

Resuscitative Hysterotomy

Section 1: Case Summary

Scenario Title:	Resuscitative Hysterotomy
Keywords:	ob-gyn, resuscitative hysterotomy
Brief Description of Case:	The team receives advance notification from EMS about a 30 year-old female who is visibly pregnant and was in a car accident. Upon arrival to the ED the patient loses pulses and CPR begins. The team must begin ACLS and proceed to resuscitative hysterotomy. After delivery they should begin neonatal resuscitation and continue management of the mother. Early consultation should be made to trauma surgery, NICU, and OB.

Goals and Objectives	
Educational Goal:	To expose learners to a resuscitative hysterotomy (aka perimortem c-section)
Objectives: (Medical and CRM)	<p>Medical Objectives:</p> <ol style="list-style-type: none"> 1. Demonstrate appropriate ACLS/ATLS involving a pregnant patient. 2. Demonstrate appropriate procedural steps for resuscitative hysterotomy 3. Appropriately manage neonatal resuscitation. 4. Demonstrate ability to manage two critically ill patients at once. <p>CRM Objectives:</p> <ol style="list-style-type: none"> 1. Demonstrate ability to lead a code team 2. Communicate effectively with team members. 3. Demonstrate appropriate resource utilization when managing two critically ill patients simultaneously.
EPAs Assessed:	<p>TD 1: Recognizing the unstable/critically ill patient, mobilizing the health care team and supervisor, and initiating basic life support</p> <p>F1: Initiating and assisting in resuscitation of critically ill patients</p> <p>C1: Resuscitating and coordinating care for critically ill patients</p> <p>C2: Resuscitating and coordinating care for critically injured trauma patients</p> <p>C13: Performing advanced procedures</p>

Learners, Setting and Personnel			
Target Learners:	<input type="checkbox"/> Junior Learners	<input checked="" type="checkbox"/> Senior Learners	<input type="checkbox"/> Staff
	<input checked="" type="checkbox"/> Physicians	<input type="checkbox"/> Nurses	<input type="checkbox"/> RTs
	<input type="checkbox"/> Inter-professional		
<input type="checkbox"/> Other Learners:			
Location:	<input checked="" type="checkbox"/> Sim Lab	<input checked="" type="checkbox"/> In Situ	<input type="checkbox"/> Other:
Recommended Number of Facilitators:	Instructors: 1		
	Confederates: 1+ (RN, EMS, RT)		
	Sim Techs: 1		



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Scenario Development	
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Section 2A: Initial Patient Information

A. Patient Chart					
Patient Name: Jane Smith		Age: 30		Gender: F	Weight: 90kg
Presenting complaint: Motor Vehicle Collision					
Temp: 36	HR: ---	BP: ---	RR: ---	O ₂ Sat: 75% with CPR	FiO ₂ : ---
Cap glucose: 5.7 mmol/L (103 mg/dL)			GCS: 3 (1E 1V 1M)		
Triage note: 30F found unresponsive in SUV that rolled over after being side swiped on highway going approximately 70 mph (~110kph). Pt has large, gravid abdomen.					
Allergies: Unable to obtain					
Past Medical History: Unable to obtain			Current Medications: Unable to obtain		

Section 2B: Extra Patient Information

A. Further History	
<p><i>Include any relevant history not included in triage note above. What information will only be given to learners if they ask? Who will provide this information (mannequin's voice, confederate, SP, etc.)?</i></p> <p>Hx from EMS confederate or Sim Tech: Single passenger, driver, belted, airbags deployed travelling ~70mph. Initially GCS 5. No further history obtained. Pulses lost on arrival to ED</p>	
B. Physical Exam	
General status: Unresponsive female with visible trauma to head, visibly gravid abdomen	
Cardio: No heart sounds.	Neuro: Unresponsive, Ecchymosis/abrasion over forehead
Resp: Bagged breath sounds equal bilaterally.	Head & Neck: Pupils fixed, unreactive, equal. No bleeding from nares. Midface is stable. Trachea midline.



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Abdo: **Gravid abdomen with fundus palpable at level of xiphoid. FHR 80 on doppler or ultrasound. No fetal parts palpable.**

MSK/skin: R thigh swollen, ecchymotic.
Ecchymosis/abrasions to forehead, R thigh.

