PRE-HOSPITAL STEMI ACTIVATION

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United Ambulance Service

- CAAS Accredited
- Non-profit, paramedic licensed service
- Centrally located in Lewiston/Auburn and Bridgton
  - EMS coverage for large part of Central Maine
  - Urban and rural settings
- Co-owned by Central Maine Medical Center (CMMC) and St. Mary’s Regional Medical Center
- High call volume (>19,000 calls)
  - Emergency calls
  - Transfers
Pre-hospital 12-lead EKGs

- Mid-1990’s
  - Pre-hospital 12-lead EKG’s

- United Ambulance
  - One of the first services in Maine to implement 12-lead EKGs
  - Part of pre-hospital cardiac patient care
  - Purchase of 10 LifePak 12 monitors

- 12-lead EKGs
  - Highly encouraged
  - Not required
  - Not always utilized by ED staff
Pre-hospital 12-lead EKGs

- Paramedic Education Verification
  - 12 EKG Recognition
- Additional 12-lead courses offered from both EDs
2003
- Central Maine Heart & Vascular Center (CMHVI)

Kevin Kendall, MD, FACEP
- United’s Medical Director began a limited review of United’s pre-hospital 12-leads for accuracy

Review of national literature
- Compare Paramedics’, Cardiologists’, and ED Physicians’ diagnosis's of STEMIs

Studies showed no significant differences in the abilities of these groups to recognize STEMIs
STEMI Activation
Research & Development

- March 2004 Pilot Project
  - Kendall, CMMC, CMHVI and United
  - 18 month comprehensive 12-lead EKG review
    - Focus on rhythm interpretation and STEMI recognition

- Results
  - Total of 658 12-lead EKGs were reviewed
  - Results were outstanding
  - Paramedics were diagnosing patients with a high degree of accuracy
  - No STEMIs missed
  - Only a small false positive (or “overcall rate”)
STEMI Activation
Program Development

- 12-lead EKG transmission or field interpretation
- Support of local cardiologists and CMHVI
  - Paramedics may activate the *Cath Lab* directly from the field without an accompanying 12-lead EKG transmission
STEMI Activation Competency

- CQI indicators
  - Expanded to include a review of every 12-lead EKG completed in the field
  - Each reviewed by the Medical Director and/or Performance Improvement Manager
  - Ongoing education, Performance Improvement and EKG testing
    - Vital parts of the program
Paramedics taking part in this protocol will be required to:

1. Participate in an approved 12-lead course every three years
   - Offered at no cost through CMMC
2. Pass an EKG written test provided by the Cardiac EMS Director with 85% or better
3. Be a member of an EMS service with an active Performance Improvement Program
   - All patients with cardiac symptoms must receive a 12-lead EKG
STEMI Activation Patient Criteria

- Duration of symptoms less than 12 hours
- ST elevation greater than 1 mm in two or more contiguous leads
- Ongoing symptoms - e.g., chest pain or shortness of breath
- Palpable lower extremity pulses
- Informed patient consent
STEMI Activation
Process

- A patient meets the above criteria
- A paramedic notifies the CMMC Emergency Department Medical Control Physician
- The Paramedic gives all patient data and requests *Cath Lab* activation
- If the *Cath Lab* team is onsite, the patient is brought directly to *Cath Lab*
- If the *Cath Lab* team is called in, the patient is managed in the ED until the *Cath Lab* is ready
STEMI Activation

- July 1, 2005
  - United became the first service in Maine to activate the Cath Lab from the field

- Program was successful
  - Nine other ambulance services in the CMMC catchment area soon began field activation
  - Same criteria used

- St. Mary's Regional Medical Center
  - Signed an agreement with CMMC
  - Divert all STEMI patients directly to the Cath Lab
  - Save additional time and muscle in concert with the pre-hospital activation program
Chest Pain Protocol

- **O2** - as appropriate
- **Aspirin 324 mg PO**
  - if not contraindicated by aspirin allergy
- **Obtain 12 lead EKG**
  - **Within the first 10 minutes of patient contact**
- **Nitroglycerin 0.4 mg SL or 1 spray, SL**
  - May repeat two times at 5 minute intervals if BP>100 mm Hg
  - If the patient had had nitroglycerin before and no IV is established, and systolic BP>100 mm Hg, then give nitroglycerin
Chest Pain Protocol (cont.)

- Do not give nitro if the patient has taken erectile dysfunction medications within the last 72 hours
  - Contact OLMC for options

- Contact OLMC for options
  - Additional Nitroglycerin
  - Fentanyl 1 microgram/kg IV
  - IM to a maximum dose of 100 micrograms
ST Elevation Myocardial Infarction

- Inclusion Criteria:
  - Patient with symptoms of suspected cardiac etiology and one of the following in a diagnostic quality EKG:
    1. Anterior, inferior, or lateral MI
       - ST elevation>1mm in two or more contiguous leads
       - QRS complex is narrower than 0.12 (3 small boxes) seconds (if Left Bundle Branch Block, you are unable to diagnose as STEMI)
    2. Posterior MI
       - ST depression>1mm in V1 and V2 with an R/S ratio> 1
       - QRS complex is narrower than 0.12 (3 small Boxes) seconds or ST segment elevation in leads V8/V9
    3. NEW Left Bundle Branch Block
       - If the patient has in his/her possession a previous EKG with narrow QRS to demonstrate that the wide is a new change
Treatment

- **Basic / Intermediate**
  - Follow chest pain protocol “Red 2”

- **Critical Care / Paramedic only**
  - Follow chest pain protocol for nitrates, aspirin and pain management
  - **Obtain EKG within 10 minutes of first contact**

- If patient meets the previous slide’s STEMI criteria:
  - Contact OLMC at receiving hospital (local hospital notification) and alert the receiving facility of impending arrival

- If the patient meets one of the previous condition sets for STEMI inclusion criteria:
  - Refer to local or regional cardiac system of care for destination decision support

- Patients with inferior MI, clear lung sounds, and BP< 90:
  - Give a fluid bolus of 250-500 ml of NS
  - For additional bolus, contact OLMC
STEMI Activation
End Results

- Based on current data
  - 43 minutes → Mean “door-to-balloon” time for prehospital STEMI
  - 7 minutes → Mean “door-to-balloon” time for patients arriving by private vehicle

- United continues to work on improving our “door-to-balloon” times
  - Bridgton → Over 35 miles away from a Cath Lab
Questions?

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