Five Bullets for the Heart: Ensuring Systems of Care for STEMI

Eagles X, February 2008
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Medical Director Boston Fire, Police and EMS
ST-Elevation Heart Attack (STEMI)

- 54 year-old patient with 2 hours of severe substernal chest pain
Treatment Strategies for STEMI

Pharmacologic = “clot buster”
- Widely available
- Quickly administered
- Less effective
- Bleeding risk lower

Mechanical = Percutaneous Coronary Intervention (Primary PCI)
- Limited availability
- Treatment delay
- More effective
- Bleeding risk lower

Reperfusion or re-opening of the artery
PCI vs Fibrinolysis:
Short Term Clinical Outcomes

N=7739
(23RCT)

State of the System

One of the biggest challenges to developing an ideal system of care for STEMI patients is the inadequate recognition by patients and bystanders of STEMI symptoms and the urgency of activating EMS and calling 911.
National Hospital Ambulatory Medical Care Survey: 2005 Emergency Department Summary

by Eric W. Nawar, M.H.S.; Richard W. Niska, M.D., F.A.C.E.P.;
and Jianmin Xu, M.S., Division of Health Care Statistics

Figure 1. Trends in numbers of emergency departments and related visits: United States, 1995–2005
State of the System

• Approximately 30% of STEMI patients do not receive any reperfusion therapy (with clot busting drugs or PCI)
State of the System

- Of the 70% of STEMI patients who are treated with reperfusion therapy, less than half are treated within the guideline recommended times frames.
Five bullets of STEMI care

- Regional systems of care-AHA Mission Lifeline
- 12 lead: acquisition, interpretation, transmission
- Access to PCI:
  - Diversion to PCI centers
  - Interhospital transfer (IHT) from non-PCI to PCI hospital
- PCI Hospitals
- Fibrinolysis
Improving the System of Care for STEMI Patients
What is Mission Lifeline?

An AHA national initiative launched in May 30/07 Circulation to improve quality of care and outcomes in STEMI patients by improving the health care system readiness and response.
Mission Lifeline

- EMS System Assessment and Improvement
- Establish local/regional systems of care
- Explore possibility of National STEMI Certification Program
Mission Lifeline

• Focus on increasing the number of patients with **timely access** to primary PCI
Establishing Local Initiatives

Recommended task force members include but are not limited to:

- Payers
- PCI capable hospitals and non-PCI capable hospitals
- EMS
- Physicians, nurses and other providers
- Department of Health
- EMS regulatory authority/Office of EMS
- Rural health association
- Patients and caregivers
- Quality improvement organizations
- State and local policymakers
Volunteer Oversight

STEYMI ADVISORY WORKING GROUP
Chair: Alice K. Jacobs, M.D.

STEYMI ECC Task Force
Chair: Robert O’Conner, M.D.

STEYMI Model Evaluation Task Force
Chair: Elliot Antman, M.D.
EKG acquisition, interpretation & transmission

• “An under-utilized but effective **strategy** for improving systems for care... is to expand the use of **PH-ECG’s** by EMS.”

2007 ACC/AHA guidelines
Access to PCI: Diversion to PCI center bypassing non-PCI center

- LeMay (NEJM Jan 17, 2008):
  Ottawa- field recognized STEMI

<table>
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<tr>
<th></th>
<th>Direct to PCI Center</th>
<th>Vs</th>
<th>Transferred from Non PCI Hospital</th>
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<tr>
<td>Median D-B (minutes)</td>
<td>69</td>
<td></td>
<td>123</td>
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<td>D-B &lt; 90</td>
<td>79%</td>
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<td>11.9%</td>
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Access to PCI via Interhospital transfer

25% of hospitals are PCI capable

but...
Interhospital Transfer (IHT) to PCI hospitals

- median time to closest PCI center: 11.4 minutes
- 80% of adult patients live within 60 minutes of PCI center

(Nallamothu, Circulation, 2006)
Interhospital Transfer (IHT) from Non PCI to PCI hospital: D1B2

- Done well in Europe
- US(NRMI) D1B2
  - 4.2% <90
  - median D1B2 180 min

>50 of time spent in interfacility transfer

Nallamothu, Circulation, Feb, 2005
Strategies for IHT

- Early recognition of STEMI
- “STEMI Alert” from first contact with patient
- Parallel processing (EMS/ED/cath lab)
- Standardize meds at non PCI hospitals - no drips
- IHT or 911 ambulance
- Air and ground ambulances
Regional STEMI systems

- Ting. Circulation, August 2007
- Jollis. JAMA, November 2007
PCI Hospital Strategies

• Activation of Cath lab by:
  EMS
  EP
  single call

Bradley. NEJM Nov 2006
PCI hospital strategies

EMS bypassing ED
Fibrinolysis

- Works best in first 2-3 hours after sx onset
- If sx onset to medical contact <3hrs & anticipated D2B minus D2N > 60 min, give lytic unless contraindications to lytics, shock or CHF,
- Underutilized