Postpartum Complications

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Disclosure statement

• No financial disclosure or affiliation concerning material discussed in this presentation

Learning objectives

• List the most common causes of maternal mortality

• Recognize early signs and symptoms of sepsis in the postpartum patient

• List all management steps that should be taken within one hour of suspicion of sepsis
South Carolina

When Pregnancy-Related Deaths Occurred, 2011-2015

- 33% 1 week to 1 Year Postpartum
- 31% During Pregnancy
- 36% At Delivery or In the Week After

S. C. 16’-19’, 27 deaths reviewed

- Hemorrhage: 28%
- Infections: 26%
- Cardiovascular and Coronary Conditions: 20%
- Aneurysmal Fluid Embolism: 10%
- Cardiomyopathy: 5%
- Malignancies: 5%
- Pre-eclampsia and Eclampsia: 5%
- Pulmonary Conditions: 5%

Sepsis
Definitions

- **Sepsis**: life-threatening organ dysfunction caused by a dysregulated host response to infection

- **Septic shock**: a subset of sepsis: persistent hypotension (requiring pressors to maintain MAP ≥ 65mmHg) and a lactate > 2 mmol/L despite adequate volume resuscitation
Sequential Organ Failure Assessment Score

SOFA

- Objectively defines organ dysfunction (=an acute increase of 2 or more points in the SOFA score)
- Used to predict ICU admission
Risk factors for sepsis

- **Comorbid conditions**
- Nulliparity
- Black race
- Having no insurance or public insurance
- Obstetric factors (CD, multiples, ART)

**Pathophysiology**

- Infection
- Cytokine release
- Dysregulated immune response
- Extravasation of albumin and fluid = intravascular hypovolemia
- Decreased vascular resistance, increased cardiac output

**Diagnosis**

- qSOFA: for rapid bedside identifications of patients at high risk of sepsis
- FEVER is not always present
**qSOFA**

Quick SOFA Score: 3 Criteria

- Systolic blood pressure < 100 mmHg
- Respiratory rate ≥ 22 breaths per minute
- Alteration in mental status

If patient has 2 or more of these:
- Start empiric antibiotics
- Start inotropic therapy
- Increased monitoring
- Consult transfer to ICU

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**Organ Systems Affected in Sepsis**

- Central Nervous System
- Endocrine
- Cardiovascular
- Hematologic
- Pulmonary
- Urinary
- Gastrointestinal
- Hepatic

Click each system icon to view the impact of sepsis on that system.

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**Sepsis & Pregnancy overlap**

<table>
<thead>
<tr>
<th>Value</th>
<th>Systemic inflammatory response syndrome (SIRS) criteria (1992)*</th>
<th>Normal ranges in pregnancy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heart rate</td>
<td>90 beats per minute or greater</td>
<td>In third trimester, can be ≥ 24% higher than nonpregnant; range from 75 to 104 beats per minute in third trimester and during labor.</td>
</tr>
<tr>
<td>Partial pressure of O2</td>
<td>95 mmHg or less</td>
<td>The mean value during all trimesters, labor, and the postpartum period is 95 mmHg or less.</td>
</tr>
<tr>
<td>White blood cell count</td>
<td>Less than 4 x 10^9/L or Greater than 12 x 10^9/L</td>
<td>5.7 to 16.9 x 10^9/L</td>
</tr>
<tr>
<td>Respiratory rate</td>
<td>20 breaths per minute or greater</td>
<td>8-24 breaths per minute</td>
</tr>
</tbody>
</table>
**Obstetrically modified SOFA Score**

- Systolic blood pressure of less than 90 or 80 mm Hg
- Respiratory rate 22-25 breaths or greater
- Altered mental status other than "alert"

If patient has 2 or more of these signs:
- Look for organ dysfunction
- Start or escalate therapy
- Increase monitoring
- Consider transfer to ICU

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**Management**

- **Management of Sepsis**
  - Suspect sepsis
  - Start vasoressors and isotopes
  - Control source infection

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**Management**

- Administer broad-spectrum antibiotics within 1 h

- Postpartum sources:
  - Endometritis
  - Wound infection
  - LPI
  - Pneumonia
  - GI

- In 30% of cases, no source identified
Management

- IVF: start with 1-2 L of crystalloid

But,
- Risk of pulmonary edema high
- Only 50% of hypotensive septic patients are fluid responders
- In nonresponders: third spacing/LV dysfunction, pulmonary/cerebral/bowel edema; higher mortality rates

Management - fluid responsiveness

- Pulse-pressure variation in mechanically ventilated patients, sinus rhythm, and not triggering the ventilator

- Passive leg rising

- Third trimester: small bolus of fluid (250-500)

All 3 require monitoring of cardiac output
- Monitor I&Os especially if preeclampsia
Fluid responsiveness: passive leg rising

- In patients breathing spontaneously & in sinus rhythm
- After 2-3 minutes fluid responders will have an increase in cardiac output

Vasopressors

- first line: norepinephrine
- hydrocortisone of no response
- target MAP ≥ 65 mm Hg

Inotropes

- Dobutamine
- Use when myocardial dysfunction or hypoperfusion despite pressors
- Target MAP 65 mm Hg
Source control
• Examination
• Imaging
• Intervention eg. curettage, drainage
• Less invasive methods preferred
• Unless, necrotizing soft tissue infection -> extensive debridement

Additional care steps
• Monitor for VTE
• Nutrition – early enteral feeding
• Avoid glucose level > 180 mg/dL

Case #1
• 30 yo PPD#8
• Fever, MAP 48 mm Hg, maculopapular rash
• WBC 23K, Hb 17, PLT 23K
• Urine & blood cultures, vaginal swab, lactate level
• Broad spectrum antibiotics
? Next step
• PLT transfusion
• 1-2 L crystalloid
• Norepinephrine
• Central venous access for CVP measurement

? Next step
MAP 52 mm Hg, anuria, HR 120, lactate 8 mmol/L
• 2 more L of LR
• Stop LR and start albumin
• Start norepinephrine
• Start IV hydrocortisone

References:
• smfm.org
• acog.org
• cdc.gov