Sepsis: Practical Pearls in Diagnosis and Treatment Decisions in Long-Term Care

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Speaker Disclosures

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Learning Objectives

By the end of the session, participants will be able to:

• Objective 1: Know the diagnostic criteria for sepsis
• Objective 2: Know principles of sepsis clinical management
• Objective 3: Understand the role of communication cascade
• Objective 4: Discern whether to treat in LTC or transfer
Case Presentation:

• 79 year old patient with indwelling foley and and history of CVA with dense left hemi, diabetes, hypertension, and CAD.
• Called by NP – facility called with patient having constitutional symptoms – acute change in condition
• Initial workup; 12K white count; no localizing symptoms.
• Ceftriaxone started; fever continues (99.5); she wants to add more antibiotics.
• Is this enough information for decision making?
• What did we do with patient?
Audience Poll

• What is the criteria/screening tool does your nursing home use for sepsis recognition?

1. qSOFA
2. MHA -100-100-100
3. None- we diagnose on case by case basis
4. Other
QSOFA: identifying sepsis

qSOFA

Hypotension
Systolic BP
<100 mmHg

Altered
Mental
Status

Tachypnea
RR >22/Min

Score of 2 cutoff criteria suggests a greater risk of a poor outcome
Seeing Sepsis: Identifying Sepsis

Is their temperature above 100?

Is their heart rate above 100?

Is their blood pressure below 100?

And does the resident just not look right? Tell the nurse, screen for sepsis and notify the physician immediately.
Sepsis diagnosis in Nursing Home

Can Sepsis Be Detected in the Nursing Home Prior to the Need for Hospital Transfer?

Philip D. Sloane MD, MPH a, b, c, Kimberly Ward BA a, David J. Weber MD, MPH c, d, Christine E. Kistler MD, MASc a, b, Benjamin Brown BS c, Katherine Davis BS c, Sheryl Zimmerman PhD a, e
## Diagnosing Sepsis in Nursing Home

<table>
<thead>
<tr>
<th>Sepsis Tool</th>
<th>Sensitivity</th>
<th>Specificity</th>
</tr>
</thead>
<tbody>
<tr>
<td>100-100-100</td>
<td>79</td>
<td>69</td>
</tr>
<tr>
<td>Oral temperature &gt;99.0</td>
<td>51</td>
<td>85</td>
</tr>
<tr>
<td>qSOFA</td>
<td>27</td>
<td>88</td>
</tr>
<tr>
<td>Oral temp&gt;100.2</td>
<td>40</td>
<td>93</td>
</tr>
</tbody>
</table>
Why is identification important?

<table>
<thead>
<tr>
<th></th>
<th>Nursing home residents</th>
<th>Non nursing home residents</th>
</tr>
</thead>
<tbody>
<tr>
<td>Patient with severe sepsis</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rate of ICU admission</td>
<td>40%</td>
<td>21%</td>
</tr>
<tr>
<td>Hospital LOS</td>
<td>7 days</td>
<td>5 days</td>
</tr>
<tr>
<td>In-hospital mortality</td>
<td>37%</td>
<td>15%</td>
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Outcomes of the Surviving Sepsis Campaign in intensive care units in the USA and Europe: a prospective cohort study


<table>
<thead>
<tr>
<th></th>
<th>USA</th>
<th>Europe</th>
<th>p-value</th>
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</thead>
<tbody>
<tr>
<td>Hospital mortality if origin is emergency department</td>
<td>3008 (24.6%)</td>
<td>736 (34.1%)</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>Hospital mortality if origin is ward</td>
<td>1661 (34.9%)</td>
<td>1481 (43.5%)</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>Hospital mortality if origin is ICU</td>
<td>644 (36.1%)</td>
<td>502 (48.0%)</td>
<td>&lt;0.0001</td>
</tr>
</tbody>
</table>

Lancet 2012
Action Items: Identification

• Use one standard tool that works for your facility.
• Impress the need for early identification
• Have a high level of suspicion
SEPSIS

Acute change in condition

I think of you constantly.

40% Mortality

Treating known infection
Principles of management
TREATMENT OF ACUTE SEPSIS

KEEP CALM AND BUNDLE UP
Effectiveness of the Bundles

- 263 patients –
- 6 hour bundle vs traditional treatment
- In hospital mortality 30.5 vs 46.5 with P=0.009

Early Goal-Directed Therapy in the Treatment of Severe Sepsis and Septic Shock
Emanuel Rivers, M.D., M.P.H., Bryant Nguyen, M.D., Suzanne Havstad, M.A., Julie Ressler, B.S., Alexandria Muzzin, B.S., Bernhard Knoblich, M.D., Edward Peterson, Ph.D., and Michael Tomlanovich, M.D. for the Early Goal-Directed Therapy Collaborative Group*

NEJM 2001
Antibiotic Choice

• Early – within 1 hour
• Appropriate –
  • Choice of antibiotic
  • Route of administration
  • Dose of antibiotic

