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## Identification and Treatment of Severe Sepsis

Purpose: To provide guidelines for the critical care healthcare staff in early identification and aggressive treatment of severe sepsis.

### Expected Practice:

#### Emergency Department/In – patient Units

### Initial Assessment and Treatment (within the first 6 hours):

#### Identification

1. Properly identify patients with Sepsis
  - a. Infectious process with 2 or > SIRS Criteria
    - i. Temperature  
≥38°C or ≤36°C
    - ii. HR ≥90 beats/min
    - iii. Respirations ≥20/min
    - iv. WBC count ≥12,000/mL or ≤4,000/mL or >10% immature Neutrophil
  - b. Begin process of identify infectious source
    - i. Assessment of probable cause
    - ii. Cultures
    - iii. Perform needed tests (CT, LP, etc)
2. Properly Identify patients with Severe Sepsis
  - a. Sepsis with Organ Dysfunction
    - i. Altered Consciousness, confusion, psychosis
    - ii. Tachypnea, hypoxia (p/f ratio < 300)
    - iii. Jaundice, elevated liver enzymes, decreased albumin
    - iv. Tachycardia, hypotension, altered CVP
    - v. Oliguria, anuria, increased creatinine
    - vi. Decreased platelets, increased PT, decreased protein C, increased D-dimer
3. Properly Identify patients with Septic Shock
  - a. Sepsis with hypotension Despite ADEQUATE fluid resuscitation
4. Patients on in – patient units shall have START notified at this time.

#### Treatment

5. Fluid resuscitation
  - a. Average requirements 20 – 40cc/kg crystalloid
    - i. Remember patients with CHF and or renal failure should be given fluids judiciously
    - ii. Consider placement of an ScVO<sub>2</sub> or SVV monitoring device
  - b. Perform initial resuscitation with crystalloid. If patient fails, consider the use of colloid.
  - c. Consider Colloid with Capillary Leak Syndrome (colloid requirements ½ the amount of crystalloid)
6. Laboratory test
  - a. CBC d/p, BMP, Mag, Phos, PT, PTT, D-dimer, CRP, Lactate
7. Obtain appropriate cultures
8. Initiate appropriate Antibiotic coverage
9. If decreased perfusion with Lactate > 4 and MAP < 65mmhg initiate vasopressors
  - a. Levophed 0.01 – 1.0 mcg/kg/min
  - b. Dobutamine 5 – 10 mcg/kg/min
  - c. Vasopressin 0.01 – 0.04 units/min

- i. Consider with refractory shock
- 10. Once vasopressors initiated notify MICU for admit. If no bed available Critical Care Consult
- 11. If prolonged stay in ER probable consider placement of CVL and Arterial Line
- 12. Assess oxygenation status
  - a. Assure optimal oxygen delivery
  - b. Consider intubation
    - i. Notify START Team

### **Intensive Care Unit (1<sup>st</sup> 24 hours of hospitalization)**

#### **Identification**

1. Properly identify patients with Sepsis
  - c. Infectious process with 2 or> SIRS Criteria
    - i. Temperature  $\geq 38^{\circ}\text{C}$  or  $\leq 36^{\circ}\text{C}$
    - ii. HR  $\geq 90$  beats/min
    - iii. Respirations  $\geq 20$ /min
    - iv. WBC count  $\geq 12,000/\text{mL}$  or  $\leq 4,000/\text{mL}$  or  $>10\%$  immature neutrophils
  - d. Begin process of identify infectious source
    - i. Assessment of probable cause
    - ii. Cultures
    - iii. Perform needed tests (CT, LP, etc)
2. Properly Identify patients with Severe Sepsis
  - a. Sepsis with Organ Dysfunction
    - i. Altered Consciousness, confusion, psychosis
    - ii. Tachypnea, hypoxia (p/f ratio $< 300$ )
    - iii. Jaundice, elevated liver enzymes, decreased albumin
    - iv. Tachycardia, hypotension, altered CVP
    - v. Oliguria, anuria, increased creatinine
    - vi. Decreased platelets, increased PT, decreased protein C, increased D-dimer
3. Properly Identify patients with Septic Shock
  - a. Sepsis with hypotension Despite ADEQUATE fluid resuscitation

