Stemi System of Care

Improving Care and Beating the Clock

presented by Holly Burke, RN, BSN
Objectives

• Review how a STEMI system of care improves Door to Balloon times

• Address the importance of EMS integration in the STEMI system of care

• Review the importance of EMS feedback regarding patient outcomes and how case reviews are crucial
Types of Myocardial Infarction

- **Non-STEMI**
  - Non ST-elevation myocardial infarction
  - Partially blocked artery
  - Decreased blood flow to a portion of the heart

- **STEMI**
  - ST-elevation myocardial infarction
  - Completely blocked artery
  - No blood flow to a portion of the heart
  - Substantial risk of death and disability
  - Critical need for quick **reperfusion**
    - "Time is Heart Muscle"
      - Restoration of blood flow by reopening the blocked artery
How do we “Beat the Clock” and ensure timely reperfusion of the STEMI patient?

• Look at every step and process from 911 call to reperfusion!
Keys to a successful STEMI System of Care

1- Pre-hospital 12 lead EKG Capability

2- Hospital / EMS Partnership

3- Hospital Stemi System

4- Performance Improvement

5- EMS feedback and Education
1- Pre-hospital 12 lead EKG

- Capability of obtaining 12 lead EKG from the field and diagnose from the field
  - EMS champions
  - 12 lead EKG equipment
  - Transmission/receipt of 12 lead EKG at the hospital
  - Education and Training of EMS personnel
  - EMS protocols
    - closest appropriate facility
2- Hospital/EMS Partnership

- Hospital Partnership/collaboration with local EMS agencies (pre-hospital 12 lead EKG program)
  - Assist with purchase of equipment
  - Dedicated printer for P12L EKG
    - Automatically set to print upon receipt/ loud audible alarm
    - Charge nurse checklist to ensure computer on and alarm is audible
  - Education provided
• EMS encouraged to follow patient to the cath lab

• Feedback/Analysis to EMS agency
  • Still pictures (before/after) immediately printed and sent with EMS crew
  • Timely report back to EMS agency with patient results
Designated STEMI Hospital

• In an ideal system:
  • Pre-hospital EKG diagnosis of STEMI, ED notification and cath lab activation occurs immediately
  • Single-call systems from STEMI-referral hospitals immediately activate the cath lab
  • Primary PCI available for STEMI 24 / 7
  • Administration support at STEMI-receiving hospital
  • STEMI coordinator at all STEMI-receiving hospitals to collect/analyze data and submit to State STEMI coordinator
  • A multidisciplinary team meets regularly to identify and solve problems
  • A continuing education program is designed and instituted
  • A mechanism for monitoring performance, process measures and patient outcomes is established
What needs to happen when patient presents with STEMI: Door to cath lab goal < 35 minutes

- Door to 12 lead EKG <10 min
- STEMI diagnosis from P12L EKG or ED EKG
- Cath Lab team activated, Cardiologist notified
- Patient attached to monitor, defibrillation pads, O2
- Medication administered
- 2 IVs with extension tubing/pump
- Labs drawn, transported to lab and run stat
- Admitting paperwork completed
- Chart compiled- documentation completed
- Consent for procedure
- STEMI checklist completed
- Clothing removed
- Cath Lab set up, equipment turned on
- Patient transported to the cath lab
3- Hospital STEMI system

- Tailored response according to hospital size and resources

- **Focus:** “Time is heart muscle”

- **Goal:** door to cath lab < 35 min

- One call to activate entire system

- Team response
“Code STEMI” team

• Multidisciplinary Team Response designed to realign priorities to the STEMI patient
• Designated tasks for team members to ensure precise, timely care of the STEMI patient

• Each Member of the team is an integral part of the team!
  • One team member failing to perform can make or break the 90 minute door to balloon standard
CODE STEMI FLOW SHEET

TIME REQUIREMENTS:
- ER walk in or EMS FMC to EKG <10