SEPSIS MANAGEMENT
Using Simulation to Accelerate Adoption of Evidence-Based Sepsis Management
Medical Simulation Corporation is a healthcare performance improvement company, advancing clinical quality and patient safety. We solve your most costly and complex problems, like sepsis.
DISCLOSURE

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AGENDA
Using Simulation to Accelerate Adoption of Evidence-Based Sepsis Management

Part 1: Sepsis Review
Part 2: Benefits of Simulation
Part 3: MSC Sepsis Program Overview
Part 4: Interactive Session
WHAT IS SEPSIS?

Definition

**Clinical syndrome made up of abnormal, unregulated responses to infection.**

**Innate immune response is intensified and uncontrolled.**

**Cytokines are unchecked and unable to keep a local response from becoming systemic.**

**Vasodilation and increased capillary permeability result.**
WHAT IS SEPSIS?
Pathophysiology progression

- Invading Pathogen
  - (trigger)

- Innate Immune Cells Recognize Pathogen

- Receptors

- Bind to Site

- Recruit PM Cells (polymorphonuclear)

- Release of Pro-inflammatory Cytokines

- Secrete Pro-inflammatory Cytokines

- PM Cells Arrive at Infection Site

- Cause Vasodilation and Vascular Permeability
THE MAIN PROBLEM - RECOGNITION

HOWARD W. COOPER
1986 - 2015
"I TOLD YOU I WAS SICK"
WHAT IS “SUSPICION?” OF INFECTION

- Extremes of Age – < 10 and > 70 years old
- Chronic illnesses [Co-morbidities]
- Compromised immune system
- Recent prior broad spectrum antibiotic use
- Exposure to infectious trigger associated with invasive procedure
- Major surgery, trauma or burns
- Prolonged hospitalization
- Other factors such as childbirth, abortion, and malnutrition
The Surviving Sepsis Campaign Care Bundle (Resuscitation) is comprised of evidence-based goals targeted for completion within 6 hours (of identification) for patients with severe sepsis and septic shock. Initial resuscitation strategies focus on stabilizing the patient.

**Efforts are directed toward:**

- ✔ Increasing preload
- ✔ Normalizing lactate
- ✔ Reversing hypoperfusion
- ✔ Increasing oxygen-carrying capacity
- ✔ Promoting adequate cardiac contractility
Complete within 3 hours:

- Measure serum lactate.
- Obtain two or more blood cultures prior to antibiotic initiation unless unable to obtain within the allowed time dictated. (A reasonable attempt should be made.)
- Administer broad spectrum antibiotic
- Administer 30 mL/kg crystalloid for hypotension or lactate $\geq 4$ mmol/L
**SSC RESUSCITATION BUNDLE – 6 HOURS**

**Complete within 6 hours:**

- If hypotension unresponsive to initial fluid resuscitation:
  - ✓ Initiate *vasopressors* for hypotension not responding to the fluid resuscitation in order to maintain a MAP ≥ 65 mmHg.

- If continued hypotension despite fluid resuscitation (septic shock) or initial lactate ≥ 4 mmol/L:
  - ✓ Measure CVP
  - ✓ Measure Scvo2

- Re-measure lactate.
In 2014, findings from the ProCESS Trial (Protocol-Based Care for Early Septic Shock)\(^1\) and preliminary findings from the ARISE Trial (Australasian Resuscitation in Sepsis Evaluation) were released\(^2\).

- Monitoring CVP and ScvO2 made no significant impact on a septic patient’s mortality.

- Confirmed that EARLY identification and EARLY protocolized management (antibiotics administered under 2 hrs. and aggressive fluid administration) improved mortality significantly.
PROCESS TRIAL 3 STUDY ARMS

Pre-randomization patients received:

- Antibiotics (> 75%)
- Greater than 2 L of fluids (on average)
- All patients were diagnosed with septic shock

3 STUDY ARMS

Arm #1: EGDT
- Dobutamine/PRBC administration
- 93% central line placement
- Mortality rate 21% x

Arm #2: Protocol-Based
- No dobutamine/PRBCs unless HGB < 7.5 d/dL
- Fluids until MD thought patient was replete
- 57% central line placement
- Mortality rate 18.2%

