Sepsis: The Billion Dollar Enemy
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DISCLOSURES
• I have no disclosures

OBJECTIVES:
• Review the new Sepsis and Septic Shock definitions
• Review and understand SEPSIS-3 (SOFA/qSOFA)
• Learn how to recognize sepsis early
• Review management and treatment of sepsis
• Describe the indications for therapeutic agents including fluids, vasopressors, antibiotics, and steroids in the treatment of sepsis
• Identify methods hospitals and other agencies are utilizing to improve sepsis recognition.
WHY IS SEPSIS IMPORTANT?

• Affects 1 million people each year in the USA
• One of the Leading causes of death from Infection
• Incidence is on the rise.
• Hospitals spent $20.3 billion in 2011 treating it.
• Most patients need short term placement at discharge
• Risk of death remains elevated 2 years post recovery

CASE

• CC· increased confusion x 1 day per family
• HPI
  • 86 y/o female with pmhx T2DM, HTN, and dementia presents to the ED with her daughter for concern of increasing confusion over the last day. Family describes confusion as her being more drowsy, harder to wake up this morning, forgot who her husband was, doesn’t remember the month or year and forgot to watch her favorite TV show last evening.
  • When patient is questioned, she states, “I’m fine, I’m just tired, my daughter worries about me too much?”
  • She denies any fever, chill, CP, cough, SOB, N, V, D, abd. Pain, HA, Neck pain, vision changes, urine sx.

HPI CONTINUES

• PMHx and Medications
  • T2DM- diet controlled
  • HTN- takes Lisinopril and Metoprolol
  • Dementia- no medications
• PSHx
  • Cholecystectomy
  • Appendectomy
• Allergies: NONE
• Social- live with daughter, denies tobacco, drugs, alcohol
• Family Hx- pt can’t recall
Physical Exam

• VITAL - HR 120, BP- 90/55, Temp 100.6, RR 24, Pulse ox 98%RA
• GENERAL - upon entering room eyes closed, but open them to verbal stimuli,
• PSYCH - A&Ox3
• CVS - S1S2 present, tachy, no murmur
• RESP - decreased air entry throughout, but no crackles
• ABD - obese, soft, diffusely tender localized over suprapubic region
• MSK - no joint swelling or tenderness
• NEURO - moving all extremities,

LABS AND IMAGING

• CBC-
  • WBC - 12
  • Hgb - 9
  • PLT - 75
• Lactate - 4.4
• BMP - Scr 2.5
• LFTs - total bili 1.2
• CXR - no infiltrates
• UA - WBC >500, nitrite +, squamous cell-2

NEW SEPSIS & SEPTIC SHOCK
DEFINITION
NEW SEPSIS DEFINITION

- A Life threatening organ dysfunction due to dysregulated host response to infection
  - Pt needs to have a suspected or documented source of infection
  - An acute increase of >= 2 SOFA (Sequential (sepsis related) organ failure assessment)

NEW SEPTIC SHOCK DEFINITION

- Septic shock: sepsis that has circulatory, cellular and metabolic abnormalities that are associated with a greater risk of mortality than sepsis alone
  - Fulfills criteria of sepsis AND vasopressor therapy needed to increase Mean Arterial Pressure (MAP) ≥ 65mmHg AND lactate > 2 mmol/L DESPITE ADEQUATE fluid resuscitation.
  - ** term severe sepsis doesn’t exist anymore

SOFA (Sequential (Sepsis Related) Organ Failure Assessment) SCORE

- Scoring system to determine the extent of organ dysfunction
  - based on six different organ systems: respiratory, cardiovascular, hepatic, coagulation, renal and neurological
  - Good predict of ICU mortality in the first 24 hours
  - Assists health care providers in estimating the risk of morbidity and mortality from sepsis
  - CMS Services will be using it as an assessment for quality of care
CASE 4 - LABS AND IMAGING

- Glasgow coma
- BP: 90/50, MAP 63
- PLT: 75
- BMP: SCr 2.5
- LFTs: total bili 1.2
- Resp. Rate: 23

- TOTAL SOFA: 6
- Patient meets sepsis criteria: Infection and SOFA of 6
- WOW... THAT WAS A LOT OF WORK

qSOFA (Quick Sequential (sepsis related) Organ Failure Assessment)

- Quick screening tool
  - Respiratory rate >= 22 breaths/min
  - Any level of altered mental status
  - Low Blood pressure <= 100 mmHg
  - **Score >2 is associated with poor outcome from sepsis

- qSOFA does NOT define sepsis nor predicts death
CASE 4 - LABS AND IMAGING

- Glasgow coma: 15 (0)
- BP: 90/50 - MAP 63 (1)****
- PLT: 75 (2)
- BMP: Scr 2.5 (2)
- LFTs: total bilirubin 1.2 (1)
- Resp Rate: 23*****
- qSOFA: 2
- WOW…..THAT WAS EASIER 😊

