Diagnosis And Management of Sepsis

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Disclosures

- Avera Health Utilization Committee Member
Objectives

1. Discuss why the identification and management of sepsis is so important

2. Define SIRS, Sepsis, Severe Sepsis, and Septic Shock

3. Discuss management of Sepsis, Severe Sepsis, and Septic Shock
   - Identify key points in sepsis care
   - Focus on nursing workflow once admitted to the hospital
CMS “Sepsis Bundle” (SEP-1 Measure)

- Data show increased utilization of 3 hour and 6 hour sepsis bundles decrease mortality

- Measure created to increase compliance in achieving superior outcomes in patients diagnosed with severe sepsis and septic shock

- Hospital performance analyzed and compared

- Measure starts at “Time Zero”
  - Time zero = When sepsis identified.
CMS “Bundle” (SEP-1 Measure)

3 Hour Bundle

- Blood cultures x 2 prior to antibiotic administration
- Broad spectrum antibiotics delivered
- Initial Lactic Acid

Additional Bundle Components

- Repeat Lactic Acid within 6 hours of “time zero” if initial Lactate > 2
- 30ml/kg fluid bolus for the following
  - Hypotension
  - Lactic Acid ≥ 4.0
- Following completion of fluid bolus, if persistent hypotension exists the following must occur:
  - Physical reassessment performed
  - Vasopressors initiated within 1 hour cessation fluid bolus
Why is early identification and management of sepsis so important?

- Sepsis and septic shock represent medical emergencies.¹

- Every hour delay of antimicrobial administration is associated with increase in mortality in patients with sepsis.²³

- Sepsis mortality in one study was 16%...those with septic shock had a mortality of 46%.⁴
Why is early identification and management of sepsis so important?

**Data Timeframe**
- July 2017-June 2018
- Patient Population
  - Adults $\geq 18$
  - Dx: Severe Sepsis, Septic Shock
  - N=1038

**Avera Health Data**

<table>
<thead>
<tr>
<th></th>
<th>Met Bundle</th>
<th>Didn’t Meet the bundle</th>
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<tbody>
<tr>
<td><strong>Mortality</strong></td>
<td>32% (24/74)</td>
<td>68% (50/74)</td>
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<tr>
<td><strong>LOS</strong></td>
<td>5.5 days (1.2 ICU days)</td>
<td>8.6 days (2.1 days in ICU)</td>
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Criteria (2/4): T <96.8, T>100.9; or RR >20; or HR >90 ; or WBC >12000, WBC <4000 or >10% Bands

SIRS

SIRS (2/4) + Infection

Sepsis

Sepsis + Organ Dysfunction

Severe Sepsis

Septic Shock

Severe Sepsis + Persistent Hypotension &/or Lactate >=4
Systemic Inflammatory Response Syndrome (SIRS)

Criteria
- Temperature:
  - < 96.8 Degrees F
  - > 100.9 F
- Respiratory Rate: > 20
- Heart Rate: > 90
- WBC:
  - < 4000
  - > 12000
  - > 10% Bands

* Need to fulfill 2/4 criteria to be diagnosed with SIRS
Sepsis

- Sepsis = SIRS + concern for infection
  - Potential sources
    - Urine (UTI/Pyelonephritis)
    - Lungs (Pneumonia)
    - Skin/Soft Tissue (Cellulitis)
    - Heart (Endocarditis)
    - Abdomen (Intra-abdominal abscess)
    - Brain (Encephalitis/Meningitis)
Severe Sepsis = Sepsis + Organ Dysfunction (any of below criteria)

Physical Exam Findings
- Hypotension:
  - SBP < 90
  - MAP < 65, or
  - Decrease in SBP by >40 points from normal.
- New need for CPAP, BiPAP or ventilator support.
- Urine output < 0.5 mL/kg/hr for 2 consecutive hours.
- Mental status changes.

Laboratory Findings
- Lactate > 2.0
- Creatinine > 2.0
- Total bilirubin > 2.0
- Platelet < 100,000
- INR > 1.5
- aPTT > 60 seconds
Septic Shock = Severe Sepsis and 1 of the following:

**Vital Sign Criteria**
- Persistent Hypotension
  - Defined as 2 consecutive low B/P readings 1 hour after conclusion of 30 mL/kg bolus
- Hypotension Definition
  - SBP <90
  - Mean Arterial Pressure (MAP) <65
  - Decrease in SBP by >40 points from normal

**Lab Criteria**
- Initial Lactic Acid
  - ≥4.0
Criteria (2/4): T <96.8, T >100.9; or RR >20; or HR >90; or WBC >12000, WBC <4000 or >10% Bands

SIRS

SIRS (2/4) + Infection

Sepsis

Sepsis + Organ Dysfunction

Severe Sepsis + Persistent Hypotension &/or Lactate >4

Septic Shock
Infection & SIRS Criteria (2/4)

Sepsis

Severe Sepsis

Sepsis + Organ Dysfunction

Severe Sepsis + Persistent Hypotension &/or Lactate ≥4

Septic Shock
Management of the “Septic” Patient

- **Concern for infection & 2/4 SIRS criteria**
  1. Obtain two peripheral blood cultures immediately PRIOR to antibiotic use
  2. Obtain Labs
     - Lactic Acid
     - Comprehensive Metabolic Panel
     - CBC
     - INR
  3. Ensure Appropriate IV Access Established
     - 2 large bore (Preferably 20 gauge or greater) Iv's
     - Antecubital fossa most distal access point
  4. Administer Broad Spectrum Antibiotics
     - Immediately following blood cultures
     - IV access limited?
     - Administer antibiotics that are able to be infused via bolus.¹
Management of the patient with “Severe Sepsis”

Group 1: Treatment no different than “septic patient”*

- Creatinine >2.0
- Total bilirubin >2.0
- Platelet <100,000
- INR >1.5
- aPTT >60 seconds
- Mental status changes
- New initiation of BiPAP or CPAP

**One Exception!**
- Lactic Acid >2
  - Repeat Lactic Acid
  - Process hardwired to reflex if >2, thus no additional order/intervention necessary

Group 2: Sepsis treatment & 30 cc/kg bolus IVF

- Hypotension:
  - SBP <90 mm Hg
  - MAP <65 mm Hg
  - Decrease SBP >40 mm Hg from baseline

- Lactate >4
Management of Patient with “Septic Shock”

Septic Shock Definition
- Persistent hypotension
  - Defined as 2 consecutive low B/P readings 1 hour after conclusion of 30 mL/kg bolus
- Hypotension definition
  - SBP <90
  - Mean Arterial Pressure (MAP) <65
  - Decrease in SBP by >40 points from normal
- Initial lactic acid ≥4.0
  - And persistent hypotension

Severe Sepsis Treatment and the Following:
- Initiate vasopressors
  - Levophed (norepinephrine)
  - Vasopressin (Pitressin)
- Goal MAP
  - 65 (Most Often)
Critical Transitions in Sepsis Care

Clinic to ED
- Communication is the most important aspect
  - Suspected source of infection
  - Blood cultures obtained
  - Antibiotics administered thus far (and those left to administer)
  - Initial lactic acid
  - Candidate for 30 cc fluid bolus
    - Amount administered & amount remaining

ED to Inpatient
- Communication is the most important aspect
  - Suspected source of infection
  - Blood cultures obtained
  - Antibiotics administered thus far (and those left to administer)
  - Initial lactic acid
  - Candidate for 30 cc fluid bolus
    - Amount administered & amount remaining

Hospital to Hospital
- Communication is the most important aspect
  - Suspected source of infection
  - Blood cultures obtained
  - Antibiotics administered thus far (and those left to administer)
  - Initial lactic acid
  - Candidate for 30 cc fluid bolus
    - Amount administered & amount remaining
Critical Transitions in Sepsis Care:

- Severe sepsis + hypotension and/or lactate >4
- Administration of 30 ml/kg bolus
- If Adult sepsis diagnostic or therapeutic order set utilized (Inpatient)
  - Volume reassessment order (reflex order) generated
  - Critical to obtain 2 blood pressures immediately following completion of fluid bolus
  - Perform focused assessment/physical exam post 30 ml/kg fluid bolus
  - Notify Provider of results
Critical Transitions in Sepsis Care:

- Severe sepsis + hypotension and/or lactate >4
  - Notify provider of recent vital signs & physical exam findings
Critical Transitions in Sepsis Care:

- Inquire if you can enter the sepsis NQM order based on your physical assessment
- If has refractory hypotension
  - Inquire if vasopressors need to be initiated
Infection

Infection & 2/4 SIRS Criteria

Sepsis

Sepsis + Organ Dysfunction

Severe Sepsis

Severe Sepsis + Persistent Hypotension &/or Lactate ≥4

Septic Shock
Take Home Points

- Sepsis kills; if patients develop septic shock, mortality can reach 46%\(^4\)
- Nursing is critical in ensuring septic patients are identified early, and managed appropriately
- Communication between nursing departments is critical for success


