**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 goad 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**

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 organsims- 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

Contact- steve@embasic.org  embasic.org  Twitter- @embasic