OBSTETRIC EMERGENCIES

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DISCLOSURE

No disclosures
OVERVIEW

- Preeclampsia
- Maternal Cardiac Arrest
- Pearls

PREECLAMPSIA

New-onset hypertension
After 20 weeks gestation
Although often accompanied by proteinuria and hypertension
Other signs or symptoms might be present without proteinuria *
### DIAGNOSTIC CRITERIA

- At least 20 weeks gestation
- **Blood Pressure**
  - Systolic blood pressure of 140 mg Hg or more **OR** diastolic blood pressure of 90 mm Hg or more on two occasions at least 4 hours apart
  - Systolic blood pressure of 160 mm Hg **OR** more or diastolic blood pressure of 110 mm Hg or more *(SEVERE hypertension can be confirmed within minutes)*
  - **AND**
- **Proteinuria**
  - 300 mg or more per 24-hour urine
  - Protein/creatinine ratio 0.3 or greater 2+ protein on urinalysis

### PREECLAMPSIA WITH SEVERE FEATURES

- Thrombocytopenia < 100 x $10^9$/L
- Renal insufficiency creatinine > 1.1 mg/dL or doubling of the serum creatinine
- Impaired liver function elevated transaminases twice normal
- Pulmonary edema
- New-onset headache unresponsive *
TREATMENT

- Seizure prophylaxis RR 0.41; 95% CI, 0.29-0.58
- Magnesium sulfate 4-6 g loading over 20-30 mins then 1-2 g/hr
- For difficult access, IM 10 g initially (divided bilateral 5 g IM)
- Benzodiazepines and phenytoin ONLY for antiepileptic treatment or when magnesium is contraindicated (i.e. myasthenia gravis, hypocalcemia, moderate-severe renal failure, heart block or myocarditis)

MAGNESIUM TOXICITY

Renal and cardiac monitoring
Adjust for renal impairment creatinine 1.0-1.5 mg/dL
Calcium gluconate 10% solution, 10 mL IV over 3 minutes with Lasix IV

<table>
<thead>
<tr>
<th>mg/dL</th>
<th>mEq/L</th>
<th>Effect</th>
</tr>
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<tbody>
<tr>
<td>1.8-2.4</td>
<td>1.2-2</td>
<td>Normal</td>
</tr>
<tr>
<td>4.8-9.6</td>
<td>3-6</td>
<td>Therapeutic</td>
</tr>
<tr>
<td>6-12</td>
<td>5-10</td>
<td>EKG changes (prolonged PR interval, widened QRS)</td>
</tr>
<tr>
<td>&gt;12</td>
<td>&gt;10</td>
<td>muscle weakness, loss of deep tendon reflexes</td>
</tr>
<tr>
<td>&gt;18</td>
<td>&gt;12</td>
<td>SAAM node block, respiratory paralysis</td>
</tr>
<tr>
<td>&gt;24</td>
<td>&gt;20</td>
<td>Cardiac arrest</td>
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</table>
## ANTIHYPERTENSIVES

<table>
<thead>
<tr>
<th>Drug</th>
<th>Dose</th>
<th>Comments</th>
<th>Onset of Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Labetalol</td>
<td>10-20 mg IV, then 20-80 mg every 10-30 mins to maximum cumulative dose 300 mg; or constant infusion 1-2 mg/min IV</td>
<td>Tachycardia is less common with few side effects. Avoid in women with acute asthma, preexisting MI, decompensated heart failure, and bradycardia</td>
<td>1-2 minutes</td>
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<tr>
<td>Hydralazine</td>
<td>5 mg IV or IM, then 5-10 mg IV every 20-40 mins to maximum cumulative dose 20 mg; or constant infusion of 0.5-10 mg/hr</td>
<td>Higher dosage associated with maternal hypotension, headaches, and abnormal FHT; may be more common than other agents</td>
<td>10-20 minutes</td>
</tr>
<tr>
<td>Nifedipine (Immediate release)</td>
<td>10-20 mg orally, repeat in 20 minutes if needed; then 10-20 mg every 2-6 hours</td>
<td>May observe reflex tachycardia and headaches</td>
<td>5-10 minutes</td>
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### HELLP

- Severe form of preeclampsia with the highest morbidity and mortality
- Majority 3rd trimester; 30% postpartum
- Insidious onset or may be atypical; **15% without HTN or proteinuria**
- **H**emolysis, **E**levated liver enzymes, **L**ow **P**latelet counts
- Dx: LDH > 600 IU/L, AST/ALT 2x normal, platelets < 100 x 10⁹/L
- **SYMPTOMS**
  - RUQ pain and malaise 90%
  - Nausea and vomiting 50%
ECLAMPSIA

