STEMI: Rationalization for Regionalization of Care

An EMS and ED Perspective
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Recent Events (November 2006)

- ACC – AHA launch national Door-to-Balloon (D2B) initiative to achieve 90-minute goal
- Tier-I Strategies
  1. ED physician activates the cath lab
  2. One call activates the cath lab
  3. Cath lab team ready in 20-30 minutes
  4. Prompt data feedback
  5. Senior management commitment
  6. Team-based approach
D2B: Continued

• **Optional** – Pre-hospital EKG to activate the cath lab
  
  – “Hospitals with the capacity for pre-hospital EKG should fully utilize this evidence-based strategy. However, participation in D2B will not be contingent upon implementation of this strategy due to its resource implications.”
1970’s *Emergency*!

Gage and DeSoto
The Peoria Experience

• Historical Perspective

• Geography:
  • City – 64 sq. miles (urban/suburban, pop. 125,000)
  • County – 630 sq. miles (pop. 125,000 additional)

• Pre-hospital providers:
  • Tiered, city-paid first response nontransport (FD)
    • County – volunteer first response, nontransport
  • Transport for all provided by private, not-for-profit, all ALS ambulance co. (AMT) – 1 company
  • 38,000 calls
  • 30,000 transports
700 square miles
Who we serve...

Inter-agency relations

Primary Service Area

- Peoria
- Dunlap
- Bartonville
- Bellevue
- Farmington
- Trivoli
- Limestone
- Hanna City
- Kickapoo
- Mapleton
- Pekin
- North Pekin
- South Pekin
- Marquette Heights
- Tuscarora
- Timber / Holiis
- Green Valley
- Groveland
- Schaeferville
- Glasford
- Alta
- Kingston Mines

Mutual Aid / Intercepts

- Peoria Heights
- West Peoria
- East Peoria
- Morton
- Chillicothe
- Delavan
- Tremont
- Mackinaw
- Lacon
- Sparland
- Roanoke
- Forest City
- Manito
- Washington
- Bradford
- Brimfield
- Yates City
- Elmwood
- Princeville
• Hospital
  – OSF Saint Francis Medical Center (1 of 4)
  – 570-bed, Level I trauma center, tertiary care
  – 12 residency programs
• ED
  – 70,000 visit, 43-bed; EM residency
  – Base station for all EMS regardless of destination
  – MDs answer all calls (1 access point)
• Cardiology
  – Heart Care Midwest (HCM) – 1 group (>25 members)
The Year: 1994

- Thrombolytic era?
- ED – Cardiology “discussion”
- EMS provider (AMT) initiates idea of possible pre-hospital 12-leads to provide early info for early decision for thrombolytics!
- Emergency Medicine buy-in
1994 – The Start

- Swiss manufacturer (Schiller) field tested
- Cardiology misgivings – “Will prolong scene times.” “Paramedics can’t do EKGs of diagnostic quality.”
- Training issues – initially 50 EKGs, 12 hours (reality 6-10 EKGs, 3 hours)
1994 – The Start

- Discussion with Cardiology to facilitate care, agreed on 1 ED MD/1 Cardiologist “go-to person”
- AMT purchases first 30 Physiocontrol LP-11 in Midwest for pre-hospital 12-lead program!
Results

- Increased productive dialog and communication
- Gave credibility to ED – definite start time for cardiology
- Increased attendance – from all parties
- Pre-hospital EKG affected ED times
- Invited to cardiology education meetings on relevant topics
- Within 3 years surrounding ALS agencies strive for same standards/technology
Maintenance of Program

- Develop monthly EM-Cardiology conference
- Use flowsheet for documentation/times
- Conference sponsored by thrombolytic manufacturer
- Invited: EM/Cardiology/ED Staff/Cath Lab Staff/Pre-hospital providers (gave CME)
Conference Format

- Present pre-hospital presentation/listen to call-in
- Using flowsheet evaluate ED care/EKGs/ times
- Then cardiologist reviews cath lab tape/lytic use
- STILL BEING USED in 2008!
Fast –Forward: 2005

- One-number activation – “777” by ED
- Streamlined ED care (no drips/x-ray) – package early
- Place timer on patient’s chest with positive EKG
- 59-minute average door-to-balloon time!
Utilization of New “777” alert code to on-call personnel for Acute ST Segment Elevation MI patients in Emergency Medicine

- In an attempt to expedite care of patients with Acute Myocardial Infarction (MI) and decrease door to balloon time, Cardiology and Emergency Medicine have agreed to institute “777.”

