Sepsis

Early Recognition and Provider Collaboration

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F441 Infection Control

The facility must establish and maintain an Infection Control Program designed to provide a safe, sanitary and comfortable environment and to help prevent the development and transmission of disease and infection.
Infection Control

Infections are a significant source of morbidity and mortality for nursing home residents and account for up to half of all nursing home resident transfers to hospitals.

Infections occur an average of 2 to 4 times per year for each nursing home resident.

Intent

The intent of this regulation is to assure that the facility develops, implements and maintains an Infection Prevention and Control Program in order to:

Prevent, Recognize & Control
the onset and spread of infection within the facility.
Early Recognition and Management of Sepsis in Post Hospital-ECF

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Objectives

• Define sepsis incidence and impact
• Define the sepsis continuum
• Understand the pathophysiology of sepsis
• Discuss early recognition through screening
• Define early interventions for patients with severe sepsis

Why sepsis? Why now?

• Faces of Sepsis  http://sepsis.org/faces/
Hospitalization by age: US 2000-2010

Common Causes of Hospitalization
Adults aged 85 and over: U.S.

<table>
<thead>
<tr>
<th>First listed diagnosis</th>
<th>Rate of hospitalization per 1,000 population</th>
</tr>
</thead>
<tbody>
<tr>
<td>Congestive heart failure</td>
<td>10.7</td>
</tr>
<tr>
<td>Pneumonia</td>
<td>18.7</td>
</tr>
<tr>
<td>Urinary tract infection</td>
<td>12.6</td>
</tr>
<tr>
<td>Septicemia</td>
<td>12.6</td>
</tr>
<tr>
<td>Stroke</td>
<td>25.0</td>
</tr>
<tr>
<td>Hip fracture</td>
<td>15.6</td>
</tr>
</tbody>
</table>

Mortality and Cost

- Sepsis is a leading cause of death and the most expensive disease in U.S. hospitals
- Mortality increased 26% in patients 60-64 and 38% in those ≥85 years of age.

Discharge Disposition After Sepsis

<table>
<thead>
<tr>
<th>Disposition</th>
<th>Septicemia or sepsis</th>
<th>Other diagnoses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Disposition Percent</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Routine</td>
<td>39</td>
<td>79</td>
</tr>
<tr>
<td>Transfer to other short-term care facility</td>
<td>6</td>
<td>3</td>
</tr>
<tr>
<td>Transfer to long-term care institution</td>
<td>30</td>
<td>10</td>
</tr>
<tr>
<td>Died during the hospitalization</td>
<td>17</td>
<td>2</td>
</tr>
<tr>
<td>Other or not stated</td>
<td>8</td>
<td>6</td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
<td>100</td>
</tr>
</tbody>
</table>
Total all-cause, 30 day readmissions and aggregate cost by payer 2011

<table>
<thead>
<tr>
<th>Study population</th>
<th>Number of all-cause readmissions (in thousands)</th>
<th>Readmission as a percentage of total study population readmissions</th>
<th>Total cost of all-cause readmissions (in millions)</th>
<th>Aggregate cost of all-cause readmissions (in dollars)</th>
<th>Total cost as a percentage of total cost of all cause readmissions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Medicare (65+ yrs)</td>
<td>1,000</td>
<td>55.0</td>
<td>24,000</td>
<td>50.2</td>
<td>17.2</td>
</tr>
<tr>
<td>Medicaid (18 to 64 yrs)</td>
<td>700</td>
<td>20.0</td>
<td>7,000</td>
<td>18.4</td>
<td>16.8</td>
</tr>
<tr>
<td>Privately Insured (18 to 64 yrs)</td>
<td>1,000</td>
<td>10.0</td>
<td>10,000</td>
<td>10.0</td>
<td>0.7</td>
</tr>
<tr>
<td>Otherwise insured (18 to 64 yrs)</td>
<td>200</td>
<td>4.9</td>
<td>4,900</td>
<td>3.7</td>
<td>15.8</td>
</tr>
<tr>
<td>Total</td>
<td>3,500</td>
<td>100.0</td>
<td>41,308</td>
<td>100.0</td>
<td>13.9</td>
</tr>
</tbody>
</table>

Source: Weighted national estimates from a readmissions analysis file derived from the Agency for Healthcare Research and Quality (AHRQ), Center for Financing, Access, and Information, Medicare Cost and Utilization Project (MCUP), State Hospital Identification (SHID), 2011.
Impact on the Elderly