#### **Treatment**

4. Fluid resuscitation
  - a. Average requirements 20 – 40cc/kg crystalloid
    - i. Remember patients with CHF and or renal failure should be given fluids judiciously
    - ii. Consider placement of an ScVO<sub>2</sub> or SVV monitoring device
  - b. Perform initial resuscitation with crystalloid. If patient fails, consider the use of colloid.
  - c. Consider Colloid with Capillary Leak Syndrome (colloid requirements ½ the amount of crystalloid)
5. Laboratory tests
  - a. CBC d/p, CMP, Mag, Phos, ion Ca, PT, PTT, D-dimer, CRP, lactate
6. Obtain appropriate cultures if not already completed
7. Initiate appropriate Antibiotic coverage
8. If decreased perfusion with Lactate  $> 4$  and MAP  $< 65\text{mmhg}$  initiate vasopressors
  - a. Levophed 0.01 – 1.0 mcg/kg/min
  - b. Dobutamine 5 – 10 mcg/kg/min
  - c. Vasopressin 0.01 – 0.04 units/min
    - i. Consider with refractory shock
9. Prepare of placement of CVL and Arterial lines
10. Assess for appropriate perfusion
  - a. Capillary refill  $< 3$  secs
  - b. Membranes pink

- c. Urine output > 0.5cc/kg
- 11. If decreased perfusion present initiate positive inotropes
  - a. Dobutamine 2.5 – 5 mcg/kg/min
  - b. Inacor 2.5 – 5 mcg/kg/min may bolus with 0.75 mcg/kg
  - c. Primacor 0.375 – 0.75 mcg/kg/min

\*Proper fluid resuscitation is recommended for appropriate response of medication\*
- 12. Assess oxygenation status
  - a. Assure optimal oxygen delivery
  - b. Consider intubation
- 13. After intubation use Lung Protective Ventilator Strategies
  - a. Tidal volume 6ml/kg
  - b. Plateau pressures < 30 cm H<sub>2</sub>O
- 14. If patient high risk of dying consider the use of Activated Protein C
  - a. High Risk of death is defined by Apache II > 25 or 2 organ system failures
  - b. 24mcg/kg/hr for 96 hours
  - c. Side effects – bleeding
  - d. Monitor platelet counts (special caution when < 50,000)
    - i. Transfuse with platelets or Hold Activated Protein C
  - e. Monitor D – Dimer, PT & PTT levels
- 15. Glucose control
  - a. Maintain DXT 80 – 140
- 16. Steroid use
  - a. Consider steroid use if on vasopressors > 6 hours
- 17. Blood product usage
  - a. Maintain Hgb >8.0
  - b. Consider Procrit 40,000 units Sub Q week
  - c. FFP PT > 15
  - d. Cryo Fib < 200
  - e. Platelets Plt 50,000 (non – surgical) < 100,000 (surgical)
- 18. VAP prophylaxis
  - a. Refer to VAP guidelines
- 19. Central Line Bacteremia prophylaxis
  - a. Refer to Central line Bacteremia guidelines

#### Resources:

1. Institute for Healthcare Improvement. [www.ihl.org](http://www.ihl.org)
2. AACN Practice Alert: Ventilator associated pneumonia (VAP). (5/2004).
3. Pruitt, B., Jacobs, M. (2006). Best practice interventions: How can you prevent ventilator – associated pneumonia. Nursing 2006 36 (2) 36 – 42.
4. Evans, B. (2005). Best practice protocols: VAP prevention. Nursing Management 2005 36 (12) 10-16.
5. Oral Care Guidelines. LSUHSC – Shreveport. Critical Care