

EM Basic- Sepsis

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A stepwise approach to classifying sepsis:

Systemic Inflammatory Response Syndrome (SIRS)

A screening tool to identify patients who are having a systemic response to a stressor (usually an infection)

WBC count <4 or >12

Temperature <36 C or >38C (<96.8 F or >100.4 F)

Respiratory rate >22 or PaCO₂ <30

Heart rate >90

PEARL- just because someone meets SIRS doesn't mean its sepsis or worse. A patient with a broken ankle could have most of those SIRS criteria but they don't have an infection- it's a screening tool

Sepsis = 2 out of 4 SIRS criteria + known or suspected source of infection

PEARL- Again, just because you meet criteria for sepsis doesn't mean you get a central line and get admitted to the MICU. *Technically* if you are febrile and tachycardic from strep pharyngitis then you are septic

Severe Sepsis- Sepsis + signs of end organ damage

Lactate >4 (byproduct of anaerobic metabolism and a marker of global hypoperfusion)

Systolic BP <90 after 2 liters of normal saline bolus (OR more than 40 points below the patient's established outpatient baseline)

New onset (or worsening) renal failure

Altered mental status

Hyperglycemia in a patient who is not diabetic

Septic Shock- Severe sepsis requiring vasopressors

Severe sepsis/Septic Shock= initiate early goal directed therapy (EGDT)

Sepsis workup

CBC

Chem 10

UA/UC

Blood cultures x2

VBG with lactate

Chest x-ray

Noncontrast head CT and LP if suspecting meningitis

Consider other less common causes of sepsis- skin infections (check for decubitus ulcers), perirectal abscesses, surgical abdomen (appy, chole, perforation), intra-abdominal abscess, in females- PID or infected IUD. Image as needed and get surgeon involved for source control

Early Goal Directed Therapy for Severe Sepsis and Septic Shock

Rivers, et al. New England Journal of Medicine. 2001; 345:1368-137
(Full text available for free- google search "rivers sepsis"- read it!)

Criteria: Patients with severe sepsis or septic shock

Main points of protocol- very aggressive fluid resuscitation- intubate if necessary, early initiation of antibiotics

Step 1: Early antibiotics- broad spectrum/tailored for source (if known)

Popular broad spectrum combo:

Zosyn (piperacillin/tazobactam)- 3.375 or 4.5 grams IV

Vancomycin- 15-20 mg/kg IV (usually capped at 1 gram per dose but latest guidelines recommend giving full weight based dose up to 2 grams IV for the first dose)

Antibiotics for other clinical situations

Healthcare associated pneumonia (patients at risk for drug resistant organisms- long term care facility resident, admitted to the hospital for 2 or more days in the past 3 months, dialysis patient, outpatient IV antibiotics or chemo in the past month)- add levaquin to zosyn/vanc

Levaquin (levofloxacin)- 750mg IV "double covers pseudomonas"

Antibiotics for other clinical situations (cont.)

Rocephin (ceftriaxone)- preferred for urosepsis and meningitis

Dose: 1 gram IV (urosepsis) or 2 grams IV (meningitis in combination with vancomycin)

Step 2: Aggressive fluid resuscitation

Start with a 2 liter normal saline bolus

Insert a central line above the diaphragm (subclavian, supraclavicular, internal jugular)

Measure central venous pressure (CVP)

If CVP <8 (or less than 12 in a ventilated patient)= more fluids

Give fluids until CVP goal is met, even if it means intubating the patient for pulmonary edema

PEARL- septic patients can get 13-14 liters in their first 24 hours!

PEARL- the actual act of breathing can take up to 30% of a critically ill patient's metabolism so by intubating early you will improve their hemodynamics and their response to therapy

Step 3: Vasopressors

Once CVP above 8 or 12, if MAP is less than 65, start vasopressors

Will probably require an arterial line at this point

Levophed (norepinephrine)- 2-20 mcg/min- strong alpha and beta agonist (increased myocardial squeeze and increased vasoconstriction)
central line, most clinician's preferred 1st line pressor

Dopamine- 2-20 mcg/kg/min- can be given through a peripheral IV- gives more tachycardia than levophed

PEARL- you can start peripheral dopamine while you are putting the central line in

Other treatments- vasopressin/steroids (not covered in the podcast)

Goal: get MAP above 65

Step 4: Assess SCVO2

SCVO2- a measurement of oxygen saturation of the blood in the superior vena cava (as it returns to the heart)

Need a central line above the diaphragm to measure this

Two methods- Edwards catheter provides continuous SCVO2 readings (expensive) or draw serial VBGs from central line and look at O2 sat

If SCVO2 <70%- check hemoglobin/hematocrit

If H and H less than 10 and 30- transfuse pRBCs until its above 10/30

Once H and H is >10/30- if SCVO2 still <70%- start dobutamine

Dobutamine- strong B1 agonist

Dose- 2-20 mcg/kg/min

Step 5: Reassess response to therapy (also continuously)

It may take 6-12 hours or longer to reach this step. Once you are here, go back and reassess each step and make sure you have optimized each one. Follow serial lactates- if they are decreasing then you are doing something right. If they are staying the same or increasing- try something different

BIG POINTS:

- 1) Know the definitions of SIRS, sepsis, severe sepsis, and septic shock
- 2) Early broad spectrum antibiotics- Zosyn/Vanc, Levaquin, Rocephin
- 3) FLUIDS FLUIDS AND MORE FLUIDS!- these patients can get 13-14 liters in the first 24 hours- be aggressive even if you have to intubate
- 4) CVP <8 or <12- pressors to MAP >65 (norepinephrine, dopamine)
- 5) MAP >65- check SCVO2- less than 70%, transfuse to H and H >10/30
- 6) H/H >10/30- add dobutamine

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