Optimal Resuscitation
Do we know?
What do we do?

Evie Marcolini MD, FACEP, FAAEM, FCCM
Assistant Professor, Departments of Emergency Medicine and Neurology
Division of Neurocritical Care and Emergency Neurology
Medical Director, SkyHealth Critical Care
Yale University School of Medicine
I have no disclosures
Surviving Sepsis Campaign
1. Screening for infection
   Early identification
   Treatment
qSOFA

Altered mental status
RR \geq 22
SBP \leq 100
Fig. 2  Mortality rate at 28 days, by classification group
2. Screening for organ dysfunction and sepsis
3-hour bundle
TO BE COMPLETED WITHIN 3 HOURS:

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

Complete 6 hour bundle
TO BE COMPLETED WITHIN 6 HOURS:

5) Apply vasopressors (for hypotension that does not respond to initial fluid resuscitation) to maintain a mean arterial pressure (MAP) ≥65 mm Hg.

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.
How did the recommendations get scored?

GRADE

Strong vs weak

Voting
What's the evidence mean?

Strong – most would use in most situations
Weak – some want it, some don’t
BPS = common sense, generally accepted
Sepsis
2 or more SIRS criteria
Temperature >38°C or <36°C
Pulse rate >90 beats/min
Respiratory rate >20 breaths/min
WBC count >12,000 cells/mL³

Severe sepsis
Sepsis + evidence of organ dysfunction
Neurologic: altered mental status by history or examination
Cardiovascular: systolic blood pressure <90 mm Hg after fluid challenge
Metabolic: lactate >4.0 mmol/L
Hematologic: platelets <100,000 cells/mL³
Renal: creatinine >2.0 mg/dL, not known to be chronic
Pulmonary: respiratory rate >20 breaths/min or pulse oximetry <90%
on room air or <95% while breathing supplemental oxygen >4 L/min

Septic shock
Sepsis + evidence of hypoperfusion

Vasopressor requirement
Hypotension after at least 2 L intravenous fluids
Within 3 hours of presentation:
Measure serum lactate
Obtain blood cultures prior to antibiotics
Administer antibiotics

Within 6 hours of presentation:
Repeat serum lactate if initial lactate is >2

For septic shock:

Within 3 hours of presentation:
Measure serum lactate
Obtain blood cultures prior to antibiotics
Administer antibiotics
Resuscitation with 30mL/kg crystalloid fluids

Within 6 hours of presentation:
Repeat volume status and tissue perfusion assessment
Vasopressor administration
(If hypotension persists after fluid)
Performance improvement program (BPS)
Initial resuscitation

30 cc/kg within first 3 hours (strong)
Frequent reassessment of hemodynamic status (BPS)
Dynamic > static
Central venous pressure
Pulmonary artery catheter
LV end diastolic pressure

Tuesday, May 9, 17
Central venous pressure
Pulmonary artery catheter
LV end diastolic pressure

Pulse contour analysis
Thermodilution
Ultrasound techniques
- mechanically vented
- no spontaneous effort
- TV > 8 ml/kg
- HR/RR < 3.6
- no RV failure
- no elevated LV filling
- no arrhythmia
IVC Collapsibility

Caval index =

\[
\frac{\text{IVC exp} - \text{IVC insp}}{\text{IVC exp} \times 100}
\]
IVC Distensibility

\[ d\text{IVC} = 95\% \]
\[ CI = 1.8 \text{ L/min/m}^2 \]

\[ d\text{IVC} = 28\% \]
\[ CI = 2.6 \text{ L/min/m}^2 \]
<table>
<thead>
<tr>
<th>Cut-off value</th>
<th>Sens</th>
<th>Spec</th>
<th>PPV</th>
<th>NPV</th>
<th>P-value</th>
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</thead>
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<tr>
<td>PLR-CI</td>
<td>10%</td>
<td>95</td>
<td>95</td>
<td>95</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>PLR-EtCO2</td>
<td>5%</td>
<td>71</td>
<td>100</td>
<td>100</td>
<td>76</td>
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</tbody>
</table>

Monnet Intensive Care Med 2013;39:93-100
What about pressors?
Figure 3 Mortality of patients whose initial norepinephrine administrations were within the indicated time interval.
Antimicrobial therapy

Empiric
Targeted
Broad-spectrum
Multidrug
Combination
Antimicrobial therapy

No prophylaxis for noninfectious states
Empiric combo therapy for initial septic shock
Combo tx for septic shock only*
Abx should be administered within 1 hour
Recruitment maneuvers
Prone positioning
No HFOV
NIV - no comment
NMBAs
Lower tidal volumes
Lung-Protective Ventilation Initiated in the Emergency Department (LOV-ED): A Quasi-Experimental, Before-After Trial

Brian M. Fuller, MD, MScI*; Ian T. Ferguson, MPH; Nicholas M. Mohr, MD, MS; Anne M. Drewry, MD, MScI; Christopher Palmer, MD; Brian T. Wessman, MD; Enyo Ablordeppey, MD, MPH; Jacob Keeperman, MD; Robert J. Stephens; Cristopher C. Briscoe; Angelina A. Kolomiets, BS; Richard S. Hotchkiss, MD; Marin H. Kollef, MD

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Thank you!

evie.marcolini@yale.edu