

Scenario Overview

History of present illness

53-year-old female with past medical history listed below has been experiencing pelvic pain for the past several months. Follow up diagnostic imaging revealed concern for uterine malignancy and she is now scheduled for an elective abdominal hysterectomy, bilateral oophorectomy.

Past medical history

Rheumatoid arthritis, hypertension, chronic anemia, chronic kidney disease secondary to chronic HTN

Allergies

No known allergies

Home medications

Lisinopril 40mg daily
Metoprolol 25mg daily
Hydrochlorothiazide 12.5mg daily
Epoetin monthly injection
Iron Supplements 325mg daily
Prednisone 5mg daily
Aspirin 81mg daily
Ginkgo biloba 1 tablet daily

Family history:

Father deceased of colon cancer, Mother deceased of pulmonary embolism, Works at printing press shop
Married with 2 children

Surgical history:

None

Labs

WBC: 6,000; Potassium: 4.1; PT/PTT: 13s / 28s; Hgb: 7.6
Creatinine: 1.3; INR: 1.0; Hct: 23

Setting

Operating room
Simulation center OR
Brief outline of simulation

Time

Pre-brief: 10 minutes
Simulation: 10 – 15 minutes
Debrief: 20 minutes

Participants

Simulation facilitator
Multidisciplinary OR team:

- ◆ Surgeon +/- First Assistant
- ◆ Anesthesia provider (MD and/or CRNA and/or SRNA)
- ◆ Primary RN circulator
- ◆ Anesthesia technician
- ◆ Surgical technologist or RN in scrub role
- ◆ Allied personnel involved in blood products management (e.g. transport, patient care technician, environmental staff, RN / surgical technologist in the facilitating role)
- ◆ Blood bank personnel

Confederates

Experienced healthcare professionals, such as physician, nurse or other practitioners), who act as team members during a simulation to provide realism or additional information for the learner
Additional stakeholders that may act as observers

Progressive Complexity

- ◆ Routine order given during Time Out for blood to be administered
- ◆ Routine start of the case and initiation of facility-specific protocols for blood products delivery to the OR
- ◆ Administration of the blood products
- ◆ Patient clinical deterioration reflective of a blood transfusion reaction
- ◆ Resuscitation of the patient

Potential Systems Explored

- ◆ Facility policy / protocol
- ◆ Roles of the perioperative team members in managing blood products
- ◆ Interprofessional communication and professionalism
- ◆ Interdepartmental collaboration

Learning Objectives

Desired overall end result:

- The participants will exhibit effective communication skill and professionalism
- The participants will exhibit effective interdepartmental collaboration and follow facility-specific protocols along the chain from the intraoperative blood products order to transfusion
- The participants will identify signs and symptoms of suspected acute and late transfusion reactions
- The participants will demonstrate effective management of intraoperative blood transfusion reaction

By the end of this simulation session, the participants will demonstrate

Knowledge

- Describe the blood ordering and acquisition process in the organization
- Understand the types of blood transfusion reactions
- Identify signs and symptoms of a blood transfusion reaction
- Describe steps to managing an intraoperative blood transfusion reaction

Psychomotor skill

- Demonstrate the blood ordering mechanisms in the organization (type and crossmatch, transfusion orders)
- Operate, manage and troubleshoot supplies related to blood transfusions
- Demonstrate effective and accurate facility-specific actions and associated documentation relating to blood transfusion reaction

Attitudinal behavior

- Demonstrate efficient and accurate hand-off communication +/- documentation at every stage of the blood products transport
- Exhibit effective inter-professional communication prior to, during, and post- blood transfusion

Participant Preparation

Prior to simulation, participants should review:

1. Journal articles

- ◆ Practice Guidelines for Perioperative Blood Management: An Updated Report by the American Society of Anesthesiologists Task Force on Perioperative Blood Management*. (2015). *Anesthesiology*, 122(2), 241–275. doi:10.1097/ALN.0000000000000463
- ◆ Campbell, D., Poost-Foroosh, L., Pavenski, K., Contreras, M., Alam, F., Lee, J., & Houston, P. (2016). Simulation as a toolkit—understanding the perils of blood transfusion in a complex health care environment. *Advances in simulation* (London, England), 1(1), 32. doi:10.1186/s41077-016-0032-z
- ◆ AABB. (2012). Primer of blood administration. Pages 98-107. Retrieved from: <https://www.bloodcenter.org/webres/File/Hospital%20.pdf%20forms/primerofbloodadministration.pdf>

2. Facility policy/procedure

- ◆ Review facility-specific blood transfusion policies/procedures
- ◆ See resources for recommended content if needing to update to reflect most up to date safety initiatives.

