Best Practice: The Role of the Pharmacist on Emergency Code Teams

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Keeping Brooklyn Healthy

• Located in Fort Greene/Downtown Brooklyn
  – Next to Long Island University
• Oldest hospital in Brooklyn
  – Established 1845
• 450 Acute Care Beds
• 85,000 Emergency Department Visits

Pharmacist Involvement in Cardiac Arrest Management at TBHC

• Program began in 2004
• ACLS-trained Pharmacy Residents respond to all Code Blue activations 24/7/365
  – ED cardiac arrests are not managed by Code Blue Team
  – Pharmacy Resident paged directly by ED clerk
• Medication management
• Independent critical review of medication use per ACLS guidelines, post-code
Code Blue: Medication Management Indicators

- Med Frequency Correct for Initial Rhythm: 83.0%
- Med Doses Correct for Initial Rhythm: 87.8%
- Meds Correct for Initial Rhythm: 93.4%

Percent Compliant with ACLS Guidelines

Code Blue Outcomes: Benefits of Pharmacist Participation

2.4 (2.9%) Additional Patients/Yr Survived to Discharge
Pharmacist Involvement in the Rapid Response Team at TBHC

- Team implemented in February 2009
  - IHI (Institute for Healthcare Improvement)
  - 5 Million Lives Campaign
- Multidisciplinary team of clinicians who bring critical care expertise to the patient’s bedside
- Defined steps for a uniform early response (including intervention) in a patient with a deteriorating status
- Pharmacist provides drug therapy expertise

Team Membership

- Critical Care Nurse
- Respiratory Therapist
- Pharmacist
- Medical Resident – Chief or senior-most PGY III
  - Pediatric Resident PGY III or attending, as appropriate
  - Ob-Gyn Resident on duty or attending, as appropriate
  - Surgical Resident on duty or attending, as appropriate
- Intensivist Attending Physician, as a consultant, in-house or via telephone

Pharmacist’s Role

- In conjunction with the Group Leader of the Rapid Response Group, provide appropriate medications
  - Directly
  - From floorstock
  - From Code Cart Medication Box
  - Or in coordination with the main pharmacy
- All medications are managed by the pharmacist.
Rapid Response Team Activation

- Any staff member (e.g., nurse, physical therapist, respiratory therapist, physician, NP, or PA) is worried about the patient
- Acute change in heart rate < 40 or > 130 bpm
- Acute change in systolic blood pressure < 90 mmHg
- Acute change in respiratory rate < 8 or > 28 per min
- Acute change in saturation < 90 percent despite O2
- Acute change in conscious state/mental status
- Acute change in urinary output to < 50 ml in 4 hours
- Uncontrolled seizures
- Significant bleeding
- Falls with significant injuries
- Failure to respond to prescribed therapies

Rapid Response Group versus Code Blue?

- NOT intended to substitute for Code Blue
- Team response to cardiac and or respiratory arrest
- It is intended for other acute conditions that might otherwise decompensate into cardiac and/or respiratory arrest, or warrant intensive care unit admission

Rapid Response Group Med Pack

- Adenosine
- Albuterol
- Amiodarone
- Atropine
- Dextrose
- Dopamine
- Racemic Epinephrine
- Etomidate
- Lorazepam
- Glucometer
- IV Start Kit
- Normal Saline
- Normal Saline
The Effect of a Rapid Response Team on Major Clinical Outcome Measures in a Community Hospital

**Design:**
- Prospective, controlled, before and after trial
- Patients: All adult patients admitted over an 18 month period
- Measured:
  - Incidence of cardiac arrests (outside the ICU)
  - Total number of ICU admissions
  - ICU length of stay
  - Total hospital mortality rate during the study period

- 5 months prior to RRT development
  - 7.6 cardiac arrests per 1000 discharges per month
  - Hospital mortality rate = 2.82%
  - Unplanned ICU admissions = 45%
  - Average length of ICU stay = 3.49 days

- 13 months with RRT available
  - 3.0 cardiac arrests per 1000 discharges per month
  - Hospital mortality rate = 2.35%
  - Unplanned ICU admissions = 29%
  - Average length of ICU stay = 3.90 days

Hospital-wide Code Rates and Mortality Before and After Implementation of a Rapid Response Team

**Measure:** Hospital-wide codes and mortality pre-post implementation of RRT

**Setting:** 404-bed tertiary care academic hospital in Kansas City, MO.

**Results:** RRT implementation was not associated with reductions in hospital-wide code rates or mortality.

**Study Weaknesses:**
- Pre-post samples significantly different
- Data on DNR status on admission and during hospitalization not captured
Hospital-wide Code Rates Before and After Implementation of a Rapid Response Team
(The Brooklyn Hospital Center; Internal Data)

Rapid Response Data Since Inception

<table>
<thead>
<tr>
<th>Year</th>
<th>Code Blue Calls</th>
<th>MCI/Non-Response Calls</th>
</tr>
</thead>
<tbody>
<tr>
<td>2011</td>
<td>120</td>
<td>50</td>
</tr>
<tr>
<td>2010</td>
<td>150</td>
<td>60</td>
</tr>
<tr>
<td>2009</td>
<td>180</td>
<td>70</td>
</tr>
<tr>
<td>2008</td>
<td>210</td>
<td>80</td>
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Hospital-wide Mortality Before and After Implementation of a Rapid Response Team
(The Brooklyn Hospital Center; Internal Data)

Survival to Discharge

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<thead>
<tr>
<th>Year</th>
<th>Survival Rate</th>
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<tbody>
<tr>
<td>2008</td>
<td>70%</td>
</tr>
<tr>
<td>2009</td>
<td>75%</td>
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<tr>
<td>2010</td>
<td>80%</td>
</tr>
<tr>
<td>2011</td>
<td>85%</td>
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Return of Pulse & Circulation

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<tr>
<th>Time Interval</th>
<th>0-5.00%</th>
<th>5.00%-10.00%</th>
<th>10.00%-15.00%</th>
<th>15.00%-20.00%</th>
<th>20.00%-25.00%</th>
<th>25.00%-30.00%</th>
<th>30.00%-35.00%</th>
<th>35.00%-40.00%</th>
<th>40.00%-45.00%</th>
<th>45.00%-50.00%</th>
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<tbody>
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<td>2008</td>
<td>40%</td>
<td>30%</td>
<td>20%</td>
<td>10%</td>
<td>5%</td>
<td>3%</td>
<td>1%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>2009</td>
<td>45%</td>
<td>35%</td>
<td>25%</td>
<td>15%</td>
<td>7%</td>
<td>4%</td>
<td>2%</td>
<td>1%</td>
<td>0%</td>
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<td>2010</td>
<td>50%</td>
<td>40%</td>
<td>30%</td>
<td>20%</td>
<td>10%</td>
<td>5%</td>
<td>3%</td>
<td>2%</td>
<td>1%</td>
<td>0%</td>
</tr>
<tr>
<td>2011</td>
<td>55%</td>
<td>45%</td>
<td>35%</td>
<td>25%</td>
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Typical Scenarios at TBHC

- Difficulty Breathing
- Congestion
- Hypertension
- Hypotension
- Malnutrition
- Infection
- Discharge transitions
- Allergies
- Altered Mental Status
- Infection
Summary

• Pharmacists can play an important role in the management of medical emergencies
  – Cardiac Arrest teams should include pharmacists
  – Rapid Response teams should include pharmacists