recommends single unit transfusions in stable, non-bleeding patients with anemia. Restrictive transfusion both with lowering thresholds and promoting single unit red blood cell (RBC) transfusions are linked to safer clinical outcomes for the recipient. A more restrictive regime is associated with decreased incidence of transfusion associated circulatory overload (TACO), which may increase morbidity and mortality.

Studies have shown that the risk of TACO increases exponentially with every unit of RBC transfused. Cases of TACO often go unreported as in certain patient populations this cluster of symptoms has become “the norm” and “what is to be expected”. Once treated with a diuretic, the recipient’s condition improves, and the adverse transfusion reaction goes unreported.

To minimize unnecessary transfusions of RBCs and mitigate avoidance of potential adverse transfusion reactions, it is of utmost importance that patients with anemia are identified, assessed, and investigated appropriately upon presentation of symptoms. Early identification can lead to treatment with safer alternative therapies and minimize or negate the need for transfusion of RBCs in many patients.

Policy

1. Regional Health Authorities (RHAs) shall develop policies, processes and procedures for appropriate prescribing of transfusion of RBCs to elective non-bleeding hemodynamically stable hospitalized patients that comply with Provincial Blood Coordinating Program policies.

***Note:** This policy **does not** apply to intraoperative patients, patients who are bleeding, or patients who are receiving transfusion therapy in outpatient settings.

2. The transfusion order shall specify the clinical indication for transfusion.
3. A restrictive threshold (hemoglobin 70-80g/L) should be used for hospitalized patients who are hemodynamically stable, without significant symptoms of decreased oxygen carrying capacity.
4. Transfusion of “one unit at a time” or single unit transfusion of RBCs should be the practice in the non-urgent setting with clinical reassessment performed prior to the decision to transfuse an additional unit.
5. Consider transfusion (independent of hemoglobin level) if symptoms of decreased oxygen carrying capacity (e.g. shortness of breath, chest pain) are present.

6. Reassessment of the patient shall be completed prior to release of a second RBC unit in a stable non-bleeding patient.
 - 6.1. Post transfusion hemoglobin result is required.
 - 6.1.1. The issue/transfusion card shall include text to prompt the transfusionist to ensure a complete blood count (CBC) is completed post transfusion.
 - 6.2. Reassessment for continued clinical indication(s) for transfusion of additional RBC(s) is required.

Note: Please follow [Massive Hemorrhage Protocol](#) in the event of massive hemorrhage.

Guidelines

1. Each unit of RBCs transfused increases the hemoglobin value by approximately 10g/L.
2. Transfusion is a temporary measure to alleviate symptoms of anemia, not a definitive treatment. The underlying cause of anemia must be determined.
3. RBC transfusion should be used to treat symptomatic anemia, not used to correct hemoglobin concentration only.
4. Liberal transfusion strategies do not improve patient outcomes when compared to restrictive transfusion strategies.
5. Single unit transfusions of RBCs are sufficient to treat many patients with anemia and may lead to a reduction in overall transfusion requirements.
6. Restrictive transfusion strategies are just as safe (if not safer) for the patient as liberal transfusion strategies. In fact, transfusion related morbidity and mortality have been shown to be dose dependent in some patient populations. Therefore, transfusion of RBCs should only be given when indicated and at the lowest effective dose.
7. Unnecessary transfusion is associated with increased health care costs and increased risk of adverse events to the patient.
8. The patient's hemoglobin should be reassessed pre and post each unit of RBCs. The end-point of treatment is relief of signs and symptoms of anemia.
9. Avoid nighttime transfusions in the non-urgent setting as research has shown a disproportionate increase in errors and adverse transfusion events occur with nighttime transfusions.
10. Alternative therapies should be discussed including cell salvage in pre-operative individuals, erythropoiesis-stimulating agents and iron therapy in certain patient populations. When possible, treat the underlying cause of the anemia.

11. Implementation of an order set, algorithm, and greater involvement of all members of the healthcare team (prescriber, medical laboratory technologist, and transfusionists) are required to change to a safer, more restrictive transfusion service.

Procedure

Prescriber

1. Assessment of the patient should include both a physical exam and assessment of laboratory findings.
2. Prescribe transfusion. Indicate the reason for transfusion on the transfusion order.
3. Ensure a CBC test is ordered pre-transfusion and post transfusion for each RBC unit. Post CBC should be drawn, at a minimum, 30 minutes post completion of RBC unit.
4. Re-assess the patient for signs and symptoms of decreased oxygen carrying capacity post transfusion of each RBC unit. This assessment in addition with the evaluation of the post CBC will determine the need for further transfusion of RBCs.

Medical Laboratory Technologist

1. Review the order for RBC transfusion.
2. Confirm hemoglobin.
3. Release a single RBC unit. (Refer to policy statement 1).
 - 3.1. Ensure issue transfusion card includes a prompt to perform CBC post transfusion.
4. For subsequent requests for RBCs:
 - 4.1. Confirm post transfusion hemoglobin (if completed).
 - 4.2. Release a single RBC unit.
5. If indications for release of RBC(s) are not met, notify the prescriber or the physician on call for the facility transfusion service.

