Death Do Us Part

Stemming STEMI
Mortality and Morbidity
Raymond L. Fowler, MD, FACEP

Professor of Emergency Medicine
Chief of EMS Operations
Co-Chief in the Section on
EMS, Disaster Medicine, and
Homeland Security
UT Southwestern Medical Center

Emergency Medicine Attending Faculty,
Parkland Memorial Hospital
AVOIDING COMMON PREHOSPITAL ERRORS

Benjamin J. Lawner, DO
Corey M. Slovis, MD
Ray Fowler, MD
Paul Pepe, MD
Amal Mattu, MD
Series Editor: Lisa Marzuci, MD
The Year was 2009

- 15 hospitals, 15 PCI labs
- 24 EMS agencies
- No uniform protocols
- No uniform data
- No public awareness
The Year was 2009

- Minimal coordination of STEMI care between EMS and receiving hospitals
- Inability for EMS to transmit ECG’s
- Lack of STEMI protocol sets between EMS and receiving hospitals
- Minimal or no QA/QI, or STEMI feedback loops
- Complete lack of data accurately reflecting STEMI care in Dallas County
We Didn’t Know What We Didn’t Know
AHA and UT Southwestern

- Spent a year writing application
- The W.W. Caruth Foundation and the Communities Foundation of Texas
- Applied for a $3.5 million grant to establish a comprehensive ACS Network in Dallas County
AHA Caruth Project

- $3.5 Million Grant over 2.5 years
- AHA led with 250 volunteers
- 15 hospitals signed a Memorandum of Understanding (MOU)
- 24 EMS agencies signed an MOU
- Research Metric: “Symptom Onset to Arterial Reperfusion”
Education and Culture

- 4,032 - Certified EMS Personnel (70% Paramedics)
- 875 - ED RN’s
- 398 - ED Physicians
- 404 - ED Technicians
- 85 - Cath Lab Technicians
- 90 - Cath Lab RN’s
- 112 - House Supervisors
- 187 - ICU Charge Nurses
- 82 - Interventional Cardiologists
Through a combination of grant funding and donations provided by one hospital system, all 24 EMS providers are currently capable of transmitting 12-Lead ECG’s. AHA Dallas Caruth Staff receive all transmitted ECG’s in Dallas County to monitor system performance and aid in quality improvement.
Critical Success Factors

- Leadership & Infrastructure
  - Dallas Stakeholder Committee
  - Open lines of communication
  - Shared Success

- Created Standardized Protocols

- Trained 4,273 Providers
Critical Success Factors

- Data, Data, Data
- Outstanding System Performer Award
- AWI Tracking (Activation Without Intervention) – NO “False Activation"
- Collaboration & Friendly Competition
- Data Sharing
- Field Trips
- EMS Equipment Upgrades
- ECG Transmission
EMS Chest Pain / ACS Guidelines

ACS Signs & Symptoms
- Chest pain- any non-traumatic pain between the jaw & umbilicus
- Chest pressure, discomfort or tightness
- Complaints of “heart racing” or palpitations
- Bradycardia
- Syncope
- Weakness in patients > 45 years old
- New onset stroke symptoms
- Difficulty breathing (without obvious cause i.e. asthma or CHF)

STEMI Criteria
ST segment elevation of ≥ 1 mm in ≥ 2 contiguous leads with or without signs & symptoms of ACS

12 Lead EMS ECG Criteria
- Patients > 20 years old experiencing any ACS signs & symptoms
- OR
- Any age patient with ACS signs & symptoms AND a history of:
  - HTN
  - Cardiac disease
  - Smoking
  - Diabetes mellitus
  - Severe Obesity
  - High Cholesterol
  - Recent recreational drug use

When In Doubt, Obtain an ECG

Minimize patient exertion
Apply Oxygen to maintain SPO2 ≥ 94%
324 mg Aspirin PO Chewed, not swallowed
Obtain 12 Lead ECG within 10 minutes of patient contact

If STEMI Criteria met, activate CATH LAB, transmit ECG & immediately initiate transport to appropriate PCI capable hospital.

