Simulation Patient Design (November, 2019)
Complete Uterine Inversion in the L&D OR

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Introduction

Acute uterine inversion after vaginal delivery occurs in one in 3737 deliveries and one in 1866 following cesarean delivery.[1] Uterine inversion is frequently associated with major obstetric hemorrhage and if not recognized and treated promptly, may necessitate administration of massive transfusion. Uterine inversion occurs when the uterine fundus collapses in the endometrial cavity turning the uterus partially or completely turned inside out and may protrude from the vagina.[2] Uterine inversion is classified by the degree of inversion: incomplete inversion when the uterine fundus is inverted and lies within the endometrial cavity without extending beyond the external os; uterine prolapse where the fundus protrudes through the vaginal introitus; and complete uterine inversion when the uterus and vagina are completely inverted.

Risk Factors for uterine inversion:

- Fundal placental implantation
- Uterine atony after delivery of the fetus
- Cord traction prior to placental separation
- Abnormally adherent placenta, i.e. accreta

Educational Rationale: To teach team skills in managing all degrees of uterine inversion/prolapse
Target Audiences: Nursing, OB, Anesthesiology, OR personnel
Learning Objectives: As per Accreditation Council for Graduate Medical Education (ACGME) Core Competencies

Upon completion of this simulation (including the debrief) learners will be able to:

- *Medical knowledge*: Describe clinical signs, symptoms, and treatment options for uterine inversion/prolapse
- *Patient care*: Describe risk factors for patients who may be predisposed to develop uterine inversion/prolapse and prioritize management options
- *Practice-based learning and improvement*: Identify the equipment/medications necessary to medically/surgically manage an obstetric patient who develops uterine inversion/prolapse, with recognition and treatment of postpartum hemorrhage
- *Interpersonal and communication skills*: Designation of a team leader who will effectively communicate with labor and delivery teams in order to provide quality safe care to the patient, plus maintain on-going communication regarding mother's status and on-going blood loss with the L&D team
- *Professionalism*: Demonstrate mutual respect for the expertise of other team members
- *Systems-based practice*: Identify that all resuscitation equipment/medications/blood bank protocols are set up or readily available in delivery locations including equipment for airway management including back up intubation devices, induction/emergency medications, supplies for IV access, equipment for massive transfusion (i.e. rapid infuser), blood bank massive

transfusion protocol plus identify barriers within the hospital system including staffing, medication, equipment, and protocol deficiencies

Questions to ask after the scenario:

- Did a leader emerge who then communicated effectively with all team members?
- Were there system modification opportunities identified during this simulation?

Assessment Instruments:

1. Learner Knowledge Assessment form (Appendix 1)
2. Simulation Activity Evaluation form (Appendix 2)

Equipment needed and set up:

In-situ OR setup

- Mannequin set up supine in stirrups with blue drapes on the legs, epidural catheter in situ connected to a running epidural infusion pump, fetal monitoring ongoing
- 18 gauge IV in hand with Lactated Ringers (IV tubing which contains an access port)
- Standard ASA monitors
- OR vaginal delivery tray set up with forceps added

Simulation Scenario set up:

The case

The patient is undergoing a vaginal delivery in the OR because of concerns for macrosomia. Mrs. Ursula Irwin is a 35 year-old healthy female G1P0 who has a poorly functioning epidural. Anesthesia is called to assist with analgesia.

Simulation pre-brief

- Read the scenario and instruct team members on their role during the simulation
- The learners take their places inside or outside of the OR
- Patient (embedded participant)
- The Labor and Delivery Nurse (embedded participant) is in the OR assisting the Obstetrician (embedded participant)
- The father of the baby is also at bedside (embedded participant or learner)

