

Simulation Patient Design (June 2024)

Case of External Cephalic Version

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Introduction:

External cephalic version (ECV) refers to an elective procedure in which the fetus is rotated from a non-cephalic to a cephalic presentation by physical manipulation through the mother's abdomen. The American College of Anesthesiologists (ACOG) and other societies recommend ECV be offered to all pregnant patients with breech presentation at term for whom there are no contraindications. ECV is typically performed in nonlaboring patients after 36 weeks gestation. Performing ECV at 37 weeks has the advantages of an increased likelihood of vertex presentation at birth and relative fetal maturity if complications arise necessitating urgent delivery.

ECV is associated with a decreased rate of breech presentation at birth, and a lower rate of cesarean section without an increase in severe maternal and perinatal morbidity. Success rates of ECV range from 22 percent to 76 percent. In a meta-analysis of 84 studies including almost 13,000 version attempts at term, the pooled success rate was 58 percent.¹ The success of ECV is influenced by both maternal and fetal factors. A dedicated ECV team and a standard ECV protocol may improve the success rate.²

Multiple supportive modalities have been used with ECV including remifentanyl infusion, nitrous oxide inhalation, hypnosis, acupuncture, and neuraxial anesthesia. Parenteral tocolysis (β mimetics such as terbutaline or oxytocin antagonist) is associated with a higher success rate compared to nitroglycerine and nifedipine. Neuraxial anesthesia, in combination with tocolysis, can further increase ECV success rates by 44% and reduce cesarean section by 17%.³ Neuraxial anesthesia techniques including single-shot spinal, epidural, or combined spinal-epidural have all been used to facilitate ECV. The analgesic effect of neuraxial blocks relieve pain and improve patient satisfaction, furthermore, the anesthetic level of sensory blockade may be associated with increased success for version.⁴ The cost of neuraxial anesthesia for ECV may be offset by the reduced rate of cesarean birth after a successful version.⁵ Remifentanyl and hypnosis are some useful modalities whereas nitrous oxide inhalation does not seem to increase success.

ECV guidelines vary across obstetric practice.⁶ Similarly, a survey on the utility of neuraxial blockade among SOAP members showed only 40% of anesthesia providers always or often used neuraxial block to facilitate ECV for breech pregnancies. There was also wide variation in terms of utilization of type of neuraxial block, sensory dermatomal block target, medication, and doses used.⁷

ECV can be performed in the operating room (OR) or the labor and delivery suite. Patients should be properly hydrated with IV fluid, carefully monitored with standard ASA monitors, and local anesthetic carefully titrated to achieve an anesthetic level. Although ECV is a safe procedure with few complications, professional consensus recommends that

it should be performed in a setting where fetal monitoring and immediate access to an operating room for emergent cesarean section is available. ECV may be associated with abnormal cardiotocography patterns (0.9%), emergency cesarean delivery(0.5%), perinatal mortality (0.16%.), and vaginal bleeding (0.08%).⁸

If ECV is successful at 37 weeks, the patient is typically discharged to home to continue prenatal care until delivery is indicated. If ECV is unsuccessful, further options include scheduling a return to the hospital at the earliest point delivery would be indicated either for planned cesarean delivery or for a repeat version attempt with a plan to proceed to cesarean if unsuccessful. If ECV is successful at or after the gestational age when delivery is reasonable, a patient could either start induction of labor or await spontaneous onset of labor as obstetrically indicated.

Educational Rationale: The goal of this simulation is to highlight the anesthetic considerations of ECV, specifically, the anesthetic conditions that facilitate successful ECV, and to emphasize the importance of provisions to quickly perform emergency cesarean section in case of complications.

