Sepsis Care in the ED

Graduate EBP Capstone Project
University of Mary EBP Graduate Capstone Project Members

- Alicia Vermeulen- Operations Manager, Avera McKennan Hospital
- Wendy Moore, RN- Ambulatory Nurse Manager, Mayo Center for Sleep Medicine, Assistant Professor of Nursing, Mayo College of Medicine
- Rachelle Taylor, RN- Clinical Team Leader, Methodist Hospital for Surgery, Dallas, TX
- David Kihara, RN- Clinical Team Leader, Truman Medical Center Rehabilitation Unit
- Erick Wahome, RN- Clinical Team Manager, Truman Medical Center Rehabilitation Unit
Acknowledgements

• Claudia Dietrich, MS, RN- University of Mary Professor
• Lori Popkes, BAN, MBA, RN- Avera McKennan Chief Nursing Officer
• Lee Bollock, MSN, RN- Director of Emergency Services, Avera McKennan
• Dr. Jared Friedman, Medical Director, Avera McKennan Emergency Services
• Dawn Tomac, RN, CIC- Director of Quality Initiatives, Avera Health
Background

- Patients who present to the emergency department with sepsis are at increased risk for morbidity and mortality
- Mortality rates are as high as 72%
- The incidence of sepsis accounts for 750,000 patients annually
- Sepsis is the third leading cause of death in the US
- Identification of sepsis and aggressive management within the first 6 hours reduces mortality
  (Keegan & Wira, 2014)
Background

- Because of the clinical significance and reimbursement issues surrounding sepsis, Avera McKennan is partnering with the University of Mary for an EBP project.
- U Mary graduate student team members include: Alicia Vermeulen, Wendy Moore, Rachelle Taylor, David Kihara and Erick Wahome.
Problem Statement

• In October 2015, the CMS announced that they would require reporting on sepsis quality measures beginning in the fall of 2016.
Significance Clinical Problem

- Sepsis is a life threatening clinical syndrome that causes physiologic, biologic and biochemical abnormalities in dysregulated response to infection
- Incidence is rising *
- Mortality rates are high 25-50%**
- Estimates suggest earlier sepsis identification and evidenced based treatment would decrease annual mortality by 92,000, save 1.25 million hospital days and reduce hospital expenditures by 1.5 billion***

* Elixhauser, Friedman & Strang, 2009
** Dellenger et al, 2013
*** Center for Disease Control (CDC), 2015
Significance of Clinical Problem

• Health care reform has significantly affected reimbursements
• Value-Based Purchasing has the potential to significantly affect financial outcomes
Sepsis in the ED

• Please click on link to view video on sepsis in the ED
  • [https://www.youtube.com/watch?v=DnsQ4RI XsZY](https://www.youtube.com/watch?v=DnsQ4RI XsZY)
Incidence of Mortality

Severe Sepsis vs Other Care Priorities

<table>
<thead>
<tr>
<th>Quality Projects</th>
<th>US Incidence</th>
<th># of Deaths</th>
<th>Mortality Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>AMI¹</td>
<td>895,000</td>
<td>171,000</td>
<td>19%</td>
</tr>
<tr>
<td>Stroke¹</td>
<td>700,000</td>
<td>157,800</td>
<td>23%</td>
</tr>
<tr>
<td>Pneumonia²</td>
<td>1,300,000</td>
<td>61,800</td>
<td>4.8%</td>
</tr>
<tr>
<td>Severe Sepsis³</td>
<td>751,000</td>
<td>215,000</td>
<td>29%</td>
</tr>
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</table>

**Classifications of Sepsis**

**Sepsis**
- Known or Suspected Infection
- Temp: >100.9 or <96.8
- HR: >90
- RR: >20
- WBC: >12 or <4, or >10% bands

**Severe Sepsis**
- Sepsis + 1 symptom of organ dysfunction
- SBP <90
- MAP <65
- SBP decrease of 40
- Cr >2.0
- Plt < 100,000
- Lactic >2.0
- Acute Respiratory Failure

**Septic Shock**
- Severe Sepsis + Tissue Hypoperfusion
- SBP <90
- MAP <65
- SBP decrease of 40
- Lactic >/= 4.0
Are Fluids Needed?

