

Manitoba Transfusion Best Practice Resource Manual

Appendix 17 Guidelines for Perioperative Autologous Blood Collection and Administration

Guidelines for Perioperative Autologous Blood Collection and Administration

Purpose

These guidelines intend to inform health care providers about the principles of Perioperative Autologous Blood Collection and Administration, specifically Acute Normovolemic Hemodilution (ANH) and Intraoperative Cell Salvage. Aligned with Patient Blood Management Standards, surgical blood conservation techniques should be considered as a strategy to reduce allogeneic blood transfusions. These techniques are often acceptable to those that would decline allogeneic transfusions.

Acute Normovolemic Hemodilution

Acute Normovolemic Hemodilution (ANH) is a technique developed and used by anesthetists to minimize red cell loss during surgery. Autologous blood is drawn at the start of a surgical procedure; the blood volume is maintained by the infusion of colloid or crystalloid. Fewer red blood cells are lost during the procedure because the surgical blood loss occurs at a lower hematocrit. Units collected have a high hematocrit, contain viable platelets and coagulation factors and may be stored at room temperature in the operating room for up to 8 hours. Once the expected surgical blood loss has past, the collected units can be transfused, minimizing allogeneic blood transfusion.

Potential Advantages of ANH

1. Acute Normovolemic Hemodilution (ANH) may decrease need for allogeneic blood, thereby minimizing or avoiding the risk of transmission of transfusion-associated complications (eg, infectious disease, allergic reactions, allosensitization, and the possibility of immunomodulation). A 2015 meta-analysis of 3819 patients undergoing any type of surgery noted that ANH reduced the risk of requiring an allogeneic red blood transfusion and the overall volume of allogeneic red blood cell units transfused, compared with control patients who did not undergo ANH.
2. It may decrease the number of red blood cells lost during surgery, since the blood lost has lower hemoglobin (Hgb) after hemodilution.
3. It can be used in patients who would otherwise not have an allogeneic transfusion.
4. It is cost effective, since testing, storage, and crossmatching costs are not incurred.
5. It provides the only opportunity to transfuse patients with fresh, whole blood containing viable platelets and high levels of clotting factors.

Potential Disadvantages of ANH

ANH requires committed anesthesia personnel trained in this area, as well as the requisite intensive monitoring of aggressively hemodiluted patients.

Precautions to ANH

ANH should be avoided in the following settings:

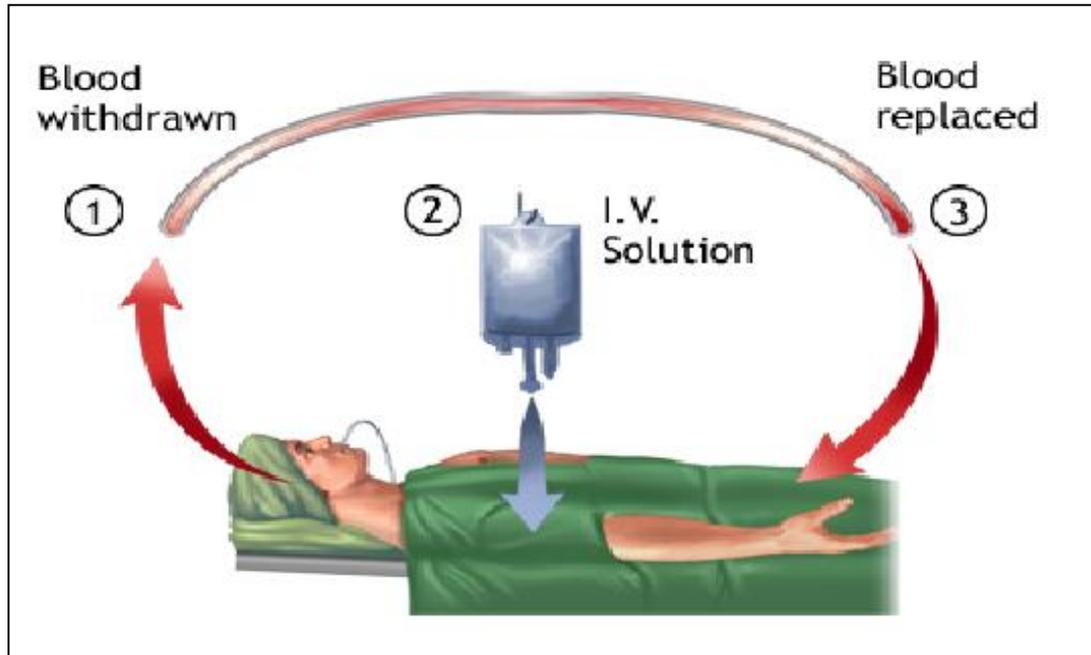
1. Patients with impaired cardiac function (eg, ejection fraction <45 percent) who may have limited ability to increase cardiac output, since the main compensatory mechanism for induced anemia is a physiologic increase in cardiac output.
2. Impaired renal function with oliguria, since potentially large amounts of replacement fluids ultimately need to be excreted.
3. Baseline Hgb <11 g/dL.