Target Audiences: Nursing, OB, Anesthesiology, OR personnel

Learning Objectives: As per the Accreditation Council for Graduate Medical Education (ACGME) Core Competencies

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

- *Medical knowledge:* Identify the anesthetic options available for ECV, understanding optimized anesthetic practice to facilitate ECV, and recognizing potential complications associated with ECV.
- *Patient care:* List the anesthesia and procedure-related risk factors associated with the anesthetic level of neuraxial block and ECV. Formulate a plan to mitigate these risk factors.
- *Practice-based learning and improvement:* Identify the possible risks associated with performing ECV outside of OR and ensure patient safety by having clear protocol on monitoring, gradual titration of anesthetic to prevent hypotension, and provision to quickly move to OR in case of maternal or fetal compromise.
- *Interpersonal and communication skills:* Demonstrate clear closed-loop communication. Maintain dialogue regarding changing clinical conditions.
- *Professionalism:* Demonstrate mutual respect for all team members.
- *Systems-based practice:* Ensure all personnel, resuscitation equipment, medications, and protocols are readily identifiable and available in delivery locations including airway management, anesthesia induction/emergency medications, and vascular access. Identify barriers to conducting safe and prompt transfer of patients to the OR.

Questions to ask after the scenario:

1. What are anesthetic options available for ECV?
2. How should a patient be monitored during ECV?
3. What level of sensory blockade is needed to facilitate ECV?
4. What are the complications of ECV?
5. How was the response to the crisis managed?
6. Did each team member have a well-defined role?
7. Was all necessary equipment available? Any barriers?

Assessment Instruments:

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

Equipment Needed and Set-up:**In-situ set-up**

List all the equipment needed:

1. Mannequin set-up in L & D triage. Using standard ECV procedure set-up
2. One 18G IV setup with fluids attached and multiple access ports on the line
3. Standard monitors (e.g. EKG, NIBP, SpO2, ultrasonography)
4. Electronic fetal monitoring data on display

Simulation Scenario Set-up:**The case**

Ms. Sharma, a 28-year-old G1P0 at 37 weeks of gestational age, BMI 40, with breech presentation, presenting for external cephalic version under neuraxial anesthesia. She has oligohydramnios with an amniotic fluid index of 4.0. The obstetrician reports that she has an anterior placenta. She is not on any regular medication other than prenatal vitamins. She has no other significant co-morbidities. She has no allergies. Airway exam is reassuring with Mallampati 2, thyromental distance-3 fingers, and full dentition. No abnormality in the heart and lung exam. The rest of the pre-anesthetic evaluation is unremarkable.

Simulation Pre-brief

- a. Read the scenario and instruct team members on their role during the simulation.
- b. The learners take their places.
- c. The simulation driver plays the patient.

Scenario Details

Trigger	Patient Condition	Action	Done	Time	Comments
Patient in L&D triage for external cephalic version	The patient is awake and responsive. HR 95 bpm BP 127/85 mmHg SpO2 97% (air) Resp 16/min Temp 37.1°C	1. The L&D triage nurse performs initial patient evaluation and examination. Starts IV and fluid infusion per the institution's protocol. 2. OB counsels the patient, performs an ultrasound, and verifies the position of the fetus. 3. Anesthesia team discusses spinal or epidural dosing/goals for sensory level			

