

Scenario Overview

Summary

The patient is a 34-year-old woman with confirmed gallstones and pain during the past several months. She was undergoing a laparoscopic cholecystectomy that was emergently converted to an open procedure after the cystic artery was cut.

Setting

OR or Simulation Center

Time

Simulation 15-20 minutes

Debrief 20-30 minutes

Participants

Simulation facilitator

Attending surgeon (or Confederate)

RN circulator

Anesthesiologist (or Confederate)

Surgical resident (or Confederate)

Surgical technologist/RN in scrub role

Other personnel as requested (eg, OR desk personnel,

Surgical assistants, Attending vascular surgeon)

Progressive Complexity

Physiological system failure

Resuscitation of the patient

Potential Systems Explored

Clarity of team member roles

Diagnosis

Communication (eg, speaking up, looped communication)

Care coordination for emergent bleeding/hemorrhage

Learning Objectives

Learning Objectives

- 1) The learner will manage care for a patient with emergent bleeding/hemorrhage.
- 2) The learner will explain the need for consistently closing the communication loop during routine and emergency situations.
- 3) The learner will define perioperative team roles for managing the crisis event of patient hemorrhage.

Participant Preparation

Pre-Simulation

Review content on effective communication and crisis management per facility procedure.
Assigned reading: Graling P, Dort J, Moynihan J. Crisis management of a hemorrhagic emergency in the OR. *AORN J*. 2014;99(4):510-516.

Pre-Brief:

Treat the scenario as a real situation and do what you would normally do.
Inject medications as you would in the OR.
Use manikin extremities for line placement if needed.
Use emergency equipment on the manikin if needed.
Stand clear during any defibrillator shock administration.

Patient History

Patient is a 34-year-old female with confirmed gallstones and pain during the past several months. No prior surgical history.

Allergies

No known drug allergies

Social History

Lives with a roommate, employed as an office worker, non-smoker, denies drug use, social alcohol consumption approximately 2 drinks per week. Roommate is in waiting area.

Physical Exam

Height: 5' 4"
Weight: 150 lb (68 kg)
VS: BP 128/86, HR 84, T 37.1° C, RR 16, SpO2 100%
General: alert and oriented x 3
Neuro: CN II-XII grossly intact, no gross motor deficit, gait unremarkable. Upper and lower extremity sensation and motor grossly intact.
HEENT: normocephalic, atraumatic, moist oral mucosa, no cervical lymphadenopathy
Heart: regular, no murmurs rubs gallops, normal S1 S2
Lungs: clear to auscultation in all lung fields bilaterally
Abdomen: Soft to palpation, nontender, nondistended
Skin: good capillary refill, 2+ radial/dorsalis pedis pulses, no jaundice, rashes, or lesions. No edema or cyanosis.

Home Medications

Daily multivitamin

Set-up

Room

OR or Simulation Center

Equipment

Patient OR bed
SimMan® or manikin in hospital gown
Identification band on arm
IV x 2 in right and left antecubital
Sequential compression devices
Electrosurgical dispersive pad
Rapid infuser
Thermostat to warm room
Code cart
Defibrillator
Set up for open procedure with retractor, Yankauer suction and tubing, lap sponges, etc.
Rapid infuser
Fluid warmer
Blood tubing
Lab tubes
Requisition slips

Medications/Solutions

4 L of fake blood that can be pushed through pressure bags and tubing to the bleeding model
(Note: Blood matches identification number on patient wristband)
4-8 L of crystalloid—both lactated Ringer's and normal saline
6 units of O positive blood
6 units of fresh, frozen plasma
10 units of cryoprecipitate
6 bags (each with 6 units) of platelets
1-2 units of factor VII or 50 mL vial/drug container

Intraoperative Labs

Arterial blood gases (ABGs)
Glucose
Calcium
Prothrombin time (PT) with International Normalized Ratio (INR)
Partial thromboplastin time (PTT)

Documentation

Electronic or paper health record
Code documentation if applicable

Sequence of Events

The following information should be communicated by the facilitator either verbally, in written format, or via a sign on the door to the simulation room:

The patient is a 34-year-old woman undergoing a laparoscopic cholecystectomy.

Initial Vital Signs

ECG: Normal sinus rhythm (NSR)

Blood pressure: 110/60

Heart rate: 72

Respirations: 16

SpO₂ 100%

Baseline Laboratory Results

	Result	Unit	Reference Range
WBC	9.7	103/ μ L	4.0-11.0
RBC	5.5	106/ μ L	4.6-6.2
HGB	12.2	g/dL	12.0-15.0
HCT	38	%	36-46
PLT	410	cells/ μ L	140-450

The patient was intubated with a 7.0-mm endotracheal tube without difficulty.

Preoperatively, a 20-gauge IV was placed in the right antecubital fossa.

The cystic artery was cut and the laparoscopic cholecystectomy was emergently converted to an open procedure.

An additional 16-gauge IV has been placed in the left antecubital fossa; both IVs are wide open with fluids being administered.

An esophageal temperature probe has been inserted.

An arterial line has been inserted into the right radial artery.

Current fluid volume deficit indicators are thready pulse, decreased venous filling, and decreased cardiac output.