Establish IV access at TKO rate or saline lock
0.4 mg nitroglycerin SL tablet or SL spray q 5 minutes until pain is gone or max 3 doses. Maintain SBP > 110 mmHg
Pain unresolved by Nitro:
- Morphine 2-5mg slow IVP max 20mg
- OR
- Fentanyl 1mcg/kg q 15 minutes max 200 mcg

If SBP falls < 110 mmHg in response to treatment:
Discontinue standing nitroglycerin & analgesic treatments

If CIP is thought to be stimulant induced:
- Diazepam 2.5-5mg slow IVF max 10mg
- OR
- Midazolam 2.5-5mg slow IVF max 5mg or IN max 10mg

Code STEMI Considerations:
1) Keep patient connected to monitor & 12 lead cables when brought into ED for physician evaluation
2) If possible, remain on EMS stretcher and monitor in ED
3) Prepare to be escorted to CATH Lab on EMS stretcher and monitor to expedite transfer of care to CATH LAB nurse/physician.

SBP > 110 mmHg

SBP < 110 mmHg

Shock position
250ml NS bolus to achieve SBP=110mmHg, Max 1 LNS, monitoring breath sounds
Morphine or Fentanyl analgesic per medical control

PEARLS:
- Females, diabetics and geriatric patients often have atypical signs/symptoms, or only generalized complaints
- Remember Erectile Dysfunction drugs are now being used to treat pulmonary hypertension
- Do not administer Nitroglycerin in any patient who has used Viagra (sildenafil) or Levitra (vardenafil) in the past 24 hours or Cialis (tadalafil) in the past 36 hours due to potential severe hypotension
- If possible, establish a second IV on STEMI patients DURING TRANSPORT ONLY
Dallas Caruth Update
JULY 2011

Making an Impact on Heart Disease

What is the Dallas Caruth Initiative?
The SouthWest Affiliate of the American Heart Association was awarded grant funding from the W.W. Caruth Jr. Foundation to create a seamless and integrated heart attack emergency care system in Dallas County. The two-year project, which will be managed by AHA staff, will allow the AHA to work closely with 15 hospitals and 25 EMS agencies in Dallas County to coordinate and streamline protocols and to reduce the amount of time it takes for heart attack patients to receive lifesaving treatment. This innovative regional collaboration will work to ensure equipment compatibility, consistent training, and uniform protocols for both transporting and treating heart attack patients across the region.

2011 Caruth AMI Symposium
The inaugural AHA Dallas Caruth AMI Advisory Symposium provided many best practices from across the country for patients who experience cardiovascular events. Concentration was from the first point of care with Emergency Medical Services through hospital interventions, while leveraging these insights to improve the quality of care for those who suffer from an acute myocardial infarction (AMI). The conference fostered informal interaction over 280 attendees and provided networking opportunities for all persons who attended. Speakers from across the United States joined us with attendees from as far as Russia for the 2011 symposium. The meeting focused on processes, initiatives, policies and research relevant to measuring and improving quality of care and outcomes for persons experiencing an AMI. As we prepare for the 2012 Dallas Caruth AMI Symposium we hope that you will return or attend this wonderful opportunity to learn new insight and understanding to the advanced world of acute cardiac care.

www.heart.org/caruth

The Importance of the Early ECG
The primary step of STEMI recognition and treatment is the importance of achieving the early ECG in patients who have symptoms of acute coronary syndrome. When treating medical emergencies or known chest discomfort ensure you have your 12-Lead ECG monitor with you upon initial patient contact. Have your partner or first responder assist you in applying the ECG electrodes to capture the 12-Lead ECG as soon as possible. The 12-Lead ECG should not be delayed except for lifesaving patient treatments and completed if possible where you find your patient. Ensure pads are secured in the proper anatomic locations and ask your patient to remain as still as possible during the capture of the 12-Lead ECG. Consider the importance of the early ECG and proper lead placement as your best opportunity to identify a STEMI.
Dallas Caruth Update

Making an Impact

Important Meetings to Remember

AHA Dallas Office - 8200 Brookriver Drive, Classroom A
Conference Call - 1-866-506-5191 - Code: 335721#

- May 9th - 0730-0900 Conference Planning Meeting - Dallas AHA
- May 10th - 0730-0900 Protocols Meeting - Dallas AHA
- May 11th - 0730-0900 Education Meeting - Dallas AHA
- May 12th - 0730-0900 EMS Resources Meeting - Dallas AHA
- May 18th - 0730-0900 QI Meeting - Dallas AHA
- May 23rd - 0730-0900 Conference Planning Meeting - Dallas AHA
- May 25th - 1200-1300 AR-G Site Manager/User Conference Call
(866-854-6779 - Code: 7929798)
AHA Dallas Caruth AMI Advisory Symposium