Other: GU - No ongoing vaginal bleeding



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Section 3: Technical Requirements/Room Vision

A. Patient
<input checked="" type="checkbox"/> Mannequin – (1) computerized adult mannequin, (2) neonatal mannequin
<input type="checkbox"/> Standardized Patient
<input checked="" type="checkbox"/> Task Trainer
<input type="checkbox"/> Hybrid
B. Special Equipment Required
Basic and advanced airway equipment, blood products including level 1 infuser, thoracotomy kit, and c-section tray. Neonatal resuscitation equipment including warmer.
C. Required Medications
Blood products, TXA
D. Moulage
OB simulator with vertical c-section capability, or standard simulator with task trainer with vertical c-section capability. Newborn simulator. OB Simulator should have evidence of head trauma, thigh trauma with ecchymosis/bleeding.
E. Monitors at Case Onset
<input checked="" type="checkbox"/> Patient on monitor with vitals displayed
<input type="checkbox"/> Patient not yet on monitor
F. Patient Reactions and Exam
<i>Include any relevant physical exam findings that require mannequin programming or cues from patient (e.g. – abnormal breath sounds, moaning when RUQ palpated, etc.) May be helpful to frame in ABCDE format.</i>
Upon ED arrival patient loses pulse, becomes unresponsive with a GCS 3 No difficulties with BVM



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Section 4: Confederates and Standardized Patients

Confederate and Standardized Patient Roles and Scripts	
<i>Role</i>	<i>Description of role, expected behavior, and key moments to intervene/prompt learners. Include any script required (including conveying patient information if patient is unable)</i>
EMS	Describes rollover, pulses lost on arrival, begins CPR. EMS: "We have a 30 year-old female who is visibly pregnant who was a rollover motor vehicle accident, unresponsive, GCS 5. Vitals en route: 90/40, HR: 120, RR 20, O2 98% on NRB.."
RN	During Scenario State 1: Baseline State - RN can suggest consults, calling NICU/OB - RN can suggest calling for blood During Scenario State 2: Resuscitative hysterotomy - RN can suggest helping with neonatal resuscitation



Simulation Scenario Template

Section 5: Scenario Progression

Scenario States, Modifiers and Triggers				
Patient State/Vitals	Patient Status	Learner Actions, Modifiers & Triggers to Move to Next State	Facilitator Notes	
1. Baseline State Rhythm: PEA HR: --- BP: --- RR: --- O ₂ SAT: 75% with CPR T: 36 °C GCS: 3	Unresponsive, pulseless, EMS has started CPR.	<u>Expected Learner Actions</u> <input type="checkbox"/> Lead ACLS protocol <input type="checkbox"/> Uterine displacement <input type="checkbox"/> Monitors (pt + FHR/US) <input type="checkbox"/> O ₂ + airway support (BVM) <input type="checkbox"/> Vocalize plan for resuscitative hysterotomy and NRP <input type="checkbox"/> Consult to trauma, OB, NICU <input type="checkbox"/> Initiate massive transfusion	<u>Modifiers</u> <i>Changes to patient condition based on learner action</i> - RN can suggest consults - RN can suggest calling for blood <u>Triggers</u> <i>For progression to next state</i> - Once all steps complete, progress to phase 2.	Uterine displacement: Manually displace uterus to the left while pt remains on backboard and compressions ongoing U/S shows single live intrauterine pregnancy, large, head down, FHR 80s. FAST +, eFAST neg for ptx.
2. Resuscitative Hysterotomy VS unchanged after 5 mins	Unresponsive, pulseless	<u>Expected Learner Actions</u> <input type="checkbox"/> Perform resuscitative hysterotomy while CPR is ongoing (Note: help should be called for and team should be divided into two, one for mother, one for fetus) <input type="checkbox"/> Another learner to manage mother's airway <input type="checkbox"/> Deliver the baby, begin NRP <input type="checkbox"/> Deliver placenta, pack abdominal cavity, post-partum hemorrhage management	<u>Modifiers</u> - RN can suggest resuscitative hysterotomy - RN can suggest helping with neonatal resuscitation <u>Triggers</u> - CPR >5 mins	Steps for resuscitative hysterotomy detailed in facilitator notes
3. Mother: Rhythm: Asystole HR: 0 BP: RR: bagged/intubated O ₂ sat:	Infant is minimally responsive, gray, begins to cry with stimulation	<u>Expected Learner Actions</u> <input type="checkbox"/> Stimulate infant, warm with blankets, move to warmer, transfer care to NICU team <input type="checkbox"/> Call Ob (if not already done) <input type="checkbox"/> Continue with ACLS protocols for another 2 rounds, then stop resus	<u>Modifiers</u> - None <u>Triggers</u> - RN can suggest calling NICU if not yet involved	



