Sepsis Protocol in the Obstetric Patient

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Objectives

At the conclusion of this learning activity, the learner will be able to:

• Apply the key recommendations of the sepsis protocol to the care of the obstetric patient.
• Describe the special considerations for care of obstetric sepsis patients and the differences from adult patients.

Length – 15 minutes

Target Audience – This lesson is intended for providers and RNs caring for patients on the Birthplace.
Sepsis

• Sepsis is a leading cause of death in the US and the #1 cause of death in the ICU
• Severe sepsis and septic shock are important contributors to maternal mortality
• Early detection and the application of time-sensitive and standard therapies can improve outcome and survivability
Maternal Sepsis: Incidence

• Septic shock: 0.002-0.01% of all deliveries
• 0.3-0.6% of all septic patients are pregnant
• Has increased over the last decade
  – Older maternal age at delivery
    • Obesity, diabetes, chronic HTN, placental abruption and placenta accreta
    • Infertility and multi-fetal gestation
  – Obesity
    • HTN, DM, Cesarean, cardiopulmonary complications

Burton and Sibai 2012
Definitions

- **Systemic Inflammatory Response Syndrome (SIRS)**
  - Inflammatory process that can be generated by infection or by non-infectious causes (burns, trauma)

- **Sepsis**
  - The systemic inflammatory response syndrome that occurs during infection (Society Critical Care Medicine 2001 consensus statement)

- **Septic shock**
  - Vascular collapse secondary to an infectious process
  - Usually components of hypovolemic and cardiogenic shock
Severe Sepsis and Septic Shock Causes in Pregnancy

Sepsis and Septic Shock in Pregnancy can be caused by:

- Pyelonephritis
- Retained products of conception
  - Septic abortion
  - Placenta accreta or percreta
- Neglected chorioamnionitis
- Pneumonia
- Necrotizing fascitis from abdominal incision, episiotomy, perineal laceration
- Intraperitoneal etiology
  - Appendicitis
  - Bowel infarction
  - Cholecysitis
  - Necrotizing pancreatitis
Pathophysiology of Septic Shock

Decreased functional intravascular blood volume

Decreased BP and tissue perfusion

Cellular acidosis and hypoxia

End-organ tissue dysfunction and death
Sepsis looks Different in the Obstetric Patient

• Key indicators for Sepsis in NON-PREGNANT adults in the Fairview system includes 2 or more of the following
  – SBP < 90
  – Temperature < 95 or > 101
  – HR > 100 beats/min
  – RR > 20 breaths/min
  – WBC < 4 or > 12

• Since these indicators may be abnormal in the PREGNANT PATIENT WITHOUT SEPSIS, different indicators were developed for the pregnant patient (see next slide).
OB Sepsis Protocol Workflow

• When the obstetric patient has 2 of the following signs, an alert will fire to the Nurse or NST
  – Temperature >38.3°C (101 F) or less than 36°C
  – Respiratory rate > 24 breaths per minute
  – Blood glucose > 140 in a known non diabetic condition and has not received betamethasone
  – Extremely altered mental status (determined by nurse charting mental status as confused, obtunded, semicomatose, unresponsive, or somnolent)
  – Heart rate > 110 bpm
  – WBC >20 or <4

• After the trigger has fired in Epic the RN will acknowledge that either the provider has been notified, is aware, or is already treating the sepsis.
OB and Adult Sepsis Protocols

• If the obstetric patient is being cared for on a Non-OB Medical/Surgical unit, and meets criteria for sepsis, the Adult Sepsis Protocol will be fired, not the OB Sepsis Protocol.
OB Sepsis Protocol Workflow

- When the provider opens the chart the provider will be notified that the patient has at least 2 OB Modified SIRS Criteria
- The OB sepsis protocol will initiate in Epic if the obstetric patient has 2 of the following OB indicators

The provider must complete the Infection Evaluation screen
OB Sepsis Protocol Workflow