Vital Signs 3 Minutes After Cystic Artery Was Cut

ECG: NSR

Blood pressure: 65/38

Heart rate: 164

Respirations: 16

SpO₂ 90%

Current Laboratory Results

	Result	Unit	Reference Range
HGB	5.6*	g/dL	12.0-15.0
HCT	13*	%	36-46

Sequence of Events

Continue with the simulation until the following actions/treatments are completed:

Task	Completed	
	Yes	No
Recognizes hemorrhage and calls for help within 5 minutes		
Calls for emergency cart		
Identifies crisis manager		
Increases FiO ₂ to 100%		
Turns down volatile anesthetics		
Notifies blood bank personnel within 5 minutes of hemorrhage recognition		
Activates massive transfusion protocol		
Assigns team member as primary blood bank contact		
Orders blood products (eg, FFP, PRBC, platelets)		
Prepares rapid infuser or pressure bags		
Administers packed RBC within 10 minutes of receipt		
Orders laboratory tests (eg, CBC, PT/PTT/INR, fibrinogen, lactate, ABG, potassium, ionized calcium)		
Initiates efforts to maintain patient normothermia (increasing room temperature, using warmed blankets, using a warming device)		
Anticipates surgeon and anesthesia needs (eg, suture, hemostatic agents, IV fluids)		

Confidential Debrief Session

Standardized debrief questions:

- How did the scenario feel; what was your overall impression?
- Did the team collaborate interprofessionally to care for this patient?
- Who was the leader?
- How was that decided?
- How was the diagnosis determined?
- Did all members of the OR team realize the situation?
- Was there enough help/the right personnel available?
- How were roles clarified?
- How did the communication among team members work?

Hemorrhage-Specific Debrief Questions

- Summarize the hemorrhage simulation session.
- Was the treatment goal of stable vital signs, adequate urine output, and minimal fluid and electrolyte imbalance met?
- Did all team members know what was happening at all times?
- Was there adequate communication, teamwork, and a shared mental model in assessing and treating this patient?
- How was the communication with the blood bank?
- Why did the team order laboratory specimens? (To detect electrolyte disturbances such as hyperkalemia and hypocalcemia)
- Why was it so important to keep the patient warm? (Hypothermia perpetuates acidosis; acidosis accelerates oxygen demand)
- What challenges did you encounter?
- How did the team manage the challenges?
- Has anyone ever been in this situation in your OR?

Take Home Message

Reinforce key learning points identified by the learners and how these learning points can be applied to the learners' perioperative practice.

Resources

Pre/Post Test

- In which patient population is there a greater risk for massive hemorrhage?
 - Patients having procedures involving the abdomen or chest
 - Patients having procedures in outpatient settings
 - Patients whose surgical pathology is adjacent to major vascular structures
 - All of the above
 - a and c
- What is the definition of massive hemorrhage?
 - Administering more than 10 units of RBC within 24 hours of the start of treatment
 - A significant decrease in blood pressure, pulse, cardiac output, and venous filling during the surgical procedure
 - Administering 6 units of packed RBC and 6 units of platelets within 4 hours
 - Patient blood loss of 2000 mL during a surgical procedure
- What should the perioperative nurse do first after massive hemorrhage is identified during a laparoscopic procedure?
 - Prepare to convert to an open procedure
 - Call for help and bring the emergency cart
 - Obtain hemostatic agents
 - Obtain a secondary IV access
- What should be the focus of the team members' actions during a hemorrhagic crisis?
 - Send appropriate labs, obtain the crash cart, and stop the bleeding
 - Defibrillate the patient, avoid coagulopathy, and call for additional resources
 - Stop the bleeding, maintain hemodynamic stability, and avoid coagulopathy
- Initiation of the massive transfusion protocol is meant to improve communication among the team and to coordinate a systematic approach to the administration of large volumes of blood products.
 - True
 - False
- In addition to the effective restoration of blood volume, the specific goal of transfusion management should be to restore the patient's
 - Baseline blood pressure
 - Body temperature
 - Oxygen-carrying capacity
 - a and b
- What methods may be used to rapidly control bleeding?
 - Applying direct pressure
 - Applying hemostatic agents
 - Using electrocautery or tissue-sealing devices
 - All of the above
- The lethal triad of hemorrhage is acidosis, coagulopathy, and hypothermia.
 - True
 - False
- Which of the following laboratory specimens should be drawn as part of a massive transfusion protocol?
 - Complete blood count
 - Prothrombin time/partial thromboplastin time/international normalized ratio
 - Arterial blood gases
 - Human immunodeficiency virus (HIV) status
 - a, b, and c
- What blood products may be required for administration during a hemorrhagic crisis?
 - Packed RBC
 - Platelets
 - Fresh frozen plasma
 - Clotting factor VII
 - Uncrossmatched type O blood
 - All of the above

Resources

Hemorrhage Test Answers

1. E
2. A
3. B
4. C
5. A
6. C
7. D
8. A
9. E
10. F

Reference for Pre/Post Test

Graling P, Dort J, Moynihan J. Crisis management of a hemorrhagic emergency in the OR. *AORN J.* 2014;99(4):510-516.

References for Scenario

Arriaga AF, Bader AM, Wong JM, et al. Simulation-based trial of surgical-crisis checklists. *N Engl J Med.* 2013;368(3):246-253.

Graling P, Dort J, Moynihan J. Crisis management of a hemorrhagic emergency in the OR. *AORN J.* 2014;99(4):510-51.

Kamerer JL. Massive transfusion protocol simulation. *Simult Healthc.* 2012;7(3):196-200.

Acknowledgments

Lead authors: Linda M. Levesque MSN, RN, CNOR, OR Clinical Systems Analyst, Perioperative Services, Tulane University Hospital & Clinic, New Orleans, LA; Beth H. Fitzgerald, MSN, RN, CNOR, Perioperative Simulation Specialist, Christiana Care Health System, Newark, DE; Maureen W. Hemingway, MHA, RN, CNOR, Nursing Practice Specialist, Perioperative Services, Massachusetts General Hospital, Boston, MA; and Kelly M. Boyle, MSN, RN, CNOR, Clinical Education for the OR, Brigham and Women's Hospital, Boston, MA. Special thanks to members of the 2015 Simulation Task Force for their assistance in the development of this simulation scenario.