- Age itself independent risk factor for death
- More likely admitted to ICU
- Highest mortality in the old elderly (85+)
- Prolonged hospitalization

Post Sepsis Impact

- Contributes to Cognitive decline
- Contributes to Physical long term disabilities (walking, ADLs, and IADLs)

Sepsis Recognition Challenges

- Febrile response not present in 47% of elderly
  - Temperature >101 generally indicates severe infection
- Delirium occurs in 50% of older adults with sepsis
- Dementia can make obtaining a history challenging
- Positioning for tests due to osteoarthritis presents challenges

Severe Sepsis: Defining a Disease Continuum

- SIRS with a presumed or confirmed infectious process
- Sepsis with ≥1 sign of organ dysfunction, hypoperfusion, or hypotension:
  - Cardiovascular (refractory hypotension)
  - Respiratory
  - Renal
  - Coagulopathy
  - DFT
  - Unexplained metabolic acidosis
Identifying Acute Organ Dysfunction as a Marker of Severe Sepsis

Definitions

- Infection
- Sepsis: infection plus 2 or more SIRS
- Severe Sepsis: infection plus 2 or more SIRS plus new organ dysfunction
- Septic Shock: severe sepsis with a lactic acid greater than or equal to 4 mmol/L OR continued hypotension (systolic BP < 90 or 40 mmHg decrease from their baseline) after initial fluid bolus (30 ml/kg)

Except on few occasions, the patient appears to die from the body’s response to infection rather than from it.”

Sir William Osler – 1904
The Evolution of Modern Medicine
Homeostasis Is Unbalanced in Severe Sepsis

- Coagulation
- Inflammation
- Fibrinolysis


Inflammation, Coagulation and Impaired Fibrinolysis In Severe Sepsis

Reprinted with permission from the National Initiative in Sepsis Education (NISE).

Microcirculation of Septic Patient: Orthogonal Polarization Spectral Imaging

- BP: 120/80 Hg
- SaO¿: 98%

Microcirculation of Septic Shock
Patient: Orthogonal Polarization Spectral Imaging

- Resuscitated with fluids and dopamine
  - HR: 82 BPM
  - BP: 90/35 mm Hg
  - SaO₂: 98%
  - CVP: 25 mm Hg

Cornerstones of Multidisciplinary Management of Severe Sepsis

- Prevention
- Screening and Early Identification
- Early Intervention: Source control, Blood cultures and broad spectrum antibiotics
- Initial Resuscitation Bundle
- Septic Shock Bundle— at the hospital

Surviving Sepsis Campaign Guidelines: 2012

- Consensus committee of 68 international experts presenting 30 international organizations
- Used GRADE system to guide assessment of quality of evidence from high (A) to very low (D) and to determine the strength of recommendations as strong (1) or weak (2)
- Some recommendations were ungraded (UG)
- Guidelines included recommendations in 3 areas:
  1. Directly targeting severe sepsis
  2. Targeting general care of critically ill patient, considered high priority in severe sepsis
  3. Pediatric considerations
SEP-1

TO BE COMPLETED WITHIN 3 HOURS OF TIME OF PRESENTATION †:

1. Measure lactate level
2. Obtain blood cultures prior to administration of antibiotics
3. Administer broad spectrum antibiotics
4. Administer 30ml/kg crystalloid for hypotension or lactate ≥4mmol/L

† “time of presentation” is defined as the time of earliest chart annotation consistent with all elements severe sepsis or septic shock ascertained through chart review.

SEP-1

TO BE COMPLETED WITHIN 6 HOURS OF TIME OF PRESENTATION:

5. Apply vasopressors (for hypotension that does not respond to initial fluid resuscitation) to maintain a mean arterial pressure (MAP) ≥65mmHg
6. In the event of persistent hypotension after initial fluid administration (MAP < 65 mm Hg) or if initial lactate was ≥4 mmol/L, re-assess volume status and tissue perfusion and document findings according to table 1.
7. Re-measure lactate if initial lactate elevated.

CORNERSTONES OF MULTIDISCIPLINARY MANAGEMENT OF SEVERE SEPSIS

• Prevention
• Screening and Early Identification
  • Early Intervention: Source control, Blood cultures and broad spectrum antibiotics
  • Initial Resuscitation Bundle
  • Septic Shock Bundle– at the hospital
ACT FAST!