Manitoba Transfusion Best Practice Resource Manual

Appendix 17 Guidelines for Perioperative Autologous Blood Collection and Administration

4. Low concentrations of coagulant proteins or platelets, or abnormalities of coagulation or platelet function tests.
5. Inability to monitor Hgb concentration, platelet number, and coagulation function with rapidly available results (ie, 5 to 30 minutes).
6. Inadequate vascular access.

Image of Acute Normovolemic Hemodilution



Manitoba Transfusion Best Practice Resource Manual

Appendix 17 Guidelines for Perioperative Autologous Blood Collection and Administration

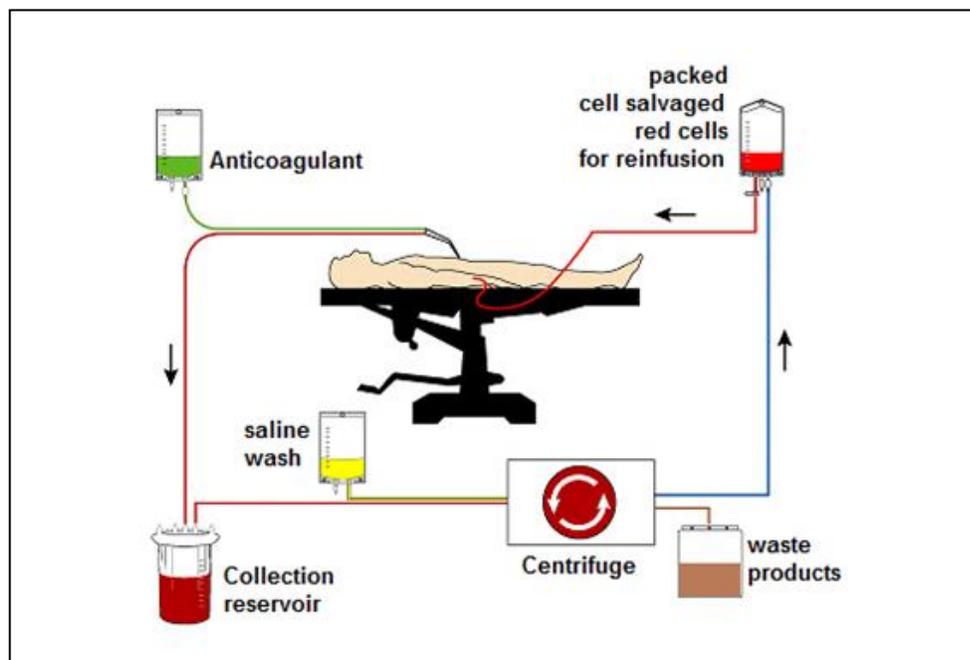
Intraoperative Cell Salvage

Intraoperative Red Blood Cell Salvage, also known as Cell Saver, is a surgical technique used to minimize the need for allogeneic blood transfusion. In this technique shed blood is collected, filtered and washed for reinfusion. This is referred to as an autologous transfusion.

Precautions to Intraoperative Cell Salvage

Red cell salvage should be used cautiously with consideration of risk benefit ratio in severe sepsis, acute respiratory insufficiency, acute anuric renal insufficiency and hepatocellular cancer. Shed blood collection from fecal contaminated surgical sites is contraindicated.

