Guidelines are the Future of Sepsis Management

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Senior Critical Care Attending
Camden NJ USA
Objectives

Sepsis guideline experience to date

Next steps

A New American Revolution
Clinical Practice Guidelines – Intent

1. Improve the quality of decisions
2. Create explicit recommendations
3. Improve consistency of care
4. Clarify proved benefit and document the quality of supporting evidence
5. Support quality improvement activities
6. Update guidelines as new evidence becomes available

Sepsis Guidelines – How are we doing?
Current Sepsis Guidelines Are Good

- Validity
  - References
  - Evidence graded
- Supportive organizations
- Emphasis on performance improvement program
- Developed bundles of care
  - 3 hour and 6 hour
Scholarly Activity for SSC Guidelines

- 2004 SSC Guidelines - Cited by 4005
- 2008 SSC Guidelines - Cited by 6200
- 2013 SSC Guidelines - Cited by 4030
- Current guideline views at 6.5M since release and posting on the SSC website
Global Guideline Application

Resource unlimited

Resource limited
Utility of the SSC Guidelines

- Non Sepsis Expert
- Typical patient

Sepsis Expert
Atypical Patient
one-size fits all

Guidelines
Can Guidelines Be Modified To Individual Patients?

http://www.nih.gov/precisionmedicine/
# Mortality based on source of infection

<table>
<thead>
<tr>
<th>Infection source</th>
<th>%</th>
<th>Mortality %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pneumonia</td>
<td>44.4</td>
<td>38.2</td>
</tr>
<tr>
<td>UTI</td>
<td>20.8</td>
<td>25.1</td>
</tr>
<tr>
<td>Abdominal</td>
<td>21.1</td>
<td>40.8</td>
</tr>
<tr>
<td>Meningitis</td>
<td>1.6</td>
<td>23.0</td>
</tr>
<tr>
<td>Skin</td>
<td>5.9</td>
<td>28.6</td>
</tr>
<tr>
<td>Bone</td>
<td>1.2</td>
<td>31.9</td>
</tr>
<tr>
<td>Wound</td>
<td>3.8</td>
<td>32.2</td>
</tr>
<tr>
<td>Catheter</td>
<td>4.1</td>
<td>33.9</td>
</tr>
<tr>
<td><strong>Endocarditis</strong></td>
<td><strong>1.1</strong></td>
<td><strong>41.0</strong></td>
</tr>
<tr>
<td><strong>Device</strong></td>
<td><strong>1.1</strong></td>
<td><strong>42.5</strong></td>
</tr>
<tr>
<td>Other infection</td>
<td>12.7</td>
<td>33.1</td>
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(n=15,022)
Mortality based on organ failures at $T_0$

Precision Medicine in Sepsis: Enrich, Modify But Not Replace...

- Optimize routine care
- Secondary analysis of completed sepsis trials
- Sepsis severity scoring system
- Biomarker
- Evaluation of Infectious source
- Genetic predisposition
- Contribution of age & comorbid condition
Things to consider for the future of the sepsis guidelines?

- Target clinician and lay public input into process
- Application to under-resourced areas
- Early identification of target patient
- Highlight prevention
- Offer a simplified version
- Promote a “How to Guide”
Early Identification and Rapid Treatment

“I wish you'd come to me sooner.”

© T. McCracken mchumor.com
Emphasis on Prevention

- Prevent stroke and heart disease
  - Lower cholesterol
SSC Emphasis on Prevention

Prevent organ dysfunction
- Screening every shift
- Early identification
- Blood Cultures
- Antibiotics

Prevent progression of organ dysfunction
- 30 ml/kg
- Lactate
- Re-measure lactate
- Clear lactate
2: Perceived barriers to implementing guidelines on diabetes care, from a survey of physicians in general hospitals in the Netherlands

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<td>81%</td>
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<tr>
<td>Lack of necessary staff</td>
<td>46%</td>
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<tr>
<th>Economic context</th>
<th>Proportion of respondents citing reason</th>
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<tr>
<td>No financial compensation</td>
<td>57%</td>
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2013 ACC/AHA Guideline on the Treatment of Blood Cholesterol to Reduce Atherosclerotic Cardiovascular Risk in Adults

A Report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines

Endorsed by the American Academy of Physician Assistants, American Association of Cardiovascular and Pulmonary Rehabilitation, American Pharmacists Association, American Society for Preventive Cardiology, Association of Black Cardiologists, Preventive Cardiovascular Nurses Association, and WomenHeart: The National Coalition for Women With Heart Disease


