Supporting Regional STEMI Systems of Care

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Overview

• Describe the development of regional STEMI systems of care:
  – Identify scope of problem
  – Describe evidence base for regional STEMI systems of care
  – Explore treatment issues for STEMI
  – Review Mission: Lifeline guidelines for regional systems of care
  – Understand rural barriers to timely provision of STEMI care
  – Discuss rural STEMI systems of care involving EMS and CAHs
  – Describe efforts to support efforts to develop regional STEMI systems
Scope of Problem

- ST-elevation myocardial infarction (STEMI)
- US - 400,000-500,000 STEMI events annually
- 30% of all patients with acute coronary syndrome
- Characterized by:
  - ECG tracings for ST segment that are elevated above baseline
  - A completely blocked artery - no blood flow to a portion of the heart
  - Substantial risk of death or disability
  - Critical need for rapid reperfusion (i.e., restoration of blood flow by reopening the blocked artery)
Reperfusion Options

• Primary percutaneous coronary intervention (PCI)
  – Balloon angioplasty and placement of intracoronary stents
  – Preferred option - more effective and carries lower risk of bleeding
  – Limitations – only 25% of acute care hospitals have PCI capacity and not all PCI hospitals provide 24/7 service

• Fibrinolytics (i.e., “clot-busting” drugs)
  – Fibrinolysis is more widely at US hospitals
  – System constraints (lack of PCI service within a reasonable distance)
  – An option when the recommended timeframes for PCI cannot be met
  – Limitations – less effective and carries a greater risk of bleeding
System Failure

• STEMI treatment is “primarily a systems problem of local communities”

• **Time is muscle!**

• 30% of patients do not receive PCI or fibrinolysis in the absence of contraindications to their use

• Fewer than 50% of fibrinolysis patients and 40% of PCI patients are treated within guidelines

• 70% of patients ineligible for fibrinolytics do not receive PCI
Guidelines for Reperfusion

• American College of Cardiology (ACC)/American Heart Association (AHA) Guidelines

• System goals for patients presenting at PCI hospitals:
  – Patients treated with PCI within 90 minutes of first medical contact (defined as EMS arrival on scene)

• System goals for presenting at non-PCI hospitals:
  – Patients who cannot be transported to a PCI hospital and undergo PCI within 90 minutes of first medical contact should be treated with fibrinolytic therapy within 30 minutes of hospital presentation unless contraindicated
AHA Mission: Lifeline Guidelines

- Goal: assist communities to improve STEMI care by defining components of the system and how they should work together
- Maintains a role for non-PCI hospitals - key in rural areas
- Key aspects of system functioning:
  - Multi-disciplinary team meetings (EMS, STEMI referral and STEMI receiving hospitals) to evaluate outcomes and QI data
  - Process for prehospital identification and activation (EMS)
  - Destination protocols for STEMI receiving hospitals
  - Referral hospital transfer protocols for patients who are: primary PCI candidates, ineligible for fibrinolytic drugs, or in cardiogenic shock
Barriers to Timely Reperfusion

- Patients: Failure to recognize symptoms; reluctance to seek medical attention
  - 50% of STEMI patients call 9-1-1 for transport
  - 50% drive themselves or have others drive them to ED

- EMS and time to transport:
  - Policies requiring EMS to transport to nearest hospital, regardless of PCI capabilities or appropriateness
  - Long travel times in remote areas that preclude access to PCI within recommended guidelines
  - EMS services without 12 lead ECG capabilities
Barriers (continued)

• Delays at STEMI referral hospitals
  – Diagnosing STEMI
  – Determining course of treatment: Transfer to PCI or administer fibrinolytics
  – Transferring patient from referral hospital to STEMI receiving hospital
  – Failure to activate EMS upon suspicion of STEMI

• Delays at STEMI receiving hospitals
  – PCI hospitals do not mobilize teams and resources prior to patient arrival
  – Multiple, simultaneous cases overwhelm existing PCI resources
  – Intake system delays
**Ideal EMS System**

- Ambulances equipped with 12 lead ECGs
- EMS personnel trained to use/transmit 12 lead ECGs, care for STEMI patients, provide feedback on performance/guidelines compliance
- Standardized point of entry protocols
- EMS can activate PCI service promptly in event of STEMI
- STEMI referral hospitals:
  - Pending transport decision, patient remains on stretcher/EMS present
  - EMS is activated when a walk-in STEMI patient presents
- Communication gaps with hospitals are closed
Ideal STEMI Referral Hospital

- Standardized transport protocol based on criteria for risk, contraindication for fibrinolysis, proximity to PCI facilities
- Standardized triage and transfer protocols
- Incentives provided to:
  - Treat patients in accordance with ACC/AHA guidelines
  - Transfer to PCI hospital using: reperfusion checklists, standardized pharmacological regimens/order sets, clinical pathways
- Rapid and efficient transfer of data, data collection, feedback
- Plans to return of patient to community for care are set
Ideal STEMI Receiving Hospital