Arm #3: "Usual Care"
- Bedside provider decided all aspects of care
- 58% central line placement
- Mortality rate 18.9%
SEPSIS MANAGEMENT KEY TAKEAWAYS

Takeaways:

• Early recognition is key
• Timely antibiotic administration improves outcomes
• Time is tissue – optimize tissue oxygenation by administering fluids
• Lactate clearance is as efficient as ScvO2 monitoring\(^1\)
• Lactate measurement, blood cultures, antibiotic administration within 1 hour and fluid administration likely to be Core Measures in 2016\(^2\)
BENEFITS OF SIMULATION

Traditional Staff Education
BENEFITS OF SIMULATION

Retention of Knowledge

- Teach Others 90%
- Learn By Doing *(Simulation)* 75%
- Discussion (Web Seminar, IM) 50%
- Demonstration *(Animation)* 30%
- Audio-Visual/PowerPoint 20%
- Lecture/Streaming Media 5%

I hear and I forget
I see and I remember
I do and I understand
~ Confucius
BENEFITS OF SIMULATION

- Accelerates knowledge transfer\(^1-3\)
- Allows concentration on specific skills and knowledge
- Involves participants in clinically challenging situations
- Improves functioning as a team
“The plane turned into a boat, mommy!”
Child on flight US Air 1529 after the plane she was flying in landed in the Hudson River.

Ask any passenger on the flight if simulation is effective – if it works to save lives...
MSC SEPSIS IMMERSE PROGRAM INTRODUCTION
MSC SEPSIS PROGRAM LEARNING OBJECTIVES

• Differentiate between sepsis, severe sepsis, and septic shock.

• Interrelate the patient’s presenting signs and symptoms to those consistent with SIRS.

• Identify historical findings that are correlated with an increased risk for sepsis (index of suspicion).

• Recognize signs and symptoms of organ dysfunction.

• Name findings indicative of decreased tissue oxygenation.

• Apply early goal-directed initial fluid resuscitation recommendations according to the SSC guidelines.

• Prioritize interventions used in the treatment of patients with severe sepsis/septic shock outlined in the SSC guidelines.

• Apply rationale for septic shock treatments.
IMMERSE COMPONENTS

MSC utilizes the most recent technology to evaluate competency, deliver education, and simulate critical care scenarios.

Knowledge Assessments

Online Education

Immersive Simulation

Team Training

Data and Analytics
HASC SEPSIS TRAINING SPRING 2014

Roles

- MD: 24%
- ED RN: 6%
- Med-Surg RN: 17%
- ICU RN: 37%
- OTHER: 3%
- Pharm D: 13%
HASC SEPSIS TRAINING SPRING 2014

Aggregate Knowledge Gain

Knowledge Check

Mean = 62%

Simulation Post-Test

Mean = 84%
“Course is extremely well done. Simulation enforced the online learning. Everyone from critical care, Hospitalists and ED should take this program.”
~ Sepsis Program Participant, ED MD

“We will apply guideline principles to our current practice as presented in this course.”
~ Sepsis Program Participant, Sepsis Coordinator
SEPSIS VIRTUAL SIMULATION

- One-hour, highly-interactive virtual simulation course

- Facilitated via live web conference by an MSC simulation education specialist

- Directed by participant polling questions to help guide treatment and interventions made to the simulated patient.

- **Debriefing** is a key component of the scenario and is facilitated by the MSC simulation education specialist.
DEBRIEFING

• A process in which, after an experience, the learner is lead through a purposeful discussion related to the experience. (Fanning & Gaba, 2007)

• Debriefing is the most important feature of simulation based education. (Thomas Nowicki, MD)
SEPSIS VIRTUAL SIMULATION LINK

For any iOS device (iPhone or iPad):
• Download the GoToTraining app on the App Store by searching for “GoToTraining”.

URL for Web Browser (desktop or mobile device):
• Registration URL:
  https://attendee.gototraining.com/r/4241592967739111169

If not pre-registered or an alternate method of registering:
• https://global.gototraining.com/join/tmpl
• Training ID: 823-861-004

If you are on your iOS device, just follow the link in your registration email (or the link above).
QUESTIONS?