R. Phillip Dellinger, MD
d Mitchell M. Levy, MD
d Andrew Rhodes, MB BS
d Djillali Annane, MD
Herwig Gerlach, MD, PhD
d Steven M. Opal, MD
d Jonathan E. Sevinsky, MD
d Charles L. Sprung, MD
d Ivor S. Douglas, MD
d Roman Jaeschke, MD
d Tiffany M. Osborn, MD, MPH
Mark E. Nunnally, MD
d Sean R. Townsend, MD
d Konrad Reinhart, MD
Ruth M. Kleinpell, PhD, RN-CS
Derek C. Angus, MD, MPH
d Clifford S. Deutschman, MD, MS
Flavia R. Machado, MD, PhD
Gordon D. Rubenfeld, MD
Steven A. Webb, MB BS, PhD
Richard J. Beale, MB BS
Jean-Louis Vincent, MD, PhD
Rui Moreno, MD, PhD
and the Surviving Sepsis Campaign Guidelines Committee including the Pediatric Subgroup

45 pages
144 references

57 pages
636 references
SSC Guideline Layers

- Rationale
- Evidence Based Tables
- Recommendation
Next Steps

Surviving Sepsis Campaign Guidelines 2016

NO FEAR
The Guidelines PLUS a Translation Anyone Can Understand
Surviving Sepsis Campaign Guidelines 2016

All-In-One Resource
✓ Expert commentary
✓ Notes and Definitions
✓ Exclusive Algorithms
✓ Handy Checklists

GUIDELINES IN PLAIN ENGLISH
Knowledge is like paint... It does no good until it is applied
Evidence-based Medicine Spectrum

Practice Experience

Clinical Research

Evidence Review

Evidence Synthesis

Consensus Statement

Clinical Decision Support

Medical Education

Quality Improvement

Healthcare Policy

Evidence-based Guideline

E-Decision Support

EMRs/e-reminders

Checklists pocketcards, etc

CME/non-CME

Simulation/VR

Other education

PMs

PIMs

Other PI projects

Reimbursement

Facilities planning/approvals

Health and Science Policy

Dissemination and Application
Guidelines are an essential starting point
But guidelines are not enough

- Quality Indicators
- Protocols
- Performance Improvement Programs
  - Audit and Feedback
Converting Goals to Measurable Indicators
Guidelines to Bundles
You say you want a revolution

The BEATLES

Revolution
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
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 arterial hypotension despite volume resuscitation (septic shock) or initial lactate ≥4 mmol/L (36mg/dl):
   - Measure central venous pressure (CVP)
   - Measure central venous oxygen saturation (ScvO2)

7. Remeasure lactate if elevated.
A Randomized Trial of Protocol-Based Care for Early Septic Shock

The ProCESS Investigators


Over 1500 Patients

Goal-Directed Resuscitation for Patients with Early Septic Shock

The ARISE Investigators and the ANZICS Clinical Trials Group


1600 Patients
A. Measure lactate level
B. Obtain blood cultures prior to antibiotics
C. Administer broad spectrum antibiotics
D. Administer 30 ml/kg crystalloid for hypotension or lactate = 4 mmol/L
E. Apply vasopressors (for hypotension that does not respond to initial fluid resuscitation to maintain a mean arterial pressure = 65)
F. 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.

*To meet the requirements, a focused exam† by a licensed independent practitioner (LIP) to include vital signs, cardiopulmonary, capillary refill, pulse and skin findings, or any 2 other items below are required:

- Measure CVP
- Measure ScvO2
- Bedside cardiovascular ultrasound
- Dynamic assessment of fluid responsiveness with passive leg raise or fluid challenge
G. Re-measure lactate if initial lactate is elevated
You say you got a real solution
Well, you know
We'd all love to see the plan
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#### Economic context
- No financial compensation: 57%

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You ask me for a contribution
Well, you know
We're all doing what we can
Revolution

The BEATLES

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1600 Patients
- SSC 2006 six hour bundle
- SSC 2012 three hour bundle
- NQF 0500
- NQF 0500 (revised)
- CMS SEP 1
TO SAVE LIVES.....

Early identification

Early antibiotics

Early fluid resuscitation
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Importance of reassessment
The Future of Sepsis Management

- **Guidelines** are the future of sepsis management

- And in the United States the future is now!