3. Websites

- ◆ <http://emergencymanual.stanford.edu/>

Standard Introduction

1. Sign in and obtain participant consents for video or research, if necessary
2. Have participants introduce themselves
 - a. Specialty, experience and role
 - b. Something personal
3. Orient participants to simulation process
 - a. Briefing
 - b. Case (simulation)
 - c. Debriefing - Discuss and review what went well and where there are opportunities for improvement
 - d. Feedback and closing
4. Discuss course objectives
5. Describe learning environment
 - a. Simulation is a safe and confidential learning environment
 - b. Acknowledge anxiety
 - c. Assure confidentiality of participant's performance and case
 - d. Obtain buy-in for simulation activities. Treat as a real-life situation, given the limitations of working with a mannequin, simulated medications, etc.
 - e. Treat this patient as if it was your perioperative patient.
 - f. Inject medications as usual
 - g. You will be video recorded for purposes of debriefing. The video will be destroyed/deleted per the simulation laboratory guidelines.
6. Discuss expectations of participants
 - a. Clinical role (be yourself)
 - b. Assure participants that the embedded simulation people are there to help them and there are no tricks.
 - c. Agree on a code word for a real event (Simulation will end immediately)
7. Identify equipment that is live or partially functional and explain any related safety issues
 - a. Mannequin
 - b. Defibrillators/emergency equipment
 - c. Cameras
 - d. Vital signs displayed on monitoring devices
 - e. Phone list
 - f. Documentation
8. Orient participants to patient situation and assumed roles; provide role cards if applicable
 - a. "It is 10:00 am on a Thursday and you are taking care of a patient with...."
 - b. "Your table is set up and all items have been counted...."
 - c. "You will start with conducting a time out...."
9. Ask the "float/supporting" personnel to leave the simulation environment and await communication they would receive during an actual crisis.
10. Ask participants if there are any questions before beginning
 - a. Answer any additional questions/clarify shared mental model
 - b. Announce that the simulation is starting

Set-up

Room

- ◆ Operating room, or
- ◆ Simulation equipped operating room.

Equipment/Supplies

1. Operating Room table
2. Mannequin dressed in a hospital gown, with hospital identification and allergy band on
3. Anesthesia machine equipped with oxygen, suction and cardiac monitor
4. Intubation equipment
5. Sequential Compression Device
6. Back table basic set up
7. Mayo stand basic set up
8. Electrosurgical unit
9. Emergency Code Cart
10. Emergency response cognitive aids
11. Simulated 2 units of packed red blood cells held in the blood bank

Medications (Simulated)

Note: Consider safety concerns regarding medications. It is essential to have a safety plan so that simulated or real medications do not leave the simulation environment and do not enter a clinical setting.

Simulator Preparation

1. Mannequin draped
2. Instrument table (basic set up), basin and Mayo stands in place
3. 1 liter of Lactated Ringers intravenous solution infusing to right antecubital space
4. Intubated with 7.0 mm ETT
5. FiO2 100%
6. Warming blanket and machine
7. Code Blue cart outside of room or in view

Documentation

1. Mock OR documentation for RN circulator
2. Medical and perioperative records
3. Patient's chart
4. Blood transfusion reaction forms
5. Blood transport log as needed per facility protocols

Sequence of Events

Note: This scenario may be conducted in whole or divided into two separate scenarios* dependent upon learner objectives.

Setting the stage

Patient is in the OR suite, intubated, Foley inserted, surgical site is prepped and draped in routine fashion.

Time Out

During the Time Out, an appropriate healthcare provider (e.g. anesthesia provider, surgeon) gives a verbal order to transfuse 2 units of packed red cells considering anticipated potential for intraoperative bleeding in the setting of baseline anemia.

Response

- ◆ The team acknowledges the order by closing the loop of communication
- ◆ Primary RN notes that the Type & Screen was drawn pre-operatively
- ◆ The team inquires if the procedure should be postponed until the blood products are in the OR suite.
- ◆ Time out is complete, and incision is made
- ◆ Transfusion protocol is initiated in accordance with facility policy from the verbal/written order to administering blood products.
- ◆ Patient's vital signs include: BP 118/72, HR 70, Normal Sinus rhythm Temp 98.8(F), PO2 100

Changes in patients' condition*

- ◆ Anesthesia is noting BP drop to 92/41, HR increase to 109
- ◆ Expectation: checking temperature and urine. Temp is reported to be 103.5 and urine turning dark brown
- ◆ Expectation: turn off warming blanket; team coming to consensus that this is a transfusion reaction and manage accordingly with utilization of crisis checklist and facility protocols.

