From SIRS to Septic Shock: an Innovative Solution to Surviving Sepsis Utilizing a Nurse Practitioner-led Screen Team

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Objectives

- Define sepsis and review the epidemiology and impact on healthcare systems

- Discuss evidence based guidelines of early sepsis management

- Describe The Methodist Hospital’s innovative Nurse Practitioner-led approach to early identification and implementation of therapy to reduce sepsis-related mortality
Definition - Sepsis Continuum

Sepsis

Alterations in:
- Temperature
- Heart Rate
- Respirations
- WBC

SIRS

Addition of vasoactive medications to maintain adequate BP

Infection

SIRS

Organ Dysfunction

Septic Shock

Severe Sepsis

SIRS

Infection

Addition of vasoactive medications to maintain adequate BP

SIRS
Why is Sepsis so Important?

Leading Causes of Death in 2007

1. Diseases of heart (heart disease)

More Americans die from severe sepsis than from breast cancer, lung cancer and stroke combined.

12. Chronic liver disease and cirrhosis
13. Essential hypertension and hypertensive renal disease (hypertension)
14. Parkinson’s disease
15. Assault (homicide)

• Estimated for 2010 nearly 1,000,000 cases of sepsis

• Associated mortality rate of greater than 30%.

• Mortality from septic shock remains unchanged over the last several decades at > 50%


• Hospitalizations for sepsis more than doubled between 2000 and 2008

• Septic patients spent 75% more time in the hospital and were eight times as likely to die in the hospital as patients with other diagnoses
  – Similar for males and females
  – Increased with age
    • 65 and over (122.2 per 10,000)
    • Under age 65 (9.5 per 10,000)
  – In-hospital deaths 2008
    • 17% vs. 2%

• In 2008, sepsis-related treatments cost an estimated $14.6 billion

Rivers, et al (2001) highlighted the importance of early recognition and treatment using goal-directed therapy (EGDT) during the critical ‘golden hours,’ when definitive recognition and treatment provide maximal benefit in outcomes.

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| Previous studies examined goal directed therapy in ICU patients with severe sepsis; however, no study has yet to examine efficacy of EGDT (maximizing cardiac preload, afterload, contractility for tissue oxygenation) prior to ICU admission | Patients admitted through ER with severe sepsis were randomly assigned EGDT vs. standard of care for the first six hours prior to ICU admission | Mortality 30.5% vs. 45.6%  
34% reduction in-hospital mortality  
21% reduction in mean length-of-stay  
Improved SCVO2, pH, lactate  
Significant decrease in APACHE 2 scores indicating less severe organ damage | Significant benefits in outcome can be achieved through early goal-directed therapy in patients with severe sepsis prior to ICU admission. |

The Surviving Sepsis Campaign, a world-wide effort led by international clinical experts, developed practical, evidence-based guidelines to increase awareness and improve outcomes related to sepsis.
Evidence-Based Guidelines

- Early Recognition
- Early Intervention
- Improved Survival!!!
Background

- In 2008, *50%* of all patients who died at TMH had a diagnosis of sepsis coded in their medical record.

Houston We Have a Problem!
Sepsis Care Management Performance Improvement

- **Interdisciplinary Team**
  - 4 Subcommittees:
    - Education/Awareness Team
    - Screening Implementation Team
    - Resuscitation Team
    - Measurement Team
  - Population:
  - Focus Group:
    - Mortality cases with ANY diagnosis of septicemia, septic shock, SIRS-sepsis or SIRS-severe sepsis (ICD9s:038.0 - 038.9, 785.52, 995.91 or 995.92)
NP-led Screen Team is Born!

- Rollout recommendations-
  - Transfer patients
    - Acute Care Nurse Practitioner-led screen team
  - ER patients
    - Physicians and staff
  - In-patients
    - Pilot unit nurses (Dunn 8 E & W, Main 6)
Sepsis prevalence: 12.2%
Sensitivity: 96.5%
Specificity: 96.7%
Positive predictive value: 80.2%
Negative predictive value: 99.5%
Please Contact the back-up CERT Nurse Practitioner @ 713-768-0774 regarding this SIRS Screen and request a clinical assessment ASAP.
Acute care unit patients

RN-initiated SIRS screen on admission and Q 12 h

A positive screen requires further assessment by the sepsis NP screen team.

Transfer patients

Nurse Practitioners SIRS screen

NP initiates evidence-based, early goal-directed therapy as recommended by the TMH-approved protocol when a potentially septic patient is identified.
Early Goal-Directed Therapy

- Initial resuscitation (first six hours)
  - Identification of early pathogenesis
  - Initiation of evidence-based protocol with defined goals:
    - Optimizing hemodynamic status, tissue hypoxia, oxygen delivery and demand
    - The sepsis NP screen team goals are tailored to non-ICU patients:
      - HR less than 100
      - SBP greater than 90 or MAP greater than 65
      - Fever reduction
      - Improved mental status
      - Improved organ perfusion

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Early Goal-Directed Therapy

- **Diagnosis**
  - Obtain indicated cultures (blood, urine, sputum, wound, etc.)
  - Radiological studies
- **Antibiotic Therapy**
  - Within one hour after cultures drawn
  - Broad spectrum tailored according to culture and susceptibility
- **Fluid Therapy**
  - Aggressive fluid administration
    - Blood products if hemoglobin less than seven
  - Monitor for hemodynamic improvement to avoid volume excess


Screen Team Statistics

- 8,885 screens October 1, 2009 thru January 20, 2012
  - 5,727 acute-care transfers
  - 117 clinical emergency response team (CERT) patients
  - 647 in-patient
  - 1,817 emergency department admissions
  - 573 follow-up patients
- 667 positive SIRS screens
- 300 sepsis protocols initiated
Sepsis Screen Team Results

2008-2011 Sepsis Mortality – Transfer Patients

![Bar chart showing % Deaths (Obs) for 2008, 2009, 2010, and 2011 with values 35.73%, 32.43%, 27.49%, and 20.39% respectively.](image-url)
Sepsis Screen Team Results

Sepsis Mortality

- 2010 TMH Transfer Sepsis Mortality: 27.49%
- 2010 TMH Sepsis Mortality: 23%
- 2010 NP Screen Transfer Sepsis Mortality: 18%

Mortality Percentage
Percent Cases with Sepsis that Died, Jan 2008 – Oct 2011

Data Source: TMH – Datamart as of 11/21/2011
Performance Improvement Dept (BRA)
• SCREENING SAVES LIVES!

• Nurses are the frontlines of early recognition and intervention.

• Physicians and Nurse champions are essential for creating buy-in and sustaining change.

• Ownership of clinical decision support tools and cultural quality shifting are also key in sustaining change.
"I think you should be more explicit here in step two."
Questions?
References and recommended readings

References and recommended readings cont.


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