Positive Sepsis Screen?
Suspected Infection:
- Fever
- Chills
- Abd Pain
- Cellulitis
- Weakness
PLUS:
- Temp >100, <96.8
- HR >90
- RR >20
- AMS

SBP <90
>40 point decrease SBP
OR
Lactic >4?

Y e s

Requires 30 cc/kg IV fluids over 3 hours

N o

Implement fluids as ordered by MD

No

Continue to Monitor

3 Hour Bundle:
- Lactate
- BC prior to antibiotics
- Broad spectrum antibiotics
- 30 ml/kg crystalloid fluid for hypotension or lactate >4
Severe Sepsis Screen

### Infection Screening

- **No Infection Suspected**
- **Known/Suspected Infection**
  - Known or Suspected infection as evidenced by any of the following:
    - Fever/Chills
    - Weakness
    - Cough/Shortness of Breath
    - On Antibiotic Therapy
    - Abdominal Pain
    - Altered Mental Status
    - Cellulitis/New Purulent Wound Drainage
    - Recent Procedure

### Sepsis Screening

- **Temp < 96.8, > 100**
- **Pulse > 100**
- **SBP < 100**
- **RR > 20**
- **O2 Sat < 90%**

If there is a Suspected or Documented infection and 2 or more of the above are present the screening is POSITIVE.

### Screening Results

- **Positive**
- **Negative**

If Sepsis Screening Result is POSITIVE - notify the Physicians Immediately.

- *Anticipate the following diagnostics: CBC, CMP, Lactic Acid, BC x2, U/A, Urine Culture, Chest X-ray.*

- *Anticipate the following Medications: Initial IV Fluid Resuscitation, Antibiotic Therapy within 1 hour.*

### Physician Notified of Results?

- **Yes**
- **No**

Comment

Document the name of the Physician notified in the comment box.

Time Physician Notified

NURSING CARE GUIDELINES for a Positive Sepsis Screen in ED:

- *Place patient on the Cardiac Monitor, monitor continuous pulse ox - Vital Signs every 15 minutes.*
- *O2 per protocol to keep sats >90%.*
- *Establish large bore IV.*
Current State: Avera McKennan

- Internal data shows significant room for improvement in meeting three and six hour bundle outcomes
- Data shows that the majority of patient diagnosed with severe sepsis present through the ED
Current State: Avera McKennan
Organizational Compliance with Sepsis Bundle
Current State: Avera McKennan
ED Compliance with Sepsis Bundle

![ED Compliance with Sepsis Measures Graph](image)
University of Mary EBP Project

• Explore the impact of a nurse-driven DART protocol on the compliance of sepsis bundled care interventions

• Enhance the patient handoff process between the ED to the Critical Care Unit to facilitate improvement with the established 6 hour bundle metrics
Review of Literature

- Literature review search engines used:
  - CINAHL
  - Medline
  - Cochrane Library
  - 2010-2016
## Review of Literature

<table>
<thead>
<tr>
<th>Topic</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Severe Sepsis Recognition</td>
<td>4234 results</td>
</tr>
<tr>
<td>Severe Sepsis Treatment</td>
<td>8717 results</td>
</tr>
<tr>
<td>ED Sepsis Protocols</td>
<td>2796 results</td>
</tr>
</tbody>
</table>
Literature Review Findings

- Sepsis Plan
- ED Studies
- CDC/Surviving Sepsis Campaign
  - Level 1 Evidence
Literature Review Themes

- Early Recognition
- Early Intervention
- Improved Outcomes
Project Design

• This is an evidence based practice project measuring the impact of nurse protocol and SBAR communication
• This project uses an evidenced based practice quality improvement model called enhancing reliability
• Project Population is Registered Nurses and Physicians
## Nurse-Driven Sepsis Algorithm

### Detect
- Identify Sepsis Early (Complete Sepsis Screening Tool at time of triage)
- Broadcast ‘Code Sepsis’
- Obtain Lactate and Blood Cultures, Obtain order from MD