<table>
<thead>
<tr>
<th>Source</th>
<th>Choice</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lung</td>
<td>antipseudo beta lactam+AG/Antipseudo FQ+vanc</td>
</tr>
<tr>
<td>Urine</td>
<td>Antipseudo betalactam</td>
</tr>
<tr>
<td>Undifferentiated</td>
<td>Antipseudo beta lactam+AG/Antipseudo FQ+vanc</td>
</tr>
</tbody>
</table>

Broad Goals

- Decrease microbial load
- Limit tissue injury by maintaining perfusion pressure

Integrative paradigm - A. Kumar

Virulence. 2014 Jan 1; 5(1): 80–97
What’s in a bundle?
Hour-1 Bundle

- Measure lactate level. Re-measure if initial lactate is >2mmol/L
- Obtain blood cultures prior to antibiotic administration
- Administer broad-spectrum antibiotics
- Begin rapid administration of 30ml/kg crystalloid for hypotension or lactate ≥4mmol/L
- Apply vasopressors if patient is hypotensive during or after fluid resuscitation to maintain MAP≥65mm Hg
Audience Poll

- My nursing home has following capabilities:
  1. Lactate levels, blood culture bottles, coverage to start IV, broad spectrum antibiotics in e Box
  2. Blood culture bottles, Start IV, broad spectrum antibiotics in e Box, NO lactate
  3. Start IV, broad spectrum antibiotics in e Box, NO lactate, NO Blood culture bottles
  4. Broad spectrum antibiotics in e Box, NO lactate, NO Blood culture bottles, maybe/NO IV
  5. Are you kidding me?
The single biggest problem in communication is the illusion that it has taken place.

George Bernard Shaw
Communication flow Cascade

- **CNA**
  - STOP AND WATCH
  - 100-100-100 Algorithm
  - Active surveillance

- **NURSE**
  - SBAR for sepsis
  - POLST/advance care plan

- **PHYSICIAN/PROVIDERS**
  - Diagnosis
  - Treatment plan and start

- **FAMILY**
  - Decision

**OUTCOME**
**Stop and Watch**

**Early Warning Tool**

If you have identified a change while caring for or observing a resident, please circle the change and notify a nurse. Either give the nurse a copy of this tool or review it with her/him as soon as you can.

- Seems different than usual
- Talks or communicates less
- Overall needs more help
- Pain – new or worsening; Participated less in activities
- Ate less
- No bowel movement in 3 days; or diarrhea
- Drank less

- Weight change
- Agitated or nervous more than usual
- Tired, weak, confused, or drowsy
- Change in skin color or condition
- Help with walking, transferring, toileting more than usual

☐ Check here if no change noted while monitoring high risk patient
**Situation:**
_____ has screened positive for sepsis at_____.
(patient name) (time)

**Background:**
1. _____ has the following **positive** criteria for SIRS
   (patient name) (state only those that apply)
   a. Temperature > 100.6 (38C) or < 96.8% (36)
   b. BP < 90 mmHg or > 40 mmHg from baseline
   c. HR > 90/min
   d. Respiratory rate > 20/min
   e. Change in mental status, ALOC

2. I suspect infection
   The most recent WBC is _______
   (Consider infection if WBC > 12,000 or < 4,000)

**Assessment:**
1. Vital signs are: _______
2. SAO₂ is _____, compared to _____ (last reading)
3. Mental status is now _______
4. Urine output is _____ cc per hour or _____ over the last 8°
5. The most recent creatinine is _____; Creatinine on admission was ____

**Recommendation:**
1. I need you to evaluate the patient to confirm if they have severe sepsis
2. In addition to a stat Lactate, what other labs would you like me to order?
3. Should I start an IV and give a fluid bolus? (if patient hypotensive)
Decision and treatment cascade for sepsis
Let’s not make our patients do this!

LIVING WILL

DO NOT put this person on artificial life support of any kind for any reason what so ever.

DO harvest reusable parts when he is dead, and then cremate all that remains.

Lee Su  
Witness I  
Witness II
To transfer or NOT to transfer

• Nursing home residents with severe sepsis, compared with non-nursing home residents, had significantly higher rates of ICU admission (40% vs 21%), hospital LOS (median, 7 vs 5 days), and in-hospital mortality (37% vs 15%).

Be aware:

- Mortality of sepsis is high
- Mortality is HIGHER if not following the full bundle!!
- May start treatment but several lab/ monitoring/ treatment resources may not be available in LTC facilities.
- The chance that patient will deteriorate despite initial treatment is high and we have no immediate ICU supportive interventions
Audience Poll

• BP was 90/60, HR 109, Temp 99.8°F (post acetaminophen), RR 22. Mental status was clear. There was dark urine in the bag. Patient had right costovertebral angle tenderness. What would you suggest?
  1. IV access and fluid resuscitation
  2. IV access and fluid resuscitation and broad spectrum antibiotics
  3. Ask staff to call 911
  4. Ask for goals of care and establish IV access
Transfer to the hospital
Nursing Home Staff are First Responders for Sepsis