Image of Intraoperative Cell Salvage



Manitoba Transfusion Best Practice Resource Manual

Appendix 17 Guidelines for Perioperative Autologous Blood Collection and Administration

Policy for Perioperative Autologous Blood Collection and Administration

1. The surgical care team considers perioperative collection for procedures with expected blood loss greater than 25% of blood volume and for those patients who refuse allogeneic blood products.
2. There should be a physician's order when blood is to be collected from the surgical patient.
3. When autologous blood has been collected by a non-Canadian Blood Services facility, such as in the operating room, it is the responsibility of the attending physician, or delegate through the informed consent process, to:
 - a. Explain to the patient the possible risks involved, in addition to the usual risks of transfusion.
 - b. Document the consent process in the medical record.
4. It is the responsibility of the anesthetist or perfusionists to:
 - a. Ensure sterile technique.
 - b. Use CPD collection bags with needle guard tubing.
 - c. Ensure appropriate agitation with the use of approved blood rocker.
5. Only those adequately trained and competent in the operation of a cell salvage device should be responsible for performing this function. Evaluation of competence must occur prior to independent performance of perioperative autologous blood collection and administration.
6. Autologous blood collected in the operating room must not be left unattended or transferred with patient.
7. Each unit collected must be labeled with the patient's first and last name and the Manitoba PHIN or other unique identifier, the date and time of collection and expiration, and the statement "For Autologous Use Only".
8. Unequivocal verification of correct patient must occur according to hospital policy. Refer to Manitoba Best Practice Resource Manual Guideline 2.0
9. Units collected for isovolemic hemodilution may be stored at room temperature for up to 8 hours prior to transfusion.
10. Units collected from a sterile operative field and processed with a device for intraoperative blood collection that washes with 0.9% saline may be stored at room temperature for up to 6 hours prior to transfusion.
11. With the exception of normal saline, neither fluids, nor medications should be added to the collected blood.
12. Equipment used for the purpose of autologous blood collection and transfusion must be maintained and calibrated according to the manufacturer's instructions.

Documentation

1. The informed consent process for perioperative autologous blood collection should be documented in the health record.
2. Fluid volumes collected and transfused must be clearly documented in the fluid balance record.
3. Adverse events related to these techniques should be documented in the health record.
4. Any deviations in these guidelines should be documented and reported to the Medical Director of Blood Management Service.

Manitoba Transfusion Best Practice Resource Manual

Appendix 17 Guidelines for Perioperative Autologous Blood Collection and Administration

References

1. The Association of periOperative Registered Nurses AORN (2014) Perioperative Standards and Recommended Practices Copyright © 2014 AORN, Inc
2. Manitoba Best Practice Resource Manual, (2017). www.bestbloodmanitoba.ca
3. Maria, Liana, Torres De Araújo, and Luis Vicente Garcia. 2013. "Acute Normovolemic Hemodilution : A Practical Approach" c (January): 38–43. http://file.scirp.org/pdf/OJAnes_2013013111295666.pdf
4. Segal, Jodi B, Elena Blasco-colmenares, Edward J Norris, and Eliseo Guallar. 2004. "Preoperative Acute Normovolemic Hemodilution : A Meta-Analysis" 44 (May): 632–644.
5. Standards for Perioperative Autologous Blood Collection and Administration. 4th edition AABB, 2009.
6. The Operating Room Nurses Association of Canada ORNAC (2017) Standards, Guidelines, and Position Statements for Perioperative Registered Nurses 13th Edition – April 2017 © 2017
7. Up to date: <https://www.uptodate.com/contents/surgical-blood-conservation-intraoperative-hemodilution>
8. Zhou, X., Zhang, C., Wang, Y., Yu, L., & Yan, M. (2015). Preoperative Acute Normovolemic Hemodilution for Minimizing Allogeneic Blood Transfusion. *Anesthesia and Analgesia.*, 121(6), 1443-1455

August 2017 Content reviewers:

Dr. Brian Muirhead, Medical Director, Blood Management Service

Dr. Todd Koga,

Jennifer Beaudry, Perioperative Nurse Educator WRHA