<p>Anesthesia provider performs spinal anesthesia or places lumbar epidural based on institution preference.</p>	<p>Lab results from the initial presentation: Hgb 11.2 g/dL Plt 180 x10⁹/L.</p> <p>Supine (with left uterine displacement), awake and oriented</p>	<ol style="list-style-type: none"> 1. Time out before neuraxial block. 2. On L and D nurse's prompting, the Patient verbalizes full name, date of birth, indicated procedure, and verifies allergies. 3. The anesthesia provider confirms that the patient has received IV fluid bolus before the procedure and monitors the patient's blood pressure every 2-3 minutes. 4. Anesthesia provider boluses the epidural with 2% lidocaine in incremental doses if epidural placed. 5. Consider starting phenylephrine infusion at time of neuraxial. 6. Anesthesia provider evaluates Sensory level with ice and pinprick and confirms T6 level block. 7. RN administers Tocolytic agent. 			
<p>Time out before ECV begins.</p>	<p>Supine (with left uterine displacement), easily arousable and oriented</p> <p>HR 124 bpm BP 86/57 mm Hg SpO₂ 97% (air) Resp 15/min Temp 36.9°C</p>	<ol style="list-style-type: none"> 1. Anesthesia provider monitors the hemodynamics and treats hypotension with phenylephrine boluses/increasing infusion. 2. Continue IVF bolus 3. Discuss waiting to start procedure until blood pressure is optimized and discuss blood pressure goals. 4. OR informed and confirmed that OR is available in case of emergency cesarean section 			
<p>Procedure begins.</p>	<p>Patient comfortable during ECV</p> <p>BP- 120/80 mmHg P-110/min RR- 18/min</p> <p>FHR- Bradycardic down to 105 while applying</p>	<ol style="list-style-type: none"> 1. Ob notifies the team that FHT has transiently dropped to 105 beats/min. 2. The Ob team stops surgical manipulation. Places oxygen on mom and ensures adequate blood pressure. 3. Continuous ultrasound visualization of fetal cardiac activity and rate, confirming fetal heart rate is close to maternal heart rate. after terbutaline. 			

	<p>pressure during procedure.</p> <p>Patient asks anxiously: Is everything okay?</p>	<p>4. Ob communicates with the team that fetal bradycardia was transient.</p> <p>5. Reassures the patient.</p> <p>6. The anesthesia provider continues to monitor the patient.</p> <p>7. The anesthesia provider informs the supervisor anesthesiologist</p>			
<p>After a break, the procedure continues. There is quickly a sustained drop in FHR to 90s.</p>	<p>The patient is pain-free. She looks worried.</p> <p>HR 126 bpm BP 110/72 mm Hg SpO₂ 98% (room air) Resp 20/min Temp 36.8°C FHT- 95/min</p>	<p>1. Ob stops manipulation, and the team helps the patient to a side-lying position.</p> <p>2. OB verbalizes that baby is not tolerating ECV and if the fetal heart rate does not recover, recommendation will be for cesarean delivery now.</p> <p>3. After continued fetal bradycardia for 3-5 minutes OB informs the patient and team at the bedside that cesarean delivery is recommended</p> <p>4. L&D charge nurse notifies NICU</p> <p>5. Ob team assigns a team member to inform the support partner regarding emergency cesarean section, if not present at the bedside.</p> <p>6. Discussion of anesthetic plan for emergency cesarean section.</p> <p>7. Scenario ends with patient transported to OR.</p>			

Appendix 1

**Learner Knowledge Assessment
Labor and Delivery Multidisciplinary 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 different anesthetic modalities for ECV?

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

2. How would you rate your knowledge of factors that improve the success of ECV?

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

3. How would you rate your knowledge of possible complications of ECV?

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

4. How would you rate your knowledge of delivery planning for ECV?

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

5. How would you rate your overall confidence with ECV resulting in emergency cesarean section?

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

Simulation Activity Evaluation

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
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PHYSICAL SPACE

Realism of the simulator space	1	2	3	4	5	N/A
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EQUIPMENT

Satisfaction with the mannequin	1	2	3	4	5	N/A
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SCENARIOS

Realism of the scenarios	1	2	3	4	5	N/A
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Ability of the scenarios to test technical skills	1	2	3	4	5	N/A
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Ability of the scenarios to test behavioral skills	1	2	3	4	5	N/A
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Overall quality of the debriefings	1	2	3	4	5	N/A
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DID YOU FIND THIS USEFUL?

To improve your clinical practice?	1	2	3	4	5	N/A
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To improve your teamwork skills?	1	2	3	4	5	N/A
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To improve your VERBAL communication?	1	2	3	4	5	N/A
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To improve your NONVERBAL communication?	1	2	3	4	5	N/A
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FACULTY

Quality of instructors	1	2	3	4	5	N/A
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Simulation as a teaching method	1	2	3	4	5	N/A
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COMMENTS/SUGGESTIONS:

References:

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