### Act
- Give 500 cc Crystalloid Bolus
- Anticipate order for antibiotics, administer ASAP

### Reassess
- Re-measure Lactate (within 6 hours of initial lactate)
- Reassess volume status after fluid boluses

### Titrate
- Frequently monitor patient response (HR, BP)
Severe Sepsis Checklist

<table>
<thead>
<tr>
<th>Severe Sepsis/Septic Shock Checklist</th>
<th>Time</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Positive Sepsis Screening</strong>: Sepsis screening completed with triage assessment</td>
<td></td>
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<tr>
<td><strong>Severe Sepsis Criteria</strong>: Sepsis plus evidence of organ dysfunction (any ONE of the following):</td>
<td>Time ZERO: ED arrival time</td>
</tr>
<tr>
<td>□ SBP &lt;90  □ MAP &lt;65  □ SBP decrease of 40 points  □ Lactic &gt;2.0  □ Acute respiratory failure with need for invasive or non-invasive ventilation</td>
<td></td>
</tr>
<tr>
<td><strong>Blood Cultures x2</strong>: drawn with IV start and sent to lab</td>
<td></td>
</tr>
<tr>
<td><strong>Initial Lactate</strong></td>
<td></td>
</tr>
<tr>
<td>Lactate level: ________</td>
<td></td>
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<tr>
<td><strong>IV fluids</strong>: 30 ml iv fluid/kg to be administered if patient exhibits signs of septic shock.</td>
<td></td>
</tr>
<tr>
<td><strong>Septic shock</strong>: Severe Sepsis PLUS sign of tissue hypo-perfusion:</td>
<td></td>
</tr>
<tr>
<td>□ SBP &lt;90      □ MAP &lt;65       □ SBP decrease of 40 points       □ Lactic &gt;4.0  □ Acute respiratory failure with need for invasive or non-invasive ventilation</td>
<td></td>
</tr>
<tr>
<td>Pt weight in kg: _______ × 30 ml = _______</td>
<td></td>
</tr>
<tr>
<td>Total IV fluids given in EDs: _______ (goal is to give IV within 3 hours of positive sepsis screening time) Repeat B/P within 1 hour of fluid bolus completion.</td>
<td></td>
</tr>
<tr>
<td><strong>Vasopressors</strong>: Norepinephrine (Levophed) preferred if not responsive to initial 30 ml/kg fluid bolus, or with profound hypotension while concurrently administering fluids.</td>
<td></td>
</tr>
<tr>
<td><strong>Antibiotics</strong>: Goal is to administer in less than 1 hour. Name of antibiotic:</td>
<td></td>
</tr>
<tr>
<td><strong>Repeat Lactic Acid</strong>: If initial lacte is &gt;2, repeat within 1 hours. Repeat Lactic acid at:</td>
<td></td>
</tr>
</tbody>
</table>

NOT A PERMANENT PART OF THE MEDICAL RECORD

Fax form to eICU at 605-322-1950

Upon completion of form, please send to Alicia Vermeuler, ED Operations Manager via Interoffice Mail
Project Implementation
Lewin’s Change Model

Unfreeze
- Sepsis Awareness
- Communication
- Motivation
- Engagement

Change
- Implementation
- Facilitating and training to decrease barriers

Freeze
- Outcome measures (internal data and nursing survey)
- Anchoring project in the culture
Project Implementation

- U Mary EBP project will be implemented on Wednesday, Sept. 14th
- Goals of the project include: decreased time to interventions, improved 3 and 6 hour bundled care metrics, and improved communication
- Data from the EBP project will be analyzed and reported December 2016
Project Measurement
Case Study

- 1428: 68 yr. old male presents via ambulance with c/o SOB x 1 day. Received 2 nebs enroute.
- Triage vitals: T- 101.3, HR-140, RR-36, O2 Sat 91% on room air, B/P- 144/75
- Sepsis? Sepsis screen completed at 1444
Case Study, con’t

• 1444- Code Sepsis initiated.
• BC x 2, Lactic, IV x2, 500 cc NS IV bolus.
• Lactic resulted at 5.2. HR- multiple PVC’s (bigeminy).
• B/P trending down to 91 systolic.
• Labs: WBC 11.8, Positive UA
• Admit Diagnosis: Septic shock, bacterial prostatitis. Admitted to the ICU
Case Study, con’t

- Patient received fluid bolus in the ED, short of 30 ml/kg by 100 cc on arrival to ICU. Severe sepsis checklist utilized- pt received additional fluid within 3 hour window.
- Levaquin 750 mg iv given in ED
Conculsion

• Sepsis is a time-critical emergency, that is linked to high morbidity and mortality rates. The literature suggests that sepsis should be treated with the same level of urgency as that of a myocardial infarction or stroke.
Questions?
References