- The alert will not fire if the provider has already completed the Infection screen in the last 4 hours, or if the patient has a medication order from the Sepsis Order Set (presumably, already being treated for sepsis).
- If the provider chooses the notifying provider acknowledgement button, the alert is suppressed for that user for 1 hour.
- If the provider chooses the already treating Sepsis button, the alert is suppressed for 4 days.
- When the provider clicks the Infection Evaluation hyperlink, the provider is taken to the navigator flow sheet.
- To prevent the alert from firing again the next time the chart is opened, follow the infection evaluation hyperlink OR choose an acknowledge reason button.
OB Sepsis Protocol Workflow

• After clicking on New Reading, the provider will be prompted to complete the OB Infection Screening for sepsis risk
OB Sepsis Protocol Workflow

• If the provider answers yes to any of these questions, one of 2 alerts will be fired
  – Patient may have SEPSIS or
  – Patient may have SEVERE SEPSIS

• Answer at least one of the questions to prevent alert from firing again the next time the chart is opened.
OB Sepsis Protocol Alert when the Patient may have SEPSIS

- The alert indicating that the patient may have SEPSIS will be fired when the provider answers yes to an infection screening question and the patient DOES NOT have a documented sign of organ dysfunction.
  - SBP<90
  - INR>1.5
  - Plt<100
  - Cr>1.5,
    - Cr incr of 0.5
  - Bilirubin>2
  - Lactic acid>2
OB Sepsis Protocol Alert when the Patient may have SEPSIS

If the patient has medication orders from the OB Sepsis order set, the alert is suppressed.

**Acknowledge reason buttons suppress the alert:**

- Already treating sepsis: Suppresses alert for 4 days
- Patient not septic: Suppresses alert for at least 4 hours.

In 4 hours, if the patient still meets the SIRS criteria for ‘initial OB sepsis risk alert’ to fire and the patient isn’t being treated for sepsis, the cycle of alerts will start again. (The reason for this is that if the SIRS criteria are still present in 4 hours, the infection may have progressed to Sepsis and should be reevaluated).
Signs of Organ Dysfunction

• When the OB patient has 2 SIRS criteria and at least 1 OB Infection Screening sign, the provider will be prompted to order the OB Sepsis Bundle Set in order to obtain these labs (INR, Platelets, Creatinine, Bilirubin, Lactic Acid)

• Organ Dysfunction includes one or more of the following
  – SBP<90
  – INR>1.5
  – Plt<100
  – Cr>1.5, Cr incr of 0.5
  – Bilirubin>2
  – Lactic acid>2
OB Sepsis Protocol when the Patient may have SEVERE SEPSIS

- The alert indicating that the patient may have SEVERE SEPSIS will be fired when the provider answers yes to an infection screening question and the patient HAS a documented sign of organ dysfunction
  - SBP<90
  - INR>1.5
  - Plt<100
  - Cr>1.5, Cr incr of 0.5
  - Bilirubin>2
  - Lactic acid>2

OR

- Fires when the provider opens the chart and there is a new lab result or SBP indicating the patient has SEVERE SEPSIS

- If the patient has medication orders from the OB Sepsis order set, the alert should be suppressed.

**Acknowledge reason buttons suppress the alert:**

- Already treating sepsis: Suppresses alert for 4 days
- Patient not septic: Suppresses alert for at least 4 hours.

In 4 hours, if the patient still meets the criteria for Alert #1 to fire and the patient isn’t being treated for sepsis, the cycle of alerts will start again. (The reason for this is that if the SIRS criteria are still present in 4 hours, the infection may have progressed to Sepsis and should be reevaluated).
OB Sepsis Protocol when the Patient may have SEVERE SEPSIS

The Sepsis Bundle order set is attached to the alert, and the box is pre-checked. **JUST CLICK ACCEPT TO PLACE THE OB SEPSIS BUNDLE ORDER SET**

You can also open the order set later by entering "sepsis" in the Order Sets box from the Orders Navigator.

*To prevent the alert from firing again the next time the chart is opened, choose an acknowledge reason OR place a medication order in the Sepsis Bundle order set.