• Standard algorithms for prehospital ECG diagnosis, ED notification, and cath lab activation
  – Facilitate: short ED stay, direct transport from field to cath lab
• Single call from referral hospital or EMS activates cath lab
• 24/7 PCI availability
• Written collaboration protocols with referral hospitals
• Multidisciplinary team meets regularly
• Continuing education
• Monitor performance, process measures, and patient outcomes
• Standardized protocols for each POE are key to functional STEMI systems of care
• Developed by regional/state-based work groups of EMS personnel, ED physicians and nurses, and cardiologists with support and involvement of third party payers
• Key Points of entry
  – EMS system - activated by 9-1-1 call
  – Presentation at non-PCI capable/STEMI referral hospital
  – Presentation at PCI-capable/STEMI receiving hospital
Economic Realities

- Cardiovascular systems of care are profitable revenue centers
- Referral hospitals should avoid diversion of patients to PCI hospitals when not medically necessary
  - Mission: Lifeline acknowledges role of non-PCI hospitals
- Overlapping PCI service areas where hospitals can be expected to aggressively compete for patients
- Protocols must be sensitive to these economic issues
Examples of Rural STEMI Systems

• Stat Heart Program – rural Illinois
  – 6 referring hospitals, 2 receiving hospitals, large CV specialty group
  – Process of care:
    o 32-65 minute time in STEMI referral hospital
    o Door 1 – Door 2 travel time ranged between 61-95 minutes
    o Door 2 to balloon 31-39 minutes
  – Median door 1 to balloon was 117 minutes
  – Greatest source of delay—waiting for transport at STEMI referral hospital
  – Demonstrates feasibility of initiating various reperfusion strategies on
    basis of standardized POE algorithm
• STEMI performance improvement project
  – CAH in the rural Lower Peninsula of Michigan
  – Spectrum Health in Grand Rapids includes the Meijer Heart Center
  – Travel time 70 minutes by ground, 25 minutes by air (70 miles)
  – Team - Reed City, 2 EMS agencies, Meijer, Aeromed, Spectrum Health
  – D2B time averaged 120 minutes
  – Barriers to achieving 90 minute D2B times
    o Lack of 12 lead ECG capability in one EMS agency
    o Long travel distance with delays caused by weather conditions
    o Delays in mobilizing Aeromed services
  – Results: D2B times within 90 minutes with some as low as 56-60 minutes
Team developed/implemented the following:

- AMI bag containing drugs, IV fluids, and supplies was created
- ED staff trained to perform 12 lead ECGs
- Standardized order set to evaluate and treat AMI/STEMI patients
- County equipped all ambulances with 12 lead ECGs
- Reed City provided 12 lead ECG interpretation classes for paramedics
- Aeromed and cath lab activation based on prehospital ECGs
- Nurse/physician meet EMS at hospital prior to Aeromed rendezvous
- Nurse brings AMI bag to landing pad and administers meds under orders
- All hospital and EMS staff educated on new STEMI protocols
Washington State’s AMI/STEMI Initiative

• Project of Rural Healthcare Quality Network
  – Ongoing initiative for Washington’s 34 CAHs
    o Standardized protocols, standing orders, data tools, and education materials
    o Technical assistance and support, assistance with data collection/analysis
    o Information on best practices for AMI/STEMI care
    o Worked with DOH, ECS Work Group, and ACC to develop protocols and standards for two levels of cardiac centers
    o Works with CAHs, PCI hospitals, and EMS to implemented Level 1 protocols
    o Convenes regional and state meetings with key stakeholders
    o Publishes quality newsletters for CAHs
  – Door to transport times dropped from 197 to 100 minutes
  – Door to ECG within 12 minutes improved from 62% to 81% of patients
Illinois Rural STEMI Activities

- Illinois Critical Access Hospital Network (ICAHN)
  - Supports CAH and rural EMS participation in regional STEMI systems
    - Assists CAHs and EMS to develop/implement standardized TX protocols and algorithms, standing orders, clinical and reperfusion pathways, and transport protocols
    - Encourages development of data collection and QI systems to support multidisciplinary STEMI teams
    - Implementing processes to monitor STEMI care provided by EMS
    - Conducting needs assessment to assess gaps and needs
    - Supports collaboration by attending meetings and developing relationships
    - Organizing professional education resources
    - Developing community awareness program
Other Rural STEMI Systems

- Geisinger STEMI Network – Pennsylvania
- Dartmouth-Hitchcock Medical Center – New Hampshire
- Regional STEMI Program – Yakima Valley, WA
- Minneapolis Heart Institute – Minnesota
  - 210 urban and rural hospitals up to 210 miles from PCI hospital
- North Carolina RACE
  - Reperfusion in AMI in Carolina Emergency Departments
  - 5 geographic regions, 21 PCI hospitals, open to all 122 acute care hospitals
State Flex Activities Supporting STEMI Systems

- Engage policymakers and statewide coalitions of STEMI providers
- Facilitate development of local and regional coalitions
- Support EMS and hospital training
- Support STEMI Systems of Care involving CAHs
- Support development of hospital and EMS standardized tools, treatment and transport protocols, data collection, etc.
- Disseminate information on best practices
Contact Information and Resources

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Developing Regional STEMI Systems of Care: A Review of the Evidence and the Role of the Flex Program