JUNE 3 - 4, 2011

WESTIN PARK CENTRAL HOTEL
12720 MERIT DRIVE, DALLAS, TEXAS
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<th>Event</th>
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<td>Registration, Posters and Exhibits</td>
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<tr>
<td>1:00PM</td>
<td>Welcome and Introductions</td>
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<td>Transport &amp; Transfers from the rural region</td>
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<td>ACLS Update</td>
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<td>The Challenge Within: Overcoming Hospital Barriers</td>
<td>Eva Kine Rogers or “Wide and Tachy” In Lead II, You Got No Clue! Bob Page</td>
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<td>4:00PM</td>
<td>Mission Lifeline</td>
<td>Chris Bjerke or STEMI-OUR system of care: A Big Town Perspective with a Small Town Compassion Todd Gray</td>
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<td>Caruth Overview and special presentation by James Jollis, Executive Director of the RACE</td>
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Education Plan

4,273 – Completed Workbooks!

Dallas Caruth
EMS Education
STEMI Workbook

Dallas Caruth
Hospital Education
STEMI Workbook

EMS Education Workbook Endorsed by:
Dr. Ray Fowler M.D.
Dr. Robert Simonson D.O.
Dr. Sarah Chavis M.D.

Dallas Caruth Initiative
Presented on behalf of the American Heart Association and the Communities Foundation of Texas
Data Analyses
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<th>Q1 2012</th>
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<td>70</td>
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<td>Condition</td>
<td>Q2 2012 D2B &gt; 90 minutes</td>
<td>Q3 2012 D2B &gt; 90 minutes</td>
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<td>N = 33</td>
<td>N = 40</td>
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<tr>
<td>Shock</td>
<td>N = 6 (18.2%)</td>
<td>N = 7 (17.5%)</td>
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<td>Heart Failure</td>
<td>N = 2 (6.1%)</td>
<td>N = 9 (22.5%)</td>
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<tr>
<td>CPR</td>
<td>N = 6 (18.2%)</td>
<td>N = 6 (15%)</td>
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<td>Cocaine</td>
<td>N = 1 (3.0%)</td>
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<td>Death</td>
<td>N = 2 (6.1%)</td>
<td>N = 5 (12.5%)</td>
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Impact on D2B When Cath Lab is Activated by EMS
Q4 2010 – Q3 2012

* Notes: Primary PCI, non-transfer, STEMI only
* EMS Activation taken from NCDR form Aux3 field
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<tr>
<td>Median total EMS time for STEMI patients</td>
<td>-</td>
<td>29.5 minutes</td>
<td>31.0</td>
<td>30.0</td>
<td>29.0</td>
<td>28.5</td>
<td>29.0</td>
<td>27.0</td>
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<tr>
<td>Patients Arriving by EMS</td>
<td>42%</td>
<td>41%</td>
<td>40%</td>
<td>39%</td>
<td>41%</td>
<td>42%</td>
<td>41%</td>
<td>35%</td>
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<tr>
<td>% of Incident Run #s entered by Hospitals</td>
<td>40%</td>
<td>58%</td>
<td>85%</td>
<td>97%</td>
<td>80%</td>
<td>84%</td>
<td>82%</td>
<td>94%</td>
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<tr>
<td>Suspected EMS Matches</td>
<td>10%</td>
<td>50%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>50%</td>
<td>14%</td>
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</table>
• **Standard EMS and Hospital Protocols**
• **ALL Hospitals on Action Registry**
• **ALL EMS Data Reported**
• **Hospital and EMS Data Joined**

**What Did We Do**

• **EMS Activation of PCI Labs**
• **Rules of Procedure**
• **Two Annual Conferences**
• **Tracked our Outcomes**
• **Mortality down from 4.6 to 1.9%**
What Else Have We Learned?

• You have to have staffing to maintain the project
• Some 50% of ACS patients will drive themselves or be driven to the hospital: This hasn’t changed
• Public awareness is key to improving success
• We haven’t measured the impact of reduced congestive heart failure morbidity and mortality
Conclusions

- You can do this
- You have to bring all the players to the table
- Get our “rules of procedure”
- Steal ideas freely