Responses to treatments

- ◆ Patient goes into shock requiring activation of the crisis response
- ◆ Utilization of the cognitive aids specific to shock
- ◆ Patient is stabilized, incision is closed, and patient is transferred to the ICU.

Usually are several directions scenario can be taken

- ◆ Continuity of investigation involving the OR team and blood bank
- ◆ Optimal hand off to the ICU team

Continue with the simulation until the following action/ treatments are completed

Skill met	Action/Treatment Checklist
Effective interprofessional communication	Professional and closed loop communication among the OR team
Efficient and accurate interdepartmental collaboration	Follow facility-specific protocols for communicating with the blood bank
Demonstrate comprehension of facility-specific protocols related to perioperative blood products management	Follow facility protocols along the flowchart from the request for blood products to transfusion. Correct blood product delivery to the OR from the blood bank.
Identify signs and symptoms of a blood transfusion reaction	Recognizing onset of hypotension, tachycardia, hyperthermia and urine discoloration
Manage an intraoperative blood transfusion reaction	Activate appropriate emergency response with use of associated cognitive aids
Demonstrate comprehension of facility-specific protocols for blood transfusion reaction	Follow facility-specific policy for actions and documentation of blood transfusion reaction

**If focus is only on blood acquisition into the OR, the scenario could end at "Changes in patient condition." If time allows and simulation mandate includes the response to a Blood transfusion, the scenario may continue with a change in patient's vital signs.*

Responsibility/Skill met/Action/Treatment Checklist/Assessment Strategy

Skills assessment

Consideration of using NOTECHs +/- CRM tools

- ◆ Observing technical and non-technical skills during transfusion reaction emergency
- ◆ Observing technical skills of operating blood transfusion supplies

Formative evaluation

Open ended discussion specific to the Knowledge components of the learning objectives during pre/post briefing

- ◆ Understand the types of blood transfusion reactions
- ◆ Identify signs and symptoms of a blood transfusion reaction
- ◆ Describe steps to managing an intraoperative blood transfusion reaction

Summative evaluation

- ◆ Consider approval to gain Continuing Education Units as part of participating in the activities and gather data from routine post-CEU questionnaire
- ◆ Identifying areas of improvement during de-briefing
- ◆ Consider dedicating an OR Skills Day to target identified opportunities
- ◆ Consider recruiting engaged participants to take part in quality improvement initiatives +/- clinical ladder projects to enhance perioperative blood products management systems and developing future simulation scenarios.

Debrief

Begin debriefing by soliciting the participant's reactions to the simulation experience.

Clarify with the team the patient situation so that everyone is on the same page.

- ◆ Clarify confidentiality and expectations.
- ◆ Review the learning objectives.
- ◆ Discuss what happened in the simulation.
- ◆ Review what went well.
- ◆ Consider opportunities for improvement.
- ◆ Encourage expression of reactions.
- ◆ Ask participants:
 - ◇ "How did participating in this simulation make you feel?"
 - ◇ "Describe your thinking when...?"
 - ◇ "Were there performance gaps?"
 - ◇ "What could be changed in the OR?"
- ◆ Review the participant's roles and team expectations.
- ◆ Review principles of effective interprofessional teamwork.
- ◆ Review expectations for effective communication.
- ◆ Discuss appropriate post-event actions:
 - ◇ Consider keeping the patient intubated & sedated.
 - ◇ Monitor the patient for 24 hours post-recovery.
- ◆ Identify learner issues.