*IF you do NOT want to place the order set, choose a reason button.*
Treatment for OB Sepsis

- Rapid Response Team Management
- Rapid fluid infusion
- Antibiotics
- Monitoring vital signs
- Transfer to a higher level of care

The next slides show the details of the OB Sepsis Bundle Order Set
The OB Order Set slightly differs from the Adult Sepsis Order Set
OB Sepsis Bundle Order Set

RX OB Sepsis Bundle OBSTETRIC [3048011755]

PATIENT CARE
Sepsis Monitoring
- Pulse oximetry nursing
  - STAT, CONTINUOUS
  - Sepsis monitoring, Keep SaO2 above 95%
- Oxygen
  - STAT, CONTINUOUS
  - Oxygen device: Other
  - Specify: Non-rebreather mask.
  - Keep SaO2 above: 95%
  - Liters per minute: 15
  - FIO2:
    - Sepsis monitoring
- Cardiac Continuous Monitoring
  - STAT, CONTINUOUS
  - Sepsis monitoring
- Telemetry Monitoring Med/Surg
  - STAT, CONTINUOUS
  - Travel to Tests: Off cardiac monitor
  - May shower off telemetry: Yes
  - Notify Provider if pulse/heart rate less than: 40
  - Notify Provider if pulse/heart rate greater than: 120
  - Notify Provider if: Third Degree Heart Block
  - Notify Provider if: New Onset of Atrial Fibrillation/Atrial Flutter
  - Notify Provider if: V-Fib or V-Tach greater than 10 beats
  - Sepsis monitoring

LABORATORY

Close
Lab test section

### Lab - Sepsis Bundle
- Lactic acid
- CBC with platelets differential
- Comprehensive metabolic panel
- Hepatic panel
- Basic metabolic panel
- Procalcitonin

### UA Testing
- UA Testing Panel - UU, UR, UA, SH, RH, WY, HI
  - UA without Microscopic
  - UA reflex to Microscopic
  - UA reflex to Microscopic and Culture
  - UA with Microscopic
  - UA with Microscopic reflex to Culture
  - Urine Culture Aerobic Bacterial

### Lab - Microbiology
- Blood Culture - 2 Sites
  - Blood culture
  - Blood culture

Collect prior to antibiotic administration.
# Fluid Resuscitation Section

## Fluids

<table>
<thead>
<tr>
<th>Option</th>
<th>Instructions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sepsis Bundle Fluid Bolus</td>
<td>Intravenous, 30 mL/kg, ONCE, For 1 Doses Infuse 1 L at a time as rapidly as possible until MAP greater than or equal to 65 mmHg, then 150 mL/hr. at 150 mL/hr. Intra venous, CONTINUOUS Start after LR bolus. CONTINUOUS</td>
</tr>
<tr>
<td>lactated ringers BOLUS</td>
<td></td>
</tr>
<tr>
<td>lactated ringers infusion</td>
<td></td>
</tr>
<tr>
<td>0.9% sodium chloride BOLUS</td>
<td></td>
</tr>
<tr>
<td>0.9% sodium chloride infusion</td>
<td></td>
</tr>
<tr>
<td>Patient does not need fluid bolus</td>
<td>CONTINUOUS PRN Patient does not need fluid bolus because ***</td>
</tr>
<tr>
<td>Patient has already received fluid bolus of 30 mL/kg in the last hour</td>
<td>CONTINUOUS PRN Patient has already received fluid bolus of 30 mL/kg in the last hour.</td>
</tr>
</tbody>
</table>

## Antibiotics (Single Response)


<table>
<thead>
<tr>
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<tbody>
<tr>
<td>Sepsis Obstetric Bundle Antibiotics</td>
<td></td>
</tr>
<tr>
<td>gentamicin (GARAMCYIN) intermittent infusion</td>
<td>2 mg/kg. Intravenous, ONCE, For 1 Doses Pharmacy to send dose STAT, then dosing per pharmacy (Sepsis Indication 1st dose).</td>
</tr>
</tbody>
</table>
MAP? What is that?

MAP is defined as the average (mean) arterial blood pressure during a single cardiac cycle.

The reason that it is so important is that it reflects the hemodynamic perfusion pressure of the vital organs.

How is it calculated?

