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

1. Invading Pathogen (trigger)
2. Innate Immune Cells Recognize Pathogen
3. Secrete Pro-inflammatory Cytokines
4. PM Cells Arrive at Infection Site
5. Recruit PM Cells (polymorphonuclear)
6. Release of Pro-inflammatory Cytokines
7. 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 ≥4mmol/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.
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
• Lactate measurement, blood cultures, antibiotic administration within 1 hour and fluid administration likely to be Core Measures in 2016
BENEFITS OF SIMULATION
Traditional Staff Education
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%

BENEFITS OF SIMULATION

I hear and I forget
I see and I remember
I do and I understand

~ Confucius
• Accelerates knowledge transfer\textsuperscript{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 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: 37%
- ED RN: 6%
- Med-Surg RN: 17%
- ICU RN: 13%
- OTHER: 3%
- Pharm D: 24%
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).