Resources

- AABB. (2015). An AABB white paper: Building a better patient blood management program. Identifying tools, solving problems and promoting patient safety. Retrieved from: <http://www.aabb.org/pbm/Documents/AABB-PBM-Whitepaper.pdf>
- AABB. (2012). Primer of blood administration. Pages 98-107. Retrieved from: <https://www.bloodcenter.org/webres/File/Hospital%20.pdf%20forms/primerofbloodadministration.pdf>
- American Society of Anesthesiologists. (2015). Practice Guidelines for Perioperative Blood Management: An Updated Report by the American Society of Anesthesiologists Task Force on Perioperative Blood Management*. *Anesthesiology*, 122(2), 241–275. doi:10.1097/ALN.0000000000000463
- Campbell, D., Poost-Foroosh, L., Pavenski, K., Contreras, M., Alam, F., Lee, J., & Houston, P. (2016). Simulation as a toolkit—understanding the perils of blood transfusion in a complex health care environment. *Advances in simulation (London, England)*, 1(1), 32. doi:10.1186/s41077-016-0032-z
- <https://www.ariadnelabs.org/areas-of-work/surgery-or-crisis-checklists/>
- <https://www.choosingwisely.org/societies/society-for-the-advancement-of-blood-management/>
- Vincent, J. L., Jaschinski, U., Wittebole, Lefrant, J. Y., Jakob, S. M., Almekhlaft, G. A., Pellis, T., Tripathy, S., Rubatto-Birri, P. N., & Sakr, Y. (2018). Worldwide audit of blood transfusion practice in critically ill patients. *Critical Care*, 22(102). doi:10.1186/s13054-018-2018-9 <https://ccforum.biomedcentral.com/track/pdf/10.1186/s13054-018-2018-9>
- WHO. (2013). Clinical transfusion practice: Guidelines for medical interns. http://www.who.int/bloodsafety/transfusion_services/ClinicalTransfusionPracticeGuidelinesforMedicalInternsBangladesh.pdf?ua=1

Acknowledgments

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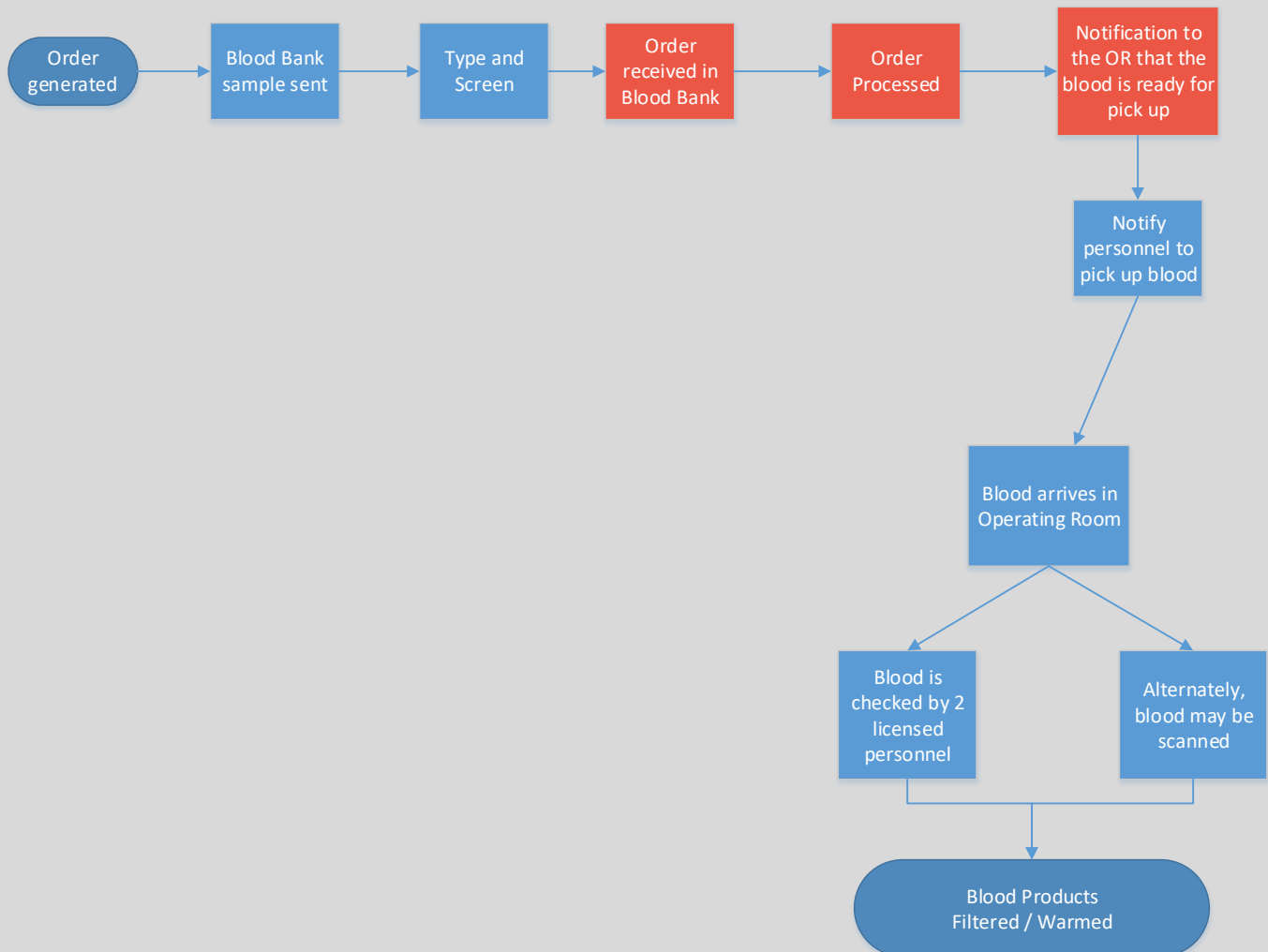
Pre/Post Test