Early Detection of SEPSIS requires fast action

STOP AND WATCH (INTERACT)

S – Seems different than usual
T – Talks or communicates less
O – Overall needs more help
P – Pain: new or worsening; Participated less in activities
A – Ate less
N – No bowel movement in 3 days; or diarrhea
D – Drank less
W – Weight change
A – Agitated or nervous more than usual
T – Tired, weak, confused, or drowsy
C – Change in skin color or condition
H – Help with walking, transferring, and toileting more than usual

* Link with current process
* Educate CNAs
SEP-1

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SSC Guidelines
Antibiotics

• We recommend that intravenous antibiotic therapy be started as early as possible and within the first hour of recognition of septic shock (1B) and severe sepsis without septic shock (1C)

Remark: although the weight of evidence supports prompt administration of antibiotics following the recognition of severe sepsis or septic shock, the feasibility with which clinicians may achieve this ideal state has not been scientifically validated

Duration of hypotension before initiation of effective antimicrobial therapy is the critical determinant of survival in human septic shock

*2,154 septic shock patients

*Effective antimicrobial administration within the 1st hour of documented hypotension was associated with increased survival in patients with septic shock.
**Early Goal Directed Therapy**

**Methodology:** 263 severe sepsis patients

- **Early Goal-Directed Therapy (EGDT)**
  - Continuous ScvO2 monitoring & tx with fluids, blood, inotropes &/or vasoactives to maintain:
    - ScvO2 >70%, SaO2 > 93%, Hct > 30%, CI/VO2
    - CVP ≥ 8-12
    - MAP ≥ 65
    - UO ≥ .5ml/kg/hr

- **Standard Therapy**
  - CVP ≥ 8-12
  - MAP ≥ 65
  - UO ≥ .5ml/kg/hr


**Early Goal-Directed Therapy Results**

![Bar graph showing 28-day Mortality with NNT = 7-8](chart)

- Standard Therapy: 49.2%, P = 0.01*
- EGDT: 33.3%

*NNT = 7-8
*Key difference was in sudden CV collapse, not MODS

ECF-Severe Sepsis Bundle
For patients with a known/suspected infection + 2 or more SIRS + new organ dysfunction
(provide the following interventions per physician order)
- Blood cultures x 2 (prior to antibiotics)
- Obtain lactic acid, if greater than 2 get repeat in 6 hours
- Broad spectrum IV antibiotic(s) within 1 hour of screening positive for severe sepsis.
- Vital signs: every 4 hours x 2 then every shift x 2 then per facility routine (if a PRISM 1 or 2: every 4 hours x 4, then every shift x 2, then qd)
- Monitor I & O every shift
- If SBP <90mmHg or 40mmHg decrease from their baseline, administer a 30ml/kg fluid bolus as fast as possible.
- IF resident’s hypotension has not resolved, call physician regarding transfer to the ED

Perform severe sepsis screen every shift and with a condition change or a STOP and WATCH notification

The Importance of Early Detection
• Efforts to just treat recognized sepsis alone is not enough.
• A critical aspect of mortality reduction has been pushing practitioners to identify sepsis early.
  1. It may well be that earlier recognition accounts for much of the signal in mortality reduction and partially explains sharply increasing incidence.
  2. Without recognition that the clock is ticking, there is simply no incentive to recognize a challenging diagnosis early.


Early Recognition and Management of Sepsis
Overview of Training Program
• Monthly one hour face to face meetings Jan to June
  – Will follow the ECC meeting
  – Walk through action plan to implement a sepsis early identification and management program that includes a focus on infection prevention
• Monthly site specific coaching calls, starting in February to provide individualized support
• Provide training and educational materials
• Defined process and outcome measures to evaluate success of the program
Roles and Responsibilities

- Each facility must have a team identified to do this work.
  - Should include: medical director, DON, infection prevention nurse at a minimum
- Team work through action plan provided in specified timeframe
- Implement screening process
- Implement early management of sepsis process
- Educate staff on screening and management processes
- Collect defined process and outcome data

Thank You

RESOURCES

- Surviving Sepsis Campaign [http://www.survivingsepsis.org/Pages/Local.aspx](http://www.survivingsepsis.org/Pages/Local.aspx)
- Minnesota Hospital Association “Seeing Sepsis Long Term Care Resources”
- American Hospital Association’s Health Research and Educational Trust “Sepsis Resources”
  - [https://www.ahajournals.org/docs/doi/10.1161/jhromed].html](https://www.ahajournals.org/docs/doi/10.1161/jhromed.html)

EVIDENCE-BASED LITERATURE RESOURCES

Sepsis Screening Assessment
Joyce Turner RN
Director of Clinical Program Development

Sepsis Screening

1. Does the patient have a suspected or documented/infections signs of Sepsis or Infection?
   - Yes
   - No

2. Is the resident on antibiotic therapy?
   - Yes
   - No

3. Does the resident have at least one of the above answered yes?
   - Yes
   - No

4. Is the resident a diabetic?
   - Yes
   - No

Systemic Inflammatory Response Syndrome (SIRS)

To screen positive on the SIRS criteria a resident must satisfy 2 or more of the following signs & symptoms.

