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S.O.S: Save Our Septics

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Why talk about Sepsis?

- Number of cases are growing
 - Broad definition
 - Patient population
 - age, immunosuppression, MDRO...
- Time is tissue
 - Poor recognition of condition
 - Delay in therapy has consequences
- Significant consequences
 - Increased risk for readmission
 - Dysfunction and Disability
 - Mortality

SOS

Types of Sepsis; it's progressive

- SIRS
 - Systemic Inflammatory Response
- Sepsis
 - SIRS + Infection
- Severe Sepsis
 - Sepsis + Organ dysfunction
- Septic Shock
 - Severe Sepsis + Tissue hypoperfusion

SOS

CMS Definitions & Documentation Requirements:	Clinical Evidence Documented in Chart:
<p>Sepsis = SIRS + Infection</p> <p>Provider Documentation:</p> <p><i>"Sepsis secondary to (source/unknown source)"</i></p>	<p><u>SIRS Criteria (Any 2):</u></p> <ul style="list-style-type: none"> <input type="checkbox"/> Temp > 100.4 or < 96.8 <input type="checkbox"/> Heart Rate > 90 <input type="checkbox"/> Resp Rate > 20 <input type="checkbox"/> WBC > 12,000 or < 4,000 <input type="checkbox"/> > 10% Bands <p><u>Infection:</u></p> <ul style="list-style-type: none"> <input type="checkbox"/> Suspected/Confirmed Source:
<p>Severe Sepsis = Sepsis + New Onset Organ Dysfunction</p> <p>Provider Documentation:</p> <p><i>"Severe Sepsis secondary to (source/unknown source)"</i></p>	<p><u>New/Acute Organ Dysfunction (Any 1):</u></p> <ul style="list-style-type: none"> <input type="checkbox"/> Altered Mental Status <input type="checkbox"/> Acute Respiratory Failure = Need for Invasive/Non-Invasive Mechanical Ventilation <input type="checkbox"/> Hypotension (SBP < 90 MAP < 65) <input type="checkbox"/> Creatinine > 2 or Urine Output < 30 ml/hr <input type="checkbox"/> Total Bilirubin > 2 mg/dL <input type="checkbox"/> Platelet Count < 100,000 <input type="checkbox"/> INR > 1.5 or PTT > 60 seconds <input type="checkbox"/> Lactic Acid > 2 mmol/L
<p>Septic Shock = Severe Sepsis + Refractory Hypotension <u>OR</u> Lactate ≥ 4mmol/L</p> <p>Provider Documentation:</p> <p><i>"Septic Shock secondary to (source/unknown source)"</i></p>	<p><u>Any 1:</u></p> <ul style="list-style-type: none"> <input type="checkbox"/> Lactic Acid ≥ 4 mmol/L <input type="checkbox"/> Refractory Hypotension (≥ 2 Consecutive SBP < 90 post 30 ml/kg bolus) <input type="checkbox"/> Refractory Hypotension (≥ 2 Consecutive MAP < 65 post 30 ml/kg bolus) <input type="checkbox"/> SBP drop > 40 mm/Hg post 30 ml/kg bolus

SOS

What about the consequences again?

- Readmissions
 - Database analysis shows previous diagnosis of sepsis was leading cause of 90 day readmissions compared to MI, COPD, HF
 - 30 day readmission between 19%-32%
 - High risk of secondary infection
 - C. Diff
 - Substantial increase in mortality risk
 - Remains elevated for 2 years, peak at 6 months

SOS

More Consequences

- Dysfunction and Disability
 - Encephalopathy
 - 3x risk for Long term cognitive impairment
 - Acute Kidney Injury
 - CKD, possible ESRD
 - Cardiovascular complications
 - Study shows 18.4% increase in ^{CVD} events in sepsis survivors

SOS

The Ultimate Consequence

- Mortality
 - Data suggests sepsis responsible for at least 6% of all deaths
 - As expected, mortality correlates to severity
 - Sepsis: 7% Mortality
 - Severe Sepsis: 16% Mortality
 - Septic Shock: 46% Mortality

SOS

So, what can we
do about it???