- This will be used by the Emergency Department when a patient with an Acute ST Segment Elevation MI presents that needs time-dependent Cath Lab intervention. When presented with a patient like this, call PALS and ask them to page the on-call Cardiologist, Interventionalist and Cath Lab personnel using “655-4060-777.” This should prompt an immediate call back from the cardiologist to the Emergency Department (655-4060) and decrease call-backs and time delays and will alert the Cath Lab personnel that there is a potential emergency cardiology cath procedure.

- All EKGs should be verified by an Emergency Department attending physician. Cases will be reviewed to make sure the system is functioning as designed. This will start April 28, 2005, at 7:00 AM.
Next Steps

• Nationally – 50% STEMIs arrive by ambulance, 50% by car
• Peoria – 70% arrive by car, 30% by ambulance
• Public awareness/education
• AED program- 415 placed, 3400 users trained
• Regional rollout of “777” utilizing helicopter with alternate algorithm for inclement weather
• By-product: used cardiology model to help in establishing response for stroke system (brain attacks – “333”)

Time Delay On-Scene

• Several studies have found that there is a minimal delay in the “on-scene” time for the acquisition of a 12-lead EKG
  – One to seven minutes is the anticipated time of delay

• Similar findings in the setting of major trauma
  – Intubation, immobilization, and IV access can reliably be obtained in <10 minutes
    • Welsh, RC et al. Am Heart J 2003; 145:1-8
• Primary Angioplasty for Acute Myocardial Infarction — Is It Worth the Wait?
  * Jacobs, AK 2003 NEJM 349:798
• Prague-2
• DANAMI-2
  – Yes, PCI IS WORTH THE WAIT
Implications for Hospital Destination

• When available, PCI is the standard of care
• Trauma-center criteria relating to availability of resources, timeliness of response, etc. are well-established for >25 years!
• No such criteria are currently enforced for cardiac emergencies
Twin Cities Experience
R.J. Frascone, Medical Director, Regions EMS

• Acute Cardiac Care Centers
  – To cath lab within 60 minutes of arrival
  – Intervention begins within 90 minutes
  – Each facility will perform 200 interventions/year
  – Each interventionalist will perform at least 75 procedures/year

• Honor system is used for reporting
Boston EMS Experience
Peter Moyer, MD MPH, Medical Director, Boston EMS, Police and Fire

• PCI-capable facilities are committed to non-diversion of STEMI patients
• Paramedics evaluate EKG without transmission
• A registry records the pre-hospital diagnostic accuracy, door-to-balloon times, volume of PCIs, and % of STEMIs receiving PCI
Boston EMS Experience
Peter Moyer, MD MPH, Medical Director, Boston EMS, Police and Fire

- Performance measures are reported every 6 months
- Any hospital that fails to meet criteria for 2 consecutive reporting periods undergoes extensive review and may lose their status as a heart hospital
2004 Olympics 100m Sprint

Superstars!!

1. USA – Justin Gatlin
2. POR – Obikwelu Francis
3. USA – Maurice Greene
4. USA – Shawn Crawford
USA Lost!!

2004 Olympics 4x100m Relay

Dropped!
STEMI Reperfusion Sprint Relay

#1) STEMI Patient
#2) Paramedics/ED triage RN
#3) Emergency Dept. Team
#4) Cardiac Cath Lab Team

START

Finish/Reperfusion
Lessons from Sprint Relay Race Analogy

• Individual can NOT win a relay race without coordinated teamwork
• Hand-offs and smooth transitions are critical
• Any member of the relay team can “champion” teamwork – the role of EMS!
• D2B is a multi-disciplinary team effort!!
  – Should NOT be a political turf battle
  – Time is our common enemy
  – “Beat the clock!!”
Summary

• To fully utilize what we’ve learned using pre-hospital 12-lead EKGs, we need to have designated STEMI centers with 24/7 available cath labs
• Need to overcome politics and remember it’s all about the patient
• In the Peoria area, the pre-hospital EKGs were the driving force for change ahead of published studies
• Continuous communication and QI critical to success
Questions?