1. What exact sequence of events must take place when a transfusion reaction is suspected?
 - a. Discontinue immediately
 - b. Intravenous access should be kept open for treatment
 - c. Notify responsible physician and blood bank to evaluate the patient
 - d. All of the above
2. Intraoperative patient monitoring includes which of the following?
 - a. Visual assessment of the surgical field
 - b. Extent of blood present, clot size and shape, and volume in suction canister
 - c. Surgical sponges
 - d. All of the above
3. In the operating room, transfusion reaction(s) may be manifested by:
 - a. Intractable bleeding
 - b. Hypotension and shock
 - c. Fever
 - d. All of the above
4. Most common immediate adverse reaction(s) to transfusion are?
 - a. Dark urine
 - b. Respiratory distress
 - c. Hypotension/hypertension
 - d. All of the above
5. Immediate management in transfusion reaction comprises of?
 - a. Stopping the transfusion
 - b. Documenting observations
 - c. Providing immediate patient care
 - d. All of the above
6. Immediate transfusion reactions may manifest during the procedure or within _____ hours of transfusion
 - a. 1 to 2 hours of transfusion
 - b. 1.5 to 2 hours of transfusion
 - c. 2 to 2.5 hours of transfusion
 - d. None of the above
7. Proper patient identification process entails:
 - a. Patient's name, medical record number and date of birth
 - b. Two licensed professionals to verify that the blood is a correct match
 - c. Verification and compared to the labels on the blood product
 - d. All of the above
8. Universal precaution should be used for contact with all patients which include:
 - a. Hand washing, using gloves and isolation precautions
 - b. Follow the Centers for Disease Control and Prevention (CDC) guidelines when in contact or potential contact with blood and blood components
 - c. Universal precautions are intended to prevent parenteral, mucous membrane, and non-intact skin exposures of health care workers to blood-borne pathogens
 - d. All of the above
9. Protective equipment should be used for administering blood transfusion include:
 - a. Gloves, masks, eyewear, or gowns
 - b. Masks and eyewear are worn together if splashes are anticipated
 - c. A gown or apron is worn to avoid soaking of clothes
 - d. Gloves, gowns, and should be changed if torn or soiled, between patients to prevent cross infection
10. Factors responsible for transfusion errors include:
 - a. Multiple team members involved in distribution of blood components
 - b. Clinical acuity/distractibility of team members
 - c. Patient identification issues and not using a standard checklist
 - d. All of the above
11. Indications for blood transfusion include:
 - a. Restore blood volume to maintain effective tissue perfusion
 - b. Increase the oxygen capacity of blood
 - c. Replace platelets, coagulation factors
 - d. All of the above

Pre/Post Test Answers

1. d (AABB, 2012, p. 28)
2. d (American Society of Anesthesiologists, 2015, p. 253)
3. d (American Society of Anesthesiologists, 2015, p. 256)
4. d
5. d
6. a (AABB, 2012, p. 36)
7. d (AABB, 2012)
8. d (AABB, 2012, p. 52)
9. a (AABB, 2012, p. 53)
10. d (Campbell, D., Poost-Foroosh, L., Pavenski, K., Contre-
ras, M., Alam, F., Lee, J., 2016, p. 4)
11. d (WHO, 2013, p. 17)

Blood Ordering Flow Chart



Thank you to Sharon Bouyer-Ferullo, DNP, MHA, RN, CNOR