

Prehospital Sepsis Initiative

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Early Identification of Sepsis

- ▶ Severe sepsis is associated with high mortality rate
 - Early recognition is critical
 - Subtle symptoms fly under radar
 - One hour delay in antibiotics equates to 7.6% increase in mortality
 - A large portion of patients are first seen by EMS

Severe Sepsis vs. Current Care Priorities

Care Priorities	US Incidence	# of Deaths	Mortality Rate
AMI	900,000	225,000	25%
Stroke	700,000	163,500	23%
Trauma (Motor Vehicle)	2.9 million (injuries)	42,643	1.5%
Severe Sepsis	751,000	215,000	<u>29%</u>

Opportunities for EMS

- ▶ Typical call for service from NH
 - Grandma isn't acting her normal baseline self
 - Nurse calls doctor
 - Doctor says send her to ED for evaluation
 - Nurse calls ambulance service for transfer to ED
 - Ambulance service has 2 transfers ahead of her
 - Patient arrives at ED 4 hours later (if she is lucky)

Opportunities for EMS

- ▶ Historically, EMS providers have been trained to identify high risk patients:
 - stroke, AMI
- ▶ Early EMS detection and advanced notification of cardiac and stroke patients to receiving ED has shown to:
 - Decrease time to diagnosis
 - Increase time to intervention
 - Improve outcomes

Opportunities for EMS

- ▶ Sepsis remains a leading cause of morbidity and mortality in patients arriving at the ED
- ▶ Of patients seen in ED, half are transported by EMS
- ▶ Recognition of sepsis is important for appropriate triage and early recognition
- ▶ Expedite care to improve:
 - door to blood cultures
 - door to antibiotic time

Opportunities for EMS

- ▶ Ideal call for service from NH
 - Nurse calls ambulance service for transfer
 - Dispatcher asks initial sepsis screen questions
 - Recognizes potential sepsis
 - Dispatches ambulance on high priority

Opportunities for EMS

- ▶ EMS arrives and assesses patient
- ▶ Completes Pre-hospital Sepsis Screening, if +
 - Initiates EGDT fluid resuscitation
 - Notifies receiving hospital of possible sepsis patient
- ▶ Hospital prepares to perform rapid sepsis screen and continue EGDT including rapid antibiotics

Challenges

- ▶ Need to increase sepsis awareness
- ▶ Lack of prehospital screening tool
- ▶ Lack of lab capabilities
- ▶ Thermometers not routinely used by EMS
- ▶ Most studies focused on ED and Hospital settings

Prehospital Sepsis Screening

- ▶ Early identification and early implementation of treatment:
 - Improve outcomes
 - Decrease mortality
- ▶ Screen determines risk of sepsis based on answering yes or no to the presence of specific symptoms and suspected infection

Implementation of EMS protocol

- ▶ Develop:
 - Budget
 - Screening tool
 - Protocol
 - Education

Anchorage EMS Sepsis Implementation Budget

	One Time	Annual	Ongoing	
ISTAT machine (\$8000 x 3 EMS trucks)	\$24,000.00			
Thermometers (\$175 x 3 EMS trucks)	\$525.00			
Thermometer probes (price per case of 1250 probes)		\$75.00		
CLIA Accreditation through STATE OIG for ISTAT		\$800.00		
Lactic Acid Cartridge (price per cartridge)			*\$8.00/patient	
Total costs for Thermometers	\$525.00	\$75.00		\$600.00
Total costs for Lactic Acid implementation	\$24,000.00	\$800.00	\$4,320.00	\$29,120.00
Total costs for Thermometers and Lactic Acid implementation	\$24,525.00	\$875.00	\$4,320.00	\$29,720.00
Pros				
If lactic acid elevated, EMS to initiate fluid bolus				
Expedite care to improve door to blood cultures and door to antibiotic time				
Cons				
The lactic acid drawn via EMS would not trigger the "reflex" lactic acid order causing CMS sepsis bundle failure				
ED nurse automatically draws the initial lactic acid as it is prechecked on the Simple Sepsis orders.				
Lactic acid level (time and result) and fluid bolus documented by EMS may not be available in timely manner				
Cost/lactic acid test for EMS is \$8.00 versus \$1.00				
*based on 4500 runs annually				
80% of runs are transported = 3600 transports				
estimate 15% would screen positive= 540 patients				
\$8/test/patient= \$4320				

Education focus

- ▶ Follows 2012 International Guidelines for Managing Severe Sepsis and Septic Shock- Surviving Sepsis Campaign
- ▶ Main objectives are:
 - Increase awareness
 - Early recognition
 - Early screening
 - Prehospital treatment of sepsis

Pre-hospital Sepsis Screen Anchorage EMS

Run number: _____ Allergies: _____

Section A: (circle answer)

Suspected Infection: Yes or No Please specify: _____

Acute Altered Mental Status: Yes or No

If answered yes to either question in section A, continue screening in Section B.

If answered no to both questions in section A, stop screening, patient screened negative for Sepsis.

Section B: (circle answer)

Temperature < 96.8 or > 100.9: Yes or No

Pulse > 90: Yes or No

Respiratory Rate > 20: Yes or No

SBP < 90: Yes or No

MAP < 65: Yes or No

Blood Glucose > 140:(with no hx of DM) Yes or No

Acute Altered Mental Status: Yes or No

Result of Sepsis Screen: (circle one)

Positive Simple Sepsis (YES on either question in Section A **and** 2 or more YES from section B)

OR

Positive Severe Sepsis (Yes on either question in Section A **and** 2 or more YES from section B with SBP < 90 or MAP < 65)

OR

Negative

Date/time form completed: _____

Signature: _____

Suspected Infection

▶ Suspected Infection Includes:

- Cough/sputum/chest pain
- Abdominal pain/distention/diarrhea
- Line or device infection
- Dysuria/Cloudy urine
- Headache with neck stiffness
- Nausea/Vomiting
- Wound infection/Cellulitis

Mean Arterial Pressure (MAP)

- ▶ Mean Arterial Pressure (MAP) monitoring is a predictive indicator of perfusion
- ▶ $MAP = \frac{SBP + 2(DBP)}{3}$

- ▶ Diastole counts twice as much as systole because $\frac{2}{3}$ of the cardiac cycle is spent in diastole
- ▶ A **MAP** of 65 is necessary to perfuse coronary arteries, brain, kidneys

Prehospital EMS Protocol

Initiate protocol if positive sepsis screen

- Cardiac monitor and pulse oximetry
- O₂ 2L/min via nasal cannula, titrate spO₂ to keep Sat ≥ 92%
- Insert large bore IV
- Assess lung sounds

Prehospital EMS Protocol

- **For simple sepsis (SBP >90):**
 - Administer 500ml NS bolus
- **For severe sepsis (SBP <90 or MAP <65):**
 - Administer 30ml/kg NS bolus in 500ml increments with reassessment of BP and breath sounds after each bolus
 - Hold additional bolus if SBP >100 or if develops wet lung sounds

Future opportunities

- ▶ Future research to involve integrating use of POC testing such as lactate levels (ISTAT- only FDA approved POC)
- ▶ Additional research needed to evaluate early identification of sepsis by EMS and impact on outcomes

You Make the Difference!

Questions?