Simulation Scenario Template

Appendix A: Laboratory Results

<p><u>CBC</u> – none available</p> <p>WBC Hgb Plt</p> <p><u>Lytes</u> – none available</p> <p>Na K Cl HCO₃ AG Urea Cr Glucose</p> <p><u>Extended Lytes</u> – none available</p> <p>Ca Mg PO₄ Albumin TSH</p> <p><u>VBG</u> – none available</p> <p>pH pCO₂ pO₂ HCO₃ Lactate</p>	<p><u>Cardiac/Coags</u> – none available</p> <p>Trop D-dimer INR aPTT</p> <p><u>Biliary</u> – none available</p> <p>AST ALT GGT ALP Bili Lipase</p> <p><u>Tox</u> – none available</p> <p>EtOH ASA Tylenol Dig level Osmols</p> <p><u>Other</u> – none available</p> <p>B-HCG Blood type</p>
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Simulation Scenario Template

Appendix B: ECGs, X-rays, Ultrasounds and Pictures

Paste in any auxiliary files required for running the session. Don't forget to include their source so you can find them later!

ECGs – none available

Images (CXRs, etc.) – none available

Ultrasound Video Files – none available

- Describe large infant, head down, bradycardic, HR 80s, FAST +, no pneumothorax



Simulation Scenario Template

Appendix C: Facilitator Cheat Sheet & Debriefing Tips

Include key errors to watch for and common challenges with the case. List issues expected to be part of the debriefing discussion. Supplemental information regarding any relevant pathophysiology, guidelines, or management information that may be reviewed during debriefing should be provided for facilitators to have as a reference.

General Debriefing Plan: Group, Without Video

Medical Objectives:

1. Demonstrates appropriate ACLS/ATLS involving a pregnant patient.
2. Demonstrates appropriate procedural steps for resuscitative hysterotomy
3. Appropriately manages neonatal resuscitation.
4. Demonstrates ability to manage two critically ill patients at once.

CRM Objectives:

1. Demonstrates ability to lead a code team
2. Communicates effectively with team members.
3. Demonstrates appropriate resource utilization when managing two critically ill patients simultaneously.

Sample questions for debriefing:

1. What is the incidence of maternal cardiac arrest? (1 in 30,000)
2. What are the survival rates for resuscitative hysterotomy? Maternal survival 54% neonatal survival 64%
3. How do you perform a resuscitative hysterotomy?

Indications - Maternal arrest + fundus above umbilicus

Procedure - SMACC video by Sara Gray (<https://vimeo.com/187765197>)

4. What is your approach for simultaneously managing two resuscitations?
5. How do you manage utilizing additional services and keeping control of the code?
6. How do you debrief your team after a death or near death in not one, but two patients?

Key Moments:

1. Think of perimortem c-section as resuscitative hysterotomy to save the life of the mother and the fetus if possible.
2. Recognize the challenge of managing two critical patients at once and effectively utilizing your team and delegating appropriately.
3. Walk through the steps of resuscitative hysterotomy.

References

1. Marx, J.A., Hockberger, R.S., Walls, R.M. & Adams J. (2013). *Rosen's emergency medicine: Concepts and clinical practice*. St. Louis: Mosby.
2. Campbell TA, Sanson, TG. (2009). *Cardiac arrest and pregnancy*. J Emerg Trauma Shock. 2(1):34-42.
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4. Einav S, Kaufman N, Sela HY. (2012). *Maternal cardiac arrest and perimortem caesarean section*. Resuscitation. 83(10):1191-200.

