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# Severe Pre-Eclampsia and Eclampsia Scenario

Used with permission, Kaiser Permanente and Mark Meyer, MD and Darin Bowers, MA

| SCENARIO | |
|---|---|
| **Duration** | • 2 hours, (Setup 1hr, prebrief 15 min, Simulation 15 min, Debrief 30 mins) |
| **Targeted Learners** | • Interdisciplinary L&D team, OB Team |
| **Confederates** | • Voice of Mom if using Noelle or SIM Mom<br>• Family member |
| **Setting** | • LDRP (or Postpartum room) |
| **Authors** | • CMQCC (California Maternal Quality Care Collaborative), Medication recommendations provided to CMQCC with permission from Stanford University Medical Center and Gillian Hilton, MD |

## PATIENT INFORMATION & BACKGROUND

- Age 32
- Weight 182 lb
- 28 y/o G2P1 at 39 weeks admi1ted several hours ago after presenting to L&D triage with severe extremity swelling, vision issues, abdominal cramps, and BP was elevated at 170/102.2
- Patient was given magnesium bolus and is currently on magnesium drip. Laboratory evaluation was WNL except for 2+ Proteinuria. She has a foley.
- PMH: None
- Medications: Prenatal Vitamins
- Allergies: Sulfa
- Social History: Married, .Manager at Target. No ETOH, Drugs, Tobacco.
- Presentation Patient calls the nurse complaining that she still has a severe headache.
- Vital Signs Most recent set before nurse enters room: T 98.2 P 93 R 24 BP 164/98

## IMBEDDED CHALLENGES- *OPTIONAL*

- Increasingly concerned family member

## LEARNING OBJECTIVES

- Demonstrate effective teamwork and communication skills with a focus on adequate shared mental model, check-backs and role clarity. This includes clear identification of all team members and SBAR to new team members as they arrive.
- Diagnose severe preeclampsia
- Treat hypertension per CMQCC Preeclampsia/Eclampsia guidelines
- Provide appropriate initial management of eclamptic seizures with magnesium
- Manage eclamptic seizures when magnesium is ineffective
- Maintain airway and oxygenation in seizing and postictal patient

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| LEARNER PREPARATION<br>Prerequisite Knowledge/Skills/Policy and Procedures |
|---|
| • Physiology of normal childbirth/uterine involution<br>• Risk factors for pre-eclampsia<br>• Emergent therapy for onset, severe hypertension with pre-eclampsia or eclampsia.<br>• Pre-eclampsia care guidelines and best practices<br>• Knowledge of airway control<br>• Knowledge of eclamptic seizure management<br>• TeamSTEPPS™ (Strategies and Tools to Enhance Performance and Patient Safety) including but not limited to: Leadership: (Brief, - roles and responsibilities, Huddle, Debrief), Situation monitoring, Shared mental model, Mutual support, Communication - assertiveness, SBAR, call outs, closed loop communication |

| FACILITATOR DIRECTIONS<br>MAIN FOCUS (Overview) |
|---|
| 1. Diagnose severe preeclampsia based upon signs and symptoms<br>  • Hypertensive Emergency i.e. SBP ≥160 OR DBP ≥105<br>  • Neuro: Headache, Visual Complaints, Altered Mental Status, CVA, Seizure<br>  • Abdominal pain – especially RUQ or epigastric pain<br>  • Persistent nausea and vomiting<br>  • Shortness of breath – pulmonary edema<br>2. Treat hypertension per 2011 ACOG guidelines – 1st line agents<br>  • Target BP =140/90 (BP<140/90 = fetal perfusion)<br>  • Labetalol – escalating doses 20mg,40mg,80mg (q10 min prn)<br>  • Hydralazine – escalating doses 5-10mg, 10 mg (q20 min prn)<br>3. Provide appropriate management of eclampsia<br>  • Initial magnesium load and drip – (already done in this case)<br>  • Additional 2g magnesium bolus for recurrent seizure<br>  • Additional agents for seizure despite maximal magnesium therapy<br>  ▪ Benzodiazepines<br>  ▪ Phenytoin<br>4. Maintain airway and oxygenation<br>  • Maintain open airway<br>  • Provide 100% O2<br>  • Definitive airway with intubation per anesthesia if needed<br>5. Consider brain-imaging if seizure is focal and/or other neurological diagnosis is suspected |