Jump et al., JAMDA. 2019; 20(3); 275-78
# Sepsis Kits in PALTC Settings

<table>
<thead>
<tr>
<th>Category</th>
<th>Specific Components</th>
</tr>
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</table>
| **Durable equipment** | Automated digital blood pressure machine  
|                    | Blood pressure cuffs (disposable) in several sizes  
|                    | Pulse oximeter  
|                    | Thermometer  |
| **Supplies**       | Mask and tubing for supplemental oxygen  
|                    | Kits for placing intravenous catheters (include several sizes)  
|                    | Blood drawing equipment including tourniquets  
|                    | Chlorhexidine swabs for cleansing skin prior to placing intravenous catheters and collecting blood cultures  
|                    | Kit for placing urinary catheter to monitor urine output  
|                    | Sterile gloves (include several sizes) for placing the urinary catheter  
|                    | Personal protective equipment including gowns, gloves and masks (include several sets)  
|                    | Dressing supplies, packing and tape  
|                    | Bags of sterile crystalloid fluid (e.g., normal saline or lactated ringers) |

Jump et al., *JAMDA*. 2019; 20(3); 275-78
# Sepsis Kits in PALTC Settings

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<tr>
<td><strong>Laboratory Tests</strong></td>
<td>• Blood culture bottles (at least 2 sets of aerobic and anaerobic bottles)</td>
</tr>
<tr>
<td></td>
<td>• Sterile containers to collect additional specimens as clinically indicated:</td>
</tr>
<tr>
<td></td>
<td>• urine (from a newly placed catheter)</td>
</tr>
<tr>
<td></td>
<td>• sputum culture</td>
</tr>
<tr>
<td></td>
<td>• stool, particularly if liquid</td>
</tr>
<tr>
<td></td>
<td>• Bacterial culture swabs</td>
</tr>
<tr>
<td></td>
<td>• Viral culture swabs and transport medium</td>
</tr>
<tr>
<td></td>
<td>• Collection tubes for common laboratory studies†</td>
</tr>
<tr>
<td><strong>Antibiotics</strong></td>
<td>• Oral: amoxicillin/clavulanic acid and linezolid</td>
</tr>
<tr>
<td></td>
<td>• Intravenous: piperacillin/tazobactam and intravenous vancomycin</td>
</tr>
<tr>
<td></td>
<td>• If penicillin allergy: levofloxacin</td>
</tr>
<tr>
<td></td>
<td>• If concern for C. difficile infection: oral vancomycin or fidaxomicin</td>
</tr>
</tbody>
</table>

*When appropriate, the components of the S-KIT should be labeled with an expiration date and replaced. Durable equipment should be checked quarterly for proper functioning and the supplies replaced at least annually.†Lavender top for a complete blood count; light blue for PT/INR; gold top or red with a gold center for basic and complete metabolic panels, cardiac enzymes and C-reactive protein; grey top for lactic acid.

Jump et al., JAMDA. 2019; 20(3); 275-78
Treat in Nursing Home
Treatment of Sepsis in PALTC
Treat

• 30ml/kg X 60 KG=1800 ml in 1 hr.

• Keep MAP >65 [(diastolic X 2)+systolic]/3

• Follow up the lactate if the first level was high-
Treat

• Send all Cultures before the first dose of antibiotics which should be within 1 hour-

• Start with broad spectrum antibiotics (2 with shock) and narrow a.s.a.p. –

• Duration 7-10 days (typical) tailored to the organ of origin
Monitor

- Close monitoring of vital signs
- Watch for system failure with O2 monitoring, labs (glucose, creatinine, platelet)
- Watch for response (CBC, lactate level)
- Follow up Cultures
Watch out for complications

- Pressure ulcers
- DVT/ stress ulcer
- Deconditioning
- Nutrition
- Delirium
Communicate

• Call family to discuss prognosis and goals of care.
Management of sepsis in LTC
CMS COP phase 3 requires facilities to have an antimicrobial stewardship program. What do you think of the state of your facility’s antimicrobial stewardship program?

1. Our facility has a robust program with involvement of consultant pharmacists and medical director.
2. Our facility is trying to get it together.
3. All I know about mine is people telling me, I can’t use antibiotics
4. What’s that?
But doesn’t this go against our antibiotic stewardship program?
Antibiotic Stewardship

- Do not treat with antibiotics
- Start Antibiotics

No signs/sx of infection
- My mother burst into tears when I helped her put on her shoes for going outside.

Possible Infection
- Mr. Jones has a terrible cough, shortness of breath and leg edema.

Likely Infection
- Mrs. Smith has a temperature of 99.4°F and a hot, red leg.

Active monitoring
Supportive Care
Diagnostic Tests
Keep Thinking!!
Principles of Antibiotic Stewardship

Treatment for Sepsis
Principles of Antibiotic Stewardship

Treatment for Sepsis
Principles of Antibiotic Stewardship

Treatment for Sepsis

Antibiotic Use Protocols
Mindful approach to treatment of Infections
Always Team Work
Questions: