Resuscitating the Emergency Center to Improve Efficiency

Paul F. Mansfield, MD
Professor and Deputy Chair
Department of Surgical Oncology,
Head Emergency Services
What Are We?
A Trauma Center (sort of)

**Oncologic**
- perforation
- bleeding
- obstruction

**Iatrogenic**
- sepsis
- postoperative
- treatment specific
21,000 patient visits per year
> 90% of visits are existing patients
1,200 visits are new patients
  failing before scheduled appointment
  no scheduled appointment
> 40% admission rate
History

Cancer center, component of U.T. System
Late 1980’s – early 90’s Station 19
Mid 1990’s – Emergency Center
2007 – new dedicated space
Increasing complexity and volume of patients
Increasing hospital occupancy
Average Hospital Occupancy (%) by Month 9/2007 – 4/2010
**BETA** Stay More than 18 hours N Pts

DISPO_HOME_NOT_HOME = ALL

Number of Cases

Jan 19, 2010 08:31:59
Dealing with a Challenge

Five Stages
- Denial
- Anger
- Bargaining
- Depression
- Acceptance

Kubler-Ross, *On Death and Dying*, 1979

Alternative Stages
- Recognition
- Response
Recognition

Task Force convened 5/09
Analyzed problems and unique situation
Report accepted
Implementation begun 9/1/09
Recognition

Environmental

EC role in the institution
EC responsibility for patients
Responsibility to community at large
Realizing strengths
Partnering
Recognition

Patient Factors

Complexity of patients
Underlying comorbidities
Complications of cancer
Complications of treatment
Survivorship
Response

Change of nursing reporting relationship
Emergency Services reporting to PIC
Communication and integration across institution
Inpatient support and Department of Emergency Medicine
Emergency Center

Urgent Priorities

1) Critical staffing analysis
2) EDIS
3) Overcrowding
4) Diagnostic services support
5) Process Improvement
Emergency Services
Emergency Department Information System (EDIS)

EDIS to optimize patient throughput
Reduce handoff errors
Billing compliance
Maintain an electronic record
Emergency Services
Emergency Department
Information System (EDIS)

Work-flow and detailed functional analysis completed
Infrastructure/Technology analysis completed
Evaluating response from vendor
Overcrowding
Emergency Services
Overcrowding – Contributing Factors

- EC as a back door for planned admissions
- Inappropriate referral to the EC
- Inpatient census exceeding capacity
- Communication problems
Communication - Vocera

Within EC
Between EC and
Clinics
ICU
Radiology
Transportation
Emergency Services
Overcrowding – Solutions

• Treat appropriate patients in clinics or ATC
  – Lovenox, IVF’s or blood products, and procedures
  – CAD workgroup addressing
• Use of Discharge Waiting Area
• Accordion space
• Full Capacity Protocol
Average Hospital Occupancy (%) by Month 9/2007 – 8/2010

Feb. 2010
EC: Stay More than 18 hours N Pts
DISPO_HOME_NOT_HOME = ALL

Baseline
New Process Change

July 2008
August 2008
September 2008
October 2008
November 2008
December 2008
January 2009
February 2009
March 2009
April 2009
May 2009
June 2009
July 2009
August 2009
September 2009
October 2009
November 2009
December 2009
January 2010
February 2010
March 2010
April 2010
May 2010
June 2010
July 2010

Baseline: 209
New Process Change: 246, 284
Process Improvement
Diagnostic Testing and Lab Medicine

POC testing
Cross training for ECG’s
Streamlining Transfusion Services
Diagnostic Imaging
Median Times EC Order to CT Report Call

- Total Time = 196.0 minutes
- Total Time = 148.0 minutes
- Total Time = 308.5 minutes
Diagnostic Imaging
Working Group

Prioritization
Streamlining imaging protocols
Contrast delivery
Transportation
Sepsis
Early Goal Directed Therapy (EGDT)

Aim

Improve Compliance with EGDT for sepsis from 36% to 70%

Through measurement of urine output
The CS&E Team

• Team Members
  – CS&E Participant: Terry Rice, MD
  – CS&E Participant: Katy Hanzelka, PharmD
  – Team Member: Debra Ruiz, RN
  – Team Member: Marie Hariri, RN
  – Team Member: Nada Fadul, MD
  – Team Member: Carmen Gonzalez, MD
  – Team Member: Imran Malik, MD
  – Team Member: Debra Smith, RT
  – Facilitator: Larry Vines

• Sponsor
  – Susan Gaeta, MD
Surviving Sepsis Campaign Guidelines

Early Goal-Directed Therapy (EGDT 6Hrs)

- Central venous pressure (CVP) 8–12 mmHg
- Mean arterial pressure (MAP) 65 mmHg
- Urine output (UO) 0.5 mL/kg/hr
- Mixed venous oxygen saturation 65%

MDACC - ICU sepsis related mortality increased from 32% to 35% to 41% in 2004, 2005, and 2006 respectively

Implementing the Change

• Education
  – Physician, Respiratory therapist, Patient service coordinator, Nursing

• Sepsis Protocol

• Sepsis Documentation Tool

• Point of care blood gas and lactic acid
# Sepsis Documentation Tool

## Sepsis Acute Documentation Tool

Goals:
- MAP > 65 mmHg, Urine Output > 0.5 mL/kg/hour
- If MAP < 65 mmHg, record BP and pulse every 15 minutes.
- If MAP is > 65 mmHg, record BP and pulse every 1 hour

Monitor temperature, RR, and SpO2 every 1 hour for all patients

### Table

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<thead>
<tr>
<th>Time</th>
<th>BP</th>
<th>MAP</th>
<th>Pulse</th>
<th>Temp</th>
<th>RR</th>
<th>SpO2</th>
<th>IV Solution and Volume / Vasopressors</th>
<th>Stop Time</th>
<th>IV fluids</th>
<th>IVPB volume</th>
<th>PO</th>
<th>Urine Output</th>
<th>Other Output</th>
<th>Notify MD of vitals and I/O’s every hour</th>
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**MAP Calculation**

\[ MAP = \frac{DBP \times 2 + SB}{3} \]
## Results

<table>
<thead>
<tr>
<th></th>
<th>Before n = 106</th>
<th>After n = 26</th>
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<tbody>
<tr>
<td>Serum lactate measured within 1 hour</td>
<td>64 (60%)</td>
<td>16 (61%)</td>
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<td>Intravenous fluid in EC (mL)</td>
<td>1979 ± 1081</td>
<td>2507 ± 50</td>
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<td>Goal MAP within 6 hours</td>
<td>78 (74%)</td>
<td>23 (88%)</td>
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<tr>
<td>Urine output recorded</td>
<td>38 (36%)</td>
<td>17 (65%)</td>
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<td>Vasopressor administered</td>
<td>62 (58%)</td>
<td>13 (50%)</td>
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<tr>
<td>Time to Vasopressor (hours)</td>
<td>4.15 ± 3.01</td>
<td>3.21 ± 1.35</td>
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<tr>
<td>28 day mortality</td>
<td>39 (36.8%)</td>
<td>3 (11.5%)*</td>
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Unless otherwise indicated, data mean +/- SD  
*P=0.01
EGDT Conclusion

• Better documentation improved EC use communication with ICU

• POC Lactic acid for early recognition of severe sepsis and septic shock
  – Average time to LA 5.5 hours to 1.5 hour

• Improvement in mortality
  – Possible difference in severity of illness
  – Small sample size
Resuscitating an EC

Conclusions

1) For many patients the EC is the lynchpin

2) Changes can occur

3) Requires
   1) Commitment
   2) Communication
   3) Continuous process improvement.
Resuscitating an EC

Conclusions

1) Changing Expectations
2) Changing Processes
3) Changing Culture
   1) Within the EC
   2) Within the institution
Emergency Center

Empathy

Efficiency

Effectiveness

Compassion