- New-onset tonic-clonic, focal, or multifocal seizures
- Incidence preeclampsia (1.9%) and severe preeclampsia (3.2%)
- ~20-38% DO NOT HAVE HTN OR PROTEINURIA BEFORE SEIZURES
- Often preceded by SIGNS (78-83%)
  - Frontal headaches
  - Blurred vision and photophobia
  - Altered mental status

MATERNAL CARDIAC ARREST

1:12000 ADMITTED DELIVERIES
14 DEATHS PER YEAR (US)
### Maternal Cardiac Arrest

<table>
<thead>
<tr>
<th>Condition</th>
<th>Incidence</th>
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<tbody>
<tr>
<td>Bleeding, DIC</td>
<td>25%</td>
</tr>
<tr>
<td>Embolism, PE, amniotic fluid</td>
<td></td>
</tr>
<tr>
<td>Anesthesia complications</td>
<td></td>
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<tr>
<td>Uterine Atony</td>
<td></td>
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<tr>
<td>Cardiac, ischemia, cardiomyopathy</td>
<td>23%</td>
</tr>
<tr>
<td>Hypertension, preeclampsia/eclampsia</td>
<td>18%</td>
</tr>
<tr>
<td>Other: Standard differential ACLS</td>
<td></td>
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<tr>
<td>Placental abruption, previa</td>
<td></td>
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<tr>
<td>Sepsis</td>
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RARE BUT SURVIVAL 58% PERIMORTEM C-SECTION

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**General Obstetrics**

The CAPS Study: incidence, management and outcomes of cardiac arrest in pregnancy in the UK: a prospective, descriptive study
RESUSCITATION

- Physiology
- Unique aspects of resuscitation
- Perimortem C-section
- Team preparedness

PHYSIOLOGIC CHANGES

↑ AFTERLOAD
↓ CARDIAC OUTPUT (20-30% in supine position)
↓ FRC ~ 20%
↑ VASCULARITY & EDEMA
↑ OXYGEN DEMAND

https://thenovakney.com/pregnancy
MANUAL UTERINE DISPLACEMENT

Figure 2: Left uterine displacement using 2-handed technique

Figure 3: Left uterine displacement using 1-handed technique

MATERNAL CARDIAC ARREST ALGORITHM

Maternal Cardiac Arrest

First Responder
- Activate maternal cardiac arrest team
- Document time of onset of maternal cardiac arrest
- Place the patient supine
- Start chest compressions as per BLS algorithm; place hands slightly higher on sternum than usual

Maternal Interventions
Treat per BLS and ACLS Algorithms
- Do not delay defibrillation
- Give typical ACLS drugs and doses
- Ventilate with 100% oxygen
- Monitor waveform capnography and CPR quality
- Provide post-cardiac arrest care as appropriate

Maternal Modifications
- Start IV above the diaphragm
- Assess for hypovolemia and give fluid bolus when required
- Anticipate difficult airway; experienced provider preferred for advanced airway placement
- If patient receiving IV/IO magnesium prearrest, stop magnesium and give IV/IO calcium chloride 10 mL in 10% solution, or calcium gluconate 30 mL in 10% solution
- Continue all maternal resuscitative interventions (CPR, positioning, defibrillation, drugs, and fluids) during and after cesarean section

Subsequent Responders

Obstetric Interventions for Patient With an Obvious Obstetric Uterus
- Perform manual left uterine displacement (LUD)—displace uterus to the patient’s left to relieve aortic compression
- Remove both internal and external fetal monitors if present
- Obstetric and neonatal teams should immediately prepare for possible emergency cesarean section
- If no ROSC by 4 minutes of resuscitative efforts, consider performing immediate emergency cesarean section
- Aim for delivery within 5 minutes of onset of resuscitative efforts
- An obviously gravid uterus is a uterus that is deemed clinically to be sufficiently large to cause aortic compression

"RECENT GUIDELINES IN THE MANAGEMENT OF MATERNAL CARDIAC ARREST." (2013).
GOALS

RESUSCITATE BOTH MOTHER AND INFANT

Recommendation: Begin at 4 mins, deliver by 5 mins

PERIMORTEM C-SECTION

From Roberts & Hedges Clinical Procedures in Emergency Medicine 6ed
CONTINUE CPR

PERIMORTEM C-SECTION

JetEM: https://www.youtube.com/watch?v=m3MXXGwWyM
“The most difficult thing is the decision to act, the rest is merely tenacity”

Amelia Earhart
REFERENCES

4. https://www.openanesthesia.org/magnesium_side_effects