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| CASE BRIEFING FOR ALL PARTICIPANTS TO HEAR | |
|---|---|
| **S** | Sarah Camp is a 35 year old patient on L&D who is being induced for preeclampsia.<br>She is G2 and P1. She arrived in L&D 4 hours ago complaining of a severe headache, leg swelling, blurred vision, abdominal pains, and a BP of 170/102.<br>She was started on the preeclampsia protocol 3 hours ago.<br>Her husband has been present the entire stay and is very supportive, but concerned. |
| **B** | Sarah has a history of mild pre-eclampsia with her first child who delivered vaginally 2 years ago.<br>She is allergic to PCN with a bad rash noted 4 years ago.<br>Her Blood pressure in the clinic 2 days ago was 140/85.. She was not started on any medications, but was put on bed-rest<br>She continues to complain of a severe headache. She is oriented x3, but somewhat sleepy.<br>She has pitting edema bilaterally at a 3+<br>She has also complained of some mild nausea with no vomiting at this point.<br>No complaints of shortness of breath. Lungs are still clear.<br>She continues to complain of mild abdominal pain.<br>Her urine dip indicated some mild 2+ proteinuria, and her u/o has been only 30cc/hr over the last two hours, despite IV bolus of NS 500 cc x2.<br>She was placed in the left lateral decubitus position.<br>She is on q15 min vital signs, and an IV was started.<br>She was initially given Nifedipine 10 mg po 3 hours ago with a repeat 10mg 30 minutes after that secondary to no decrease in BP. She was also given a 4 GM loading bolus of Magnesium Sulfate IV over 20 minutes, and is presently on a 2Gm/hr maintenance dose. Labs are pending.<br>Her most recent vital signs are BP158/98, P98 R14, T98.6 |
| **A** | I am concerned she may develop eclampsia. |
| **R** | Dr. Meyers indicated if the BP gets over 160 systolic or 110 Diastolic to page him immediately for additional medication orders. He also wants to know immediately if she has any shortness of breath or any additional decrease in urine output, change in mental status, abnormal FHT's, or indications of seizure activity.<br><br>She will need another set of vital signs, her DTR's monitored (reflexes), and her lungs checked in 5 min. |

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| TECHNICIAN STAGING & EQUIPMENT | | |
|---|---|---|
| Equipment needed | Pre-Set | Available for Learners |
| Patient Jenn<br>• Hi –tech Manikin<br>  • Noelle or SimMom<br>• Mid- tech<br>  • Pt. Actor w/ MaMa Natalie<br>• Lo-tech<br>  • Pt. Actor w/ Partopants | • Mic to speaker for voice<br>• BP cuff on patient<br>• IV in left arm<br>• R arm “loaded” for IV start<br>• ID bracelet on<br>• Allergy bracelet (Sulfa)<br>• Foley | |
| Environment | • L&D<br>• Bed put together | • Phone<br>• Call bell<br>• Code bell<br>• Emesis basin |
| LDRP Equipment | | • Additional IV pole & pump<br>• Exam light<br>• Pulse Oximeter<br>• BP cuff<br>• Suction module canister & tubing |
| Disposable Supplies | | • IV start kits (2)<br>• Fluids, meds Syringes, needles, ETOH wipes<br>• Blood draw tubes<br>• Maternal O2 set up<br>  ○ Non-rebreather face mask<br>  ○ Adult Ambu bag<br>  ○ Yankauer suction tip<br>• Stethoscope<br>• Gloves, masks, gowns, goggles |
| IV /Fluids | | • Angiocaths 18,20 gauge<br>• IV primary tubing<br>• Extra IV fluids (1000 NS/LR) -2 |