Uterine Inversion Scenario

Trigger	Patient Condition	Action	Done	Time	Comments
In OR, the patient is pushing and has very poor pain relief	Supine, stirrups	1. Labor and delivery nurse is assisting the OB with delivery and monitoring the patient 2. Nurse is monitoring the fetal heart tracing			
The OB requests anesthesia presence to assist with pain control	Supine, stirrups, screaming in pain	1. Anesthesia at bedside, standard ASA monitors placed 2. Report given by OB - states the epidural snagged a bit when moving patient over to the delivery bed 3. Anesthesia trouble shooting epidural 4. Epidural dosed with local anesthetic 5. Baby delivered by forceps			
OB reports difficulty delivering placenta which progress to uterine inversion	Supine, stirrups, screaming in pain	1. OB request uterine relaxation 2. IV nitroglycerin ineffective			
Proceeds to massive hemorrhage requiring induction of general anesthesia	Patient intubated	1. Patient is pre-oxygenated and intubated 2. Start volatile agent for relaxation 3. Large bore IV access obtained 4. Vasopressors as indicated 5. Active resuscitation with IV fluid, rapid infuser 6. Arterial line placed 7. Massive Transfusion Protocol initiated 8. CBC, coagulation studies, DIC, and ABG labs drawn			
OB states uterine inversion resolved, minimal active bleeding	Patient hemodynamically stable after resuscitation	1. Oxytocin infusion started 2. Send additional CBC, coagulation study, DIC, and ABG labs drawn			
OB requests uterotonics for atony which then resolves with medication		1. Methylergonovine 2. Carboprost			

Appendix 1

Obstetrics Interdisciplinary Team Simulation

Name of simulation: _____ Date: _____

OB Nursing Anes

Each item has two components. The "Before the simulation" column (left side) examines your perspective at the beginning of the simulation. The "End of Simulation" column (right side) is to evaluate your perspective at the completion of the simulation.

1. How would you rate your knowledge of patient risk factors for uterine inversion or prolapse?

BEFORE THE SIMULATION	END OF SIMULATION
1 2 3 4 5 6 7 Little/none Knowledgeable	1 2 3 4 5 6 7 Little/none Knowledgeable

2. How would you rate your knowledge of signs and symptoms of uterine inversion or prolapse?

BEFORE THE SIMULATION	END OF SIMULATION
1 2 3 4 5 6 7 Little/none Knowledgeable	1 2 3 4 5 6 7 Little/none Knowledgeable

3. How would you rate your knowledge of treatment options for uterine inversion or prolapse?

BEFORE THE SIMULATION	END OF SIMULATION
1 2 3 4 5 6 7 Little/none Knowledgeable	1 2 3 4 5 6 7 Little/none Knowledgeable

4. How would you rate your knowledge of treatment of postpartum hemorrhage?

BEFORE THE SIMULATION	END OF SIMULATION
1 2 3 4 5 6 7 Little/none Knowledgeable	1 2 3 4 5 6 7 Little/none Knowledgeable

5. How would you rate your knowledge of blood product administration during a postpartum hemorrhage?

BEFORE THE SIMULATION	END OF SIMULATION
1 2 3 4 5 6 Little/none Knowledgeable	1 2 3 4 5 6 7 Little/none Knowledgeable

Appendix 2

SIMULATION ACTIVITY EVALUATION FORM

DATE OF SIMULATION: _____

OCCUPATION: Consultant PG Yr 1 2 3 4 STUDENT NURSE MIDWIFE OTHER

SPECIALTY:_____ YEARS IN PRACTICE: _____

Please rate the following aspects of this training program using the scale listed below:

1 = poor 2 = suboptimal 3 = adequate 4 = good 5 = excellent

Use "N/A" if you did not experience or otherwise cannot rate an item

INTRODUCTORY MATERIALS						
Orientation to the simulator	1	2	3	4	5	N/A
PHYSICAL SPACE						
Realism of the simulator space	1	2	3	4	5	N/A
EQUIPMENT						
Satisfaction with the mannequin	1	2	3	4	5	N/A
SCENARIOS						
Realism of the scenarios	1	2	3	4	5	N/A
Ability of the scenarios to test technical skills	1	2	3	4	5	N/A
Ability of the scenarios to test behavioral skills	1	2	3	4	5	N/A
Overall quality of the debriefings	1	2	3	4	5	N/A
DID YOU FIND THIS USEFUL?						
To improve your clinical practice?	1	2	3	4	5	N/A
To improve your teamwork skills?	1	2	3	4	5	N/A
To improve your VERBAL communication?	1	2	3	4	5	N/A
To improve your NONVERBAL communication?	1	2	3	4	5	N/A
FACULTY						
Quality of instructors	1	2	3	4	5	N/A
Simulation as a teaching method	1	2	3	4	5	N/A

COMMENTS

References:

1. Ojabo OA, Adesiyun AG, Ifenne DI, Hembar-Hilekan S, Umar H. Acute uterine inversion: A case report and literature review. Arch Int Surg 2015;5:52-5
2. Macones G. Puerperal uterine inversion. UpToDate, 2019. https://www-uptodate-com (accessed 10/31/19)