Quality Control

Each facility is responsible to ensure that red blood cells are transfused for appropriate indications.

Key Words

Patient blood management, RBC, single unit transfusion, transfusion

Additional Resources

<http://transfusionontario.org/en/wp-content/uploads/sites/4/2016/04/Quality-Improvement-Plan-Tools-Appendix.pdf>

References

- American Society of Hematology. (2013). *Ten things physicians and patients should question*. Available at: <http://www.hematology.org/Clinicians/Guidelines-Quality/502.aspx>
- Berger, M. D., Gerber, B., Arn, K., Senn, O., Schanz, U., & Stusi, G. (2012). 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*, 97(1), 116-122. DOI:10.3324/haematol.2011.047035.
- Bowman, Z., Cumpston, A., Craig, M., Wen, S., Perrotta, P. L., Ahn, J., Fei, N., Shah, N. A., & Kanate, A. S. (2016). Single Unit Red Blood Cell Transfusion Is a Safe and Effective Alternative to Double Unit Transfusion in Hematologic Malignancies. *Blood*, 128(22), 3855. Accessed June 25, 2019. Retrieved from <http://www.bloodjournal.org/content/128/22/3855>
- Canadian Society for Transfusion Medicine. (2017). *Choosing Wisely Canada: Ten things patients and physicians should question*. Available at: <http://www.choosingwiselycanada.org/recommendations/transfusion-medicine/>
- Carson, J.L., Grossman, B.J., Kleinman, S., Tinmouth, A.T., Marques, M.B., Fung, M.K., Holcomb, J.B., & Djulbegovic, B. (2012). Red blood cell transfusion: A clinical practice guideline from the AABB. *Ann Intern Med*, 157(1), 49-58. DOI: 10.7326/00034819-157-1-201206190-00429.
- Gross, I., Trentino, K. M., Andreescu, A., Pierson, R., Maietta, R. A., & Farmer, S. (2016). Impact of a patient blood management program and an outpatient anemia management protocol on red cell transfusions in oncology inpatients and outpatients. *The Oncologist*, 21(3), 327-332. doi:10.1634/theoncologist.2015-0406
- Hébert, P. C., Wells, G., Blajchman, M. A., et al. (1999). A multicenter, randomized, controlled clinical trial of transfusion requirements in critical care. *The New England Journal of Medicine*, 340 (1999), 409-417. DOI: 10.1056/NEJM199902113400601
- Hoffman, A., Farmer, S., & Shander, A. (2011). Five drivers shifting the paradigm from product-focused transfusion practice to patient blood management. *The Oncologist*, 16(2011), 3-11. DOI: 10.1634/theoncologist.2011-S3-3

- National Advisory Committee on Blood & Blood Products. (2014). *NAC companion document to: "Red Blood Cell Transfusion: A Clinical Practice Guideline from the AABB"*. Ottawa, ON: Author.
- National Blood Authority. (2012). *Patient blood management guidelines: Module 3- Medical*. Canberra, AU: Author.
- National Blood Authority. (2012). *Single unit transfusion guide: Every ONE matters*. Canberra, AU: Author.
- Public Health Agency of Canada. (2007). *Transfusion Transmitted Injuries Surveillance System User's Manual*. (Version 3.0). Ottawa, ON: Author.
- Ramsey, G., Wagar, E.A., Grimm, E.E., Friedberg, R.C., Souers, R. J., & Lehman, C. M. (2015). Red blood cell transfusion practices: A College of American Pathologists Q-Probes study of compliance with audit criteria in 128 hospitals. *Archives of Pathology & Laboratory Medicine*: 139(3), 351-355. <https://doi.org/10.5858/arpa.2013-0756-CP>
- Shander, A., Gross, I., Hill, S., Javidroozi, M., Sledge, S., College of American Pathologists, ... American Association of Blood Banks (2013). A new perspective on best transfusion practices. *Blood transfusion = Trasfusione del sangue*, 11(2), 193–202. doi:10.2450/2012.0195-12
- Soril L. J. J., Noseworthy T. W., Dowsett L. E., et al. (2018). Behaviour modification interventions to optimise red blood cell transfusion practices: a systematic review and meta-analysis. *BMJ Open* 2018;8:e019912. doi: 10.1136/bmjopen-2017-019912
- Thakkar, R. N., Podlasek, S. J., Rotello, L. C., Ness, P. M., & Frank, S. M. (2017). Things We Do For No Reason: Two-Unit Red Cell Transfusions in Stable Anemic Patients. *J. Hosp. Med* 2017;9:747-749. doi:10.12788/jhm.2806
- Warwick, R., Mediratta, N., Chalmers, J., Pullan, M., Shaw, M., Mcshane, J., & Poullis, M. (2013). Is single-unit blood transfusion bad post coronary artery bypass graft? *Interactive Cardiovascular and Thoracic Surgery*, 16(2013), 765-771. DOI: 10.1093/icvts/ivt062.