| | | |
|---|---|---|
| Medications | | • Magnesium Sulfate 6g<br>• Magnesium Sulfate 4g<br>• Magnesium Sulfate 2g<br>• Magnesium Sulfate (20g / 500ml of Normal Saline)<br>• Pitocin (Optional)<br>• Labetalol 100mg/20ml vial<br>• Hydralazine 20mg/ml vial<br>• Benzodiazepine<br>  ○ Ativan 4mg vial (2)<br>  ○ Versed 2mg vial (2)<br>  ○ Valium 5-10mg vial (1)<br>• Phenytoin (Dilantin)<br>• Nifedipine 10mg (3) |
| Intubation Equip | | • Anesthesia cart, ET tubes L-scope<br><br>Sim Meds per Anesthesia provider facility (i.e. Etomidate, Succinylcholine etc.) |

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<table>
<tr><th colspan="2">Initial State</th></tr>
<tr><td>Sinus Rhythm 93 bpm<br>Monitor Controls<br>• SpO2 = 98%<br>• Temp = 98.2 °F<br>Respiration Rate: 20<br>CO2 Exhalation: Off<br>Blood Pressure 177/110</td><td>1. This is a case of a patient on L&D who is being induced for mild preeclampsia on a magnesium drip. The patient develops severe preeclampsia and eclampsia. Either 2 doses of hydralazine or 3 doses of labetalol will be required to control BP. Despite maximal magnesium therapy, the patient may require additional medications to control seizures. The case will end when the patient's BP and seizures are well controlled.<br>2. There is a great emphasis on appropriate medication and timing to insure staff are following ACOG guidelines for preeclampsia and eclampsia. Since labetalol and hydralazine require 10-20 min for effect, the instructors will speed up the case by announcing 10 minutes has passed for each minute after labetalol or hydralazine is given.<br>3. The SimMan operator will be the voice of the patient and will use the seizure feature on this simulator. Since the seizure feature has limited realism, it is recommended that a confederate notify the team that the patient is having a seizure if the treatment team does not recognize this. This same programming can be used with a standardized patient as well. In that case, the patient would mimic a tonic-clonic seizure.<br>_____<br><br>In this frame, the patient calls the nurse because she has a moderate headache. The responding nurse should note the VS and report the BP to the physician or CNM that responds to the call for help.<br><br>Once the physician or CNM orders either labetalol or hydralazine, or vocalizes the diagnosis of sever preeclampsia, then click "Advance next frame." In the next frame, the patient begins to seize for the first time.<br><br>Note: "The seizure airway" handler – this will restore SpO2 to 98% when the airway is opened after the patient seizes</td></tr>
<tr><td colspan="2">Suggested Actions<br>• Call for physician<br>• Call for additional nurse<br>• Diagnosis of Severe Preeclampsia<br>Minimum Actions to Advance<br>• Order Labetalol<br>• Order Hydralazine</td></tr>
</table>

# Severe Pre-Eclampsia and Eclampsia Scenario

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| Seizure #1 | |
|---|---|
| Eyes:<br>• Eyes half open<br>• Blinking speed: Off<br>Convulsions: Tonic-Clonic<br>Fluids and Secretions:<br>• Froth:On<br>Airway<br>• Trismus:On<br>Start Trend: Seizure desaturation | 1. The patient is now seizing. When using SimMan3G, the seizures are most notable if the arms are out from the body & visible to the participants. If using the bodily fluid function of the simulator, the patient will foam at the mouth as well.<br>2. Note the trend: "Seizure desaturation" which causes the SpO2 to fall into the 80's. The team should reposition the patient's head & keep the airway open, which will restore the SpO2 to normal levels.<br>3. The team should be working to administer an antihypertensive & an additional magnesium bolus.<br>4. The seizure will last 60 seconds & the scenario will advance automatically. Click "Advance next frame" to advance more quickly if desired. |
| **Suggested Actions**<br>• **Check airway patency**<br>• **Open airway**<br>• **Order Magnesium Bolus**<br>• **Oxygen**<br>**Minimum Actions to Advance**<br>• **FT 1:00??** | |

