

SEPSIS

The Past, Present and Future

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A vertical bar on the left side of the slide, composed of several colored segments: a small black rectangle at the top, followed by a thin white line, a thin grey rectangle, a thin olive green rectangle, and a long red rectangle at the bottom.

Disclosures

None

ΣΉΨΙΣ

- Greeks, 700 BCE
- Decomposition, or rot
- Life-threatening condition
- Associated with infection
- High risk of death




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SEPSIS -3

- JAMA 2/23/16 . Vol 315, No. 8, pp 762 – 787,
801 – 810



Third International Consensus Definitions for Sepsis and Septic Shock

- SCCM
- ATS
- ESICM
- Dozens of other organizations



Problems with Old Definition

- Too much focus on inflammation
- Inaccurate portrayal of sepsis to septic shock as a continuum
- Inadequate sensitivity and specificity of SIRS

SEPSIS - 3

- “life-threatening organ dysfunction caused by a dysregulated host response to infection
- No more: “Severe sepsis”
- All sepsis is severe, i.e. has organ dysfunction
- Mortality risk 10%



Organ Dysfunction

- SOFA (Sequential Sepsis-related) Organ Failure Assessment
 - q SOFA (quick SOFA)
- 

SOFA

- Respiration PaO₂/FiO₂
 - Coagulation Platelets
 - Liver Bilirubin
 - Cardiovascular MAP or vasopressor
 - CNS Glasgow Coma Score
 - Renal Creatinine or U/O
-
- SOFA of 2 = 10% mortality risk

qSOFA

At least 2 or more of 3 criteria:

- 1. RR over 22
- 2. Altered mentation (GCS)
- 3. SBP under 100 mm Hg

*Suspected source of infection

*In hospital mortality over 10%

Septic Shock

DESPITE adequate volume resuscitation

- Vasopressors to keep MAP over 65 AND
 - Lactate over 2 mmol/L
-
- In hospital mortality over 40%

CMS DEFINITION: SEVERE SEPSIS

- Suspected Source of Infection
- 2 or more SIRS criteria
- Organ dysfunction
- .
- All 3 criteria must be met within 6 hours of each other



SIRS criteria (2 or more)

- T over 38.3 or under 36
- HR over 90
- RR over 20
- WBC over 12,000 or under 4,000 or Bands over 10%



Organ Dysfunction

- SBP under 90
- MAP under 65
- SBP decrease over 40 mm Hg
- Creatinine over 2
- UOP under 0.5 ml/kg/Hr x 2 hr
- Bili over 2
- Platelets under 100,000
- INR over 1.5
- PTT over 60
- Lactate over 2

CMS Definition: Septic Shock

- Severe Sepsis AND:
- Tissue hypoperfusion after IVF administration, evidenced by ONE of the following:
 - SBP under 90
 - MAP under 65
 - SBP drop of over 40 points
 - Initial lactate 4

To Be Completed within 3 Hrs of Time of Presentation

- measure lactate
- obtain blood cultures prior to administration of antibiotics
- administer broad spectrum antibiotics
- For hypotension or lactate ≥ 4 , administer 30 ml/kg crystalloid




Time of Presentation/Time Zero

- Earliest chart annotation
- signs or symptoms (of severe sepsis or septic shock) are all present
- May be nursing charting, labs, physician documentation

To Be Completed within 6 hrs of Time of Presentation

1. Apply vasopressors (for hypotension that does not respond to initial fluid resuscitation).
maintain mean arterial pressure 65 mm Hg
2. Remeasure lactate if initial lactate over 2
3. For persistent hypotension after initial fluid administration, or if initial lactate 4, reassess volume status and tissue perfusion (and document findings)



Document Reassessment of Volume Status and Tissue Perfusion with:

- EITHER by physical exam OR using technology:
- Repeat focused exam (after fluid resuscitation) by licensed independent practitioner (MD/DO/PA/NP) including ALL of the following:
 - vital signs
 - cardiopulmonary exam
 - capillary refill
 - peripheral pulses
 - skin findings



OR (using technology) do any TWO of the following:

- Measure cvp
- Measure ScvO₂
- Bedside cardiovascular ultrasound
- Dynamic assessment of fluid responsiveness with passive leg raise or fluid challenge

More on the CMS Focused Exam

- Vitals: must record T, HR, RR , BP
- Cardiopulmonary exam: must reference both heart and lungs
- Capillary refill : may describe as prolonged, or <2 seconds, > 2 seconds
- Peripheral pulses: radial, DP, PT
- Skin exam: flushed, pink, pale, mottled

Bedside Cardiac Ultrasound

- MD or tech
- IVC compressibility , OR
- IVC diameter, OR
- Cardiac chambers:
 - LV size, LV function
 - RV size, RV function

Passive Leg Raise

- Start with pt supine, upper torso 45 degrees
- Put pt fully supine
- Raise legs 45 degrees
- Measure the following at baseline and at 60-80 seconds:
 - pulse pressure (rise of over 10%)
 - cardiac output (rise of over 10%)
 - stroke volume (rise of over 10%)
 - end tidal CO₂ (rise of over 5%)



Fluid Challenge

- Crystalloid 500 ml/15 min or 1000 ml/30 min
- Measure:
 - cardiac output (rise over 15%), or
 - stroke volume (rise 10%), or
 - pulse pressure (rise 10%)



Recap: 3 Hour Clock

- Lactate
- Blood cultures, then
- Antibiotics
- IVF (30 ml/kg crystalloid) for shock or
Lactate 4

Recap: 6 Hour Clock

- If still in shock after initial fluids, vasopressors
- Remeasure lactate if over 2
- If still in shock after initial fluids, or if lactate ≥ 4 , document reassessment of volume status and tissue perfusion (by exam or with “technology”)

SEPSIS -3, THE FUTURE

- CRITICS:
- Simpson, Chest 2016;149:1117-1118
- Angus, AJRCCM 2016;194:14-15
- Cortes-Puch, AJRCCM 2016;194:16-18

- “sacrifices sensitivity for specificity”
- “difficult to implement”
- “no scientific breakthroughs to mandate revision in (sepsis) definition

SEPSIS – THE FUTURE

- Sepsis 3 inconsistent with ICD 10 guidelines
- Sepsis 3 not yet accepted by CMS
- Surviving Sepsis Campaign: “screening should continue as previously recommended (using Sepsis 2 criteria)”
- SSC: “sepsis (severe sepsis) should be identified by the same organ dysfunction criteria”
- Hospitals should prepare for major changes!

Thank You