SCREENING & MANAGEMENT OF SEPSIS

- EARLY IDENTIFICATION OF PATIENTS WITH SUSPECTED INFECTION
  - Obtain blood cultures and other cultures

- SCREEN FOR ORGAN DYSFUNCTION
  - qSOFA (2)

- IDENTIFY & MANAGEMENT OF HYPOTENSION
  - Poor peripheral perfusion
Early Goal Directed Therapy (EGDT)

- Introduced in 2001
- Therapy used for treatment of severe sepsis** and septic shock
- Involved adjustments of cardiac preload, afterload, and contractility to balance oxygen delivery with an increased oxygen demand
- Three trials published in 2014/2015 have shown that EGDT should be abandoned

Challenges against EGDT

- ARISE (2014)- demonstrated that the use of EGDT for patient presenting to the ED with early septic shock did not reduce all cause mortality at 90 days
- March 2015, a study in the NEJM suggested that EGDT did not improve mortality or outcomes. They found that on average, EGDT increased costs and was not cost effective
- ProCESS study (2014)- randomly assigned patients to EGDT vs standard therapy- they found no difference in 90 day and 1 year mortality.

Today’s Management

- Look for clinical signs to identify poor perfusion
  - BP <90, MAP <70, or decrease in SBP >=40
  - Tachy >90
  - obtundation/restlessness
  - Oliguria/anuria
  - Elevated lactate >= 2mmol/L
- Rapid restoration achieved with IV fluids
Administration of IVF

• Administer in well defined rapidly infused boluses
• After each bolus, check volume status, tissue perfusion and presence of fluid overload
• Repeat boluses until BP and tissue perfusion are acceptable or patient develops pulmonary edema or fluid challenges fails.

IVF and Pressor Continue

• Multiple studies show no convincing differences between fluids
  • Crystalloids (lactate ringers)
  • Albumin (SAFE trail, expensive)
• Vasopressors are used when patient remains hypotensive despite adequate fluid resuscitation or develop cardiogenic pulmonary edema
  • Septic shock: prefer norepinephrine, but if tachycardic, could use phenylephrine

Practices For Monitoring Fluid Resuscitation

• No longer targeting straight CVP or intense CVO2sat monitoring
• Moved more to using ultrasound for volume assessment by looking at the IVC diameter and collapsibility and dynamic measures like LiDCO and other NICOM for calculation of stroke volume variation.
• Monitor MAP >= 65
• UOP >= 0.5cc/kg/hr
• Lactate clearance Q6 hrs
Sepsis Bundles and CMS Guidelines

CMS guidelines/SIRENS protocol

- To be completed within 3 hours of sepsis identification
  - Serum lactate stat & q2 hrs
  - 2 sets of blood cultures stat (prior to antibiotic administration)
  - Intravenous fluids (bolus & maintenance)
  - IV antibiotics (1st dose stat after blood cultures)

CMS guidelines/SIRENS protocol- continue

- To be completed within 6 hours of sepsis identification
  - If after IVF bolus MAP <65 or lactate >4, call HCP for CVC, and consider initiation of vasopressors
  - HCP to document- focused exam, cap refill and skin findings
  - HCP to document- bedside CV U/S and dynamic assessment of fluid responsiveness w/ passive leg raise or fluid challenge
ANTIBIOTIC MANAGEMENT OVERVIEW

• Obtain 2 sets of blood cultures from 2 DIFFERENT sites prior to antibiotics.
• Administer within three hours of recognition
• Gram positive organisms most commonly cause sepsis
• Because Staph Aureus is becoming so common, all patients with sepsis should get vancomycin, if no obvious source
Steroids

Steroid Administration

- Pathogenesis of sepsis involves an intense host inflammatory response
- Steroids benefits patient with septic shock
  - BP <90, unresponsive to IVF or vasopressors

TAKE HOME POINTS:

- Sepsis defined as “Life threatening organ dysfunction due to dysregulated host response to infection”
- Septic shock defined as “sepsis that has circulatory, cellular and metabolic abnormalities that are associated with a greater risk of mortality than sepsis alone”
- Severe Sepsis and S.I.R.S no longer exist in defining sepsis
TAKE HOME POINTS:

• SOFA is used to clinically evaluate for organ dysfunction
• qSOFA- simplified version of SOFA, used as an initial way to identify patients at high risk for poor outcomes due to sepsis outside the ICU
• Goal of treatment is early recognition and management
• Hospitals and CMS services are using bundles to ensure timely and appropriate management.

SOURCES:

• Sanford Guide Antimicrobial Therapy 2015
• Erdman, S., Weaver, B. (2016). Choosing Wisely: Selecting the Best Antimicrobial. [PowerPoint slides].

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QUESTIONS

• THANK YOU