HELP ME!

Time is Tissue!

- Early Recognition
 - Sepsis screening in the ED
 - Sepsis screens during nursing evaluations
- Leveraging technology
 - SPOT: Real time dynamic monitoring of patient data for immediate alert

SOS

OK, I've got a Septic. Now what?

- Sound the alarm and put out the fire!
- Think FAST!!!
 - Fluids, Antibiotics, Source check, Time
 - Sepsis Alerts
 - Rapid restoration of perfusion
 - Early antimicrobial therapy
 - Search for the cause

SOS

Sepsis Alerts

- Brings awareness to the level of urgency
- Team led by Sepsis Coordinator
- Gathers the multidisciplinary team with the tools and skills to provide rapid simultaneous testing and treatment
- Opportunity to set goal metrics and better track and evaluate process

SOS

Early Antibiotics

- Consider the possible source
 - Respiratory
 - Urinary
 - GI
 - Skin
 - CNS
 - Unknown
- Empiric or source directed ABX
 - Within 3 hours
 - Within 1 hour even better

SOS

Restore perfusion

- Nearly all levels of Sepsis have intravascular volume depletion and tissue hypoperfusion secondary to capillary leak
- Sometimes we let clinical comorbidities bias us against giving volume (CHF, CKD)
 - While some patients have clinical findings of overload (edema) they still usually have low intravascular volumes

SOS

Restore perfusion

- Better wet then dead!
 - Consider crystalloid IVF for all Septics
 - More aggressive volume for Severe Sepsis
 - Rapid volume administration for Septic Shock (SBP<90; MAP<65; Lactate>4)
 - 30ml/kg bolus (within 3hrs)
 - Vasopressors if unresponsive to IVF

SOS

Find the source

- Order sets can be helpful to remind you of the stones to turn over
 - Cultures (within 3hrs, preferably prior to ABX)
 - Blood
 - Urine
 - CSF
 - Imaging
 - Chest
 - Abdomen
 - Skin assessment
 - Stool studies

SOS

Is it working?

- Reassessment evaluation (within 6hrs)
 - Physical examination
 - VS
 - Cardiopulmonary
 - Peripheral Pulses
 - Skin color
 - Capillary Refill
 - Stabilization of VS and labs
 - EV-1000; noninvasive measurement of SV, CO...
 - Repeat Lactate

SOS

EV1000 Clinical Platform



What you need. When you need it.



The FloTrac sensor



EV1000 clinical platform



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Case Study

- 85 y/o WM with Hx of COPD, DM has 1 week of diarrhea and progressive decline
- EMS called
- Noted to be hypotensive en route
- EMS calls Sepsis Alert from the field
 - ED Physician initiates Sepsis order set upon patients arrival
 - Nursing screen notes BP 78/41, copious amounts of diarrhea
 - Initial Lactate 3.57

Case Study

- Patient receives 3,000ml crystalloid IVF and empiric ABX within 1hr of arrival
- Patient continues to be hypotensive, IV Levophed infusion initiated
- Initial labs:
 - WBC 5.7 with 51% bands
 - BUN/Cr 47/3.36
 - BNP 1128
- HM contacted for admission

Case Study

- Patient admitted to ICU with Septic Shock under Sepsis protocol
 - Including order for stool studies
 - Nephrology and ID consultation
- IV Pressors quickly weaned off
- Stool Cultures positive for Salmonella
- Patient responded to tx with steady gradual improvement, Cr returning to baseline 1.2
- Discharged after 8 day hospitalization in good condition with no obvious morbidity of illness

Case Study

- What we took from review
 - Think FAST!
 - Early recognition and alert
 - Early Aggressive IVF
 - Despite elevated BNP, patient never experienced volume overload
 - Don't fear the fluids!
 - Source check, not always blood and urine
 - Time is tissue!

Questions?