Does the patient have any of the following symptoms (SIRS)? Check all that apply.

- 1. Temperature ≥ 101.0 °F
- 2. Temperature ≤ 96.8 °F
- 3. Respiratory Rate > than 20 breaths/min
- 4. Heart Rate > than 90 BPM
- 5. WBC > than 12,000 or < than 4,000 or > than 10% bands (labs must be within last 24 hours)
**Blood Glucose**
Perform a blood glucose check only if **one** symptom is present (Question 1–5)

Do Not perform a blood glucose check in no symptoms are present, or 2 or more symptoms are present (Question 1–5)

6. Blood Glucose > than 140 in non-diabetics

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**SIRS continued**
Does the patient have 2 or more symptoms checked?

If yes the patient has screened positive for Sepsis.
- Yes
- No

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**Sepsis is a Spectrum**
SIRS + Infection = Sepsis
Sepsis + organ failure = Severe Sepsis
Severe Sepsis + ↓ B/P = Septic Shock
Septic Shock leads to Organ Failure = MODS (Multiple Organ Dysfunction Syndrome)
Organ Dysfunction

Does the Patient exhibit any of the following conditions? (Check all that apply)

- 1. Respiratory: SAAO2 < than 90% or increase in O2 required
- 2. Cardiovascular: SBP < than 90 mmHg or < 40 mmHg from Baseline
- 3. Renal: Urine Output < than 0.5 ml/kg over last 8 hours
- 4. CNS: Mental status changes
- 5. Lab (last 24 hours): Platelets < 100,000 µL
- 6. Lab (last 24 hours): INR > than 1.5
- 7. Lab (last 24 hours): Bilirubin ≥ 4 mg/dL
- 8. Lab (last 24 hours): Serum Lactic acid ≥ 2 mEq/L

Sepsis Protocol

I. Initial Steps

1. Review the advance directive and options
2. Complete the e-Interact Change in Condition Evaluation
3. Notify the physician of findings, utilizing the information from the Sepsis Screen and e-Interact Change of Condition Evaluation
4. Educate the patient / family on possible diagnosis

II. Treatment at the facility

Provide the following recommendations / request to the physician

1. Labs:
   - CBC with differential
   - BMP
   - Lactate level
   - Urinalysis and culture
   - Consider CXR if patient has adventitious breath sounds
   - Blood cultures for two different sites, all sent ASAP
II. Treatment at the facility continued

2. Establish IV Access:
   - Normal Saline at 30cc/kg over 3 hours if SBP < 100 mmHg
     (subsequent rate determined by physician)
   - Administer broad spectrum IV or IM antibiotics within one (1) hour of identification of sepsis
     Suggestions include Zosyn and Levaquin,
     Rocephin and Levaquin
   - Check for drug allergies

II. Treatment at the facility continued

3. Comfort Care:
   - Pain Management
   - Antipyretics for fever
   - Keep family informed

II. Treatment at the facility continued

4. Nursing Care:
   - Vital signs every four (4) hours
   - Intake/output monitoring
   - Reposition frequently
   - Encourage fluids
   - Adjust care plan
Sepsis Screening Assessment Schedule

Admissions & Re-admissions
- A 21-day schedule will automatically activate when a census line of admission (AA) or re-admission (RA) is entered into PCC on a resident. If after the initial 21-days the resident remains skilled or continues on antibiotics another 21-day schedule will need to be manually activated.

For in-house patients started on antibiotics
- A 21-day schedule will need to be manually activated.

Additional Training Links

www.cdc.gov/sepsis/clinicaltools/index.html

http://www.sepsisalliance.org/resources/video/
Faces of Sepsis Video – 4 minutes

https://www.youtube.com/watch?v=emDqlzCUuy6Q&list=PLV61315vZ27FHEY6q0tDUH8yAGsGy0&index=10
Sepsis – SIRS – Multiple Organ Dysfunction Syndrome
7.5 minutes

Link to Sepsis Alliance http://www.sepsisalliance.org/
Tri-fold educational brochure

Closing

Question & Answers
Comments

Ciena Healthcare