• The simple way to calculate the patients MAP is to use the following formula:
  \[ \text{MAP} = \left( \frac{2 \times \text{diastolic} + \text{systolic}}{3} \right) \]
  Or simply look at the BP or fetal monitor for the reading.

• The reason that the diastolic value is multiplied by 2, is that the diastolic portion of the cardiac cycle is twice as long as the systolic. Or you could say, it takes twice as long for the ventricles to fill with blood as it takes for them to pump it out..... at a normal resting heart-rate.
MAP? What is that?

MAP is a vital sign to monitor anytime the patient has a potential problem with perfusion of his organs. Some examples (and there are many more) might include:

- a patient with septic shock on vasopressors
- head injured patients
- Cardiac patients on vasodilator (GTN) infusion
- Patient with a dissecting abdominal aneurysm who needs to have his BP controlled within a narrow range so as not to cause increased bleeding
# Antibiotics

### Sepsis Obstetric Bundle Antibiotics

<table>
<thead>
<tr>
<th>Antibiotic</th>
<th>Dosage</th>
<th>Route</th>
<th>Frequency</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gentamicin (GARAMCYIN) intermittent infusion</td>
<td>2 mg/kg, Intravenous, ONCE, For 1 Doses</td>
<td>Pharmacy to send dose STAT, then dosing per pharmacy. (Sepsis Indication-1st dose)</td>
<td>STAT, ONE TIME, Starting today</td>
<td>Indication (need for RPh dosing/monitoring): Sepsis Other Indication (free text): Recommended dose for OB Sepsis is 1.7 mg/kg IV q8hr, adjust according to renal function. Goal peak 10 mg/L, trough less than 1 mg/L FIRST DOSE STAT</td>
</tr>
<tr>
<td>Clindamycin (CLEOCIN) intermittent infusion</td>
<td>900 mg, Intravenous, EVERY 8 HOURS</td>
<td>FIRST DOSE STAT</td>
<td>3 Million Units, Intravenous, EVERY 4 HOURS</td>
<td></td>
</tr>
<tr>
<td>Penicillin G potassium intermittent infusion</td>
<td>500 mg, Intravenous, EVERY 6 HOURS</td>
<td>Patient already on appropriate antibiotic for sepsis treatment</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Sepsis Obstetric Bundle Antibiotics ACOG Alternative Regimen

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<tr>
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<th>Frequency</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vancomycin (VANCOCIN) intermittent infusion</td>
<td>20 mg/kg, Intravenous, ONCE, For 1 Doses</td>
<td>Pharmacy to send dose STAT, then dosing per pharmacy (SEPSIS indication - first dose).</td>
<td>STAT, ONE TIME, Starting today</td>
<td>Indication (need for RPh dosing/monitoring): Sepsis Other Indication (free text): Send 20 mg/kg dose STAT, then dosing per pharmacy. 4.5 g, Intravenous, EVERY 6 HOURS</td>
</tr>
</tbody>
</table>

### Sepsis Obstetric Bundle Antibiotics- Use IF patient history of penicillin allergy or cephalosporin anaphylaxis

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<tr>
<td>Vancomycin (VANCOCIN) intermittent infusion</td>
<td>20 mg/kg, Intravenous, ONCE, For 1 Doses</td>
<td>Pharmacy to send dose STAT, then dosing per pharmacy (SEPSIS indication - first dose).</td>
<td>STAT, ONE TIME, Starting today</td>
<td>Indication (need for RPh dosing/monitoring): Sepsis Other Indication (free text): Send 20 mg/kg dose STAT, then dosing per pharmacy. 500 mg, Intravenous, EVERY 6 HOURS</td>
</tr>
</tbody>
</table>

### Meropenem (MERREM) intermittent infusion

| Pharmacy to dose vancomycin        | 500 mg, Intravenous, EVERY 6 HOURS | CONTINUOUS PRN |

Patient already on appropriate antibiotic for sepsis treatment
Conclusion

• Severe sepsis and septic shock left untreated leads to tissue hypoxia, cell death, and end-organ failure.

• Early detection and targeted therapy improves survivability

• Hospital-wide sepsis management protocols targeting the identification and treatment of severe sepsis has demonstrated mortality benefit.
References