| Seizure #1 Stops | |
|---|---|
| Convulsions: None<br>Eyes:<br>• Blinking speed: Normal<br>Fluids and Secretions:<br>• Froth:Off<br>Airway<br>• Trismus:Off<br>Blood Pressure: 179/109 | 1. The seizure stops & the patient is post-ictal. She will respond to simple questions & commands, but will have somewhat slurred speech. The patient must appear awake enough to protect her airway or the team may try to intubate the patient. If the team has not already done so, they must reposition the head and open the airway to restore a normal SpO2 level.<br>2. The scenario advances when either the labetalol or hydralazine is given. Alternatively click "Advance to next frame" to advance.<br>3. The team should be administering an additional magnesium bolus at this time. |
| **Suggested Actions**<br>• **2g Magnesium Given or**<br>• **4g Magnesium Given**<br>**Minimum Actions to Advance**<br>• **10mg Hydralazine Given or**<br>• **5mg Hydralazine Given**<br>• **20mg Labetalol Given** | |

| 10 Minutes Since Anti-HTN and Magnesium Bolus | |
|---|---|
| Blood Pressure: 175/100 | 1. At approximately one minute into this frame, the instructor should call out that 10 minutes have passed which should prompt an additional BP check.<br>2. If labetalol was given initially, another dose is indicated. The scenario will advance when the next does of labetalol is given.<br>3. If hydralazine was initially given, click "Advance next frame" as it is given q20 min pm. |
| **Minimum Actions to Advance**<br>• **40mg Labetalol Given** | |

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| 20 Minutes Since Anti-HTN and Magnesium Bolus | |
|---|---|
| Convulsions: None<br>Fluids and Secretions:<br>• Froth:Off<br>Eyes:<br>• Blinking speed: Normal<br>Airway<br>• Trismus:Off<br>Blood Pressure: 167/100 | 1. In this frame, approximately 20 minutes have passed since HTN meds and magnesium were given.<br>2. This should prompt an additional BP check. The BP has improved but requires another dose of hydralazine.<br>3. The instructor should also call out that the mag bolus is complete. Click on either medication or "Advance next frame" and the case will end.<br>4. If desired, click "Advance to Seizure #2" and the patient will seize again. |
| **Minimum Actions to Advance**<br>• **10mg Hydralazine Given**<br>• **80mg Labetalol Given** | |

| Seizure #2 | |
|---|---|
| Convulsions: Toinic-Clonic<br>Fluids and Secretions:<br>• Froth:On<br>Eyes:<br>• Half Open<br>• Blinking speed:Off<br>Airway<br>• Trismus:On<br>Start Trend: Seizure desaturation (Start 0 min) | 1. The patient seizing despite maximal magnesium therapy should prompt the team to use other meds to control the seizure.<br>2. The team should consider benzodiazepines or Dilantin.<br>3. The seizure lasts minutes – Go back to previous frame to insure that the additional does of labetalol or hydralazine is given. |
| **Suggest Actions**<br>• **Check airway patency**<br>• **Check breathing**<br>• **Order Benzo and Given**<br>**Minimum Actions to Advance**<br>• **10mg Hydralazine Given**<br>• **80mg Labetalol Given** | |

| End | |
|---|---|
| Eyes:<br>• Wide Open<br>• Blinking speed:Off<br>Airway<br>• Trismus:On<br>Start Trend: Seizure desaturation (Start 0 min) | 1. At approximately one minute into this frame, call out that 10 minutes have passed.<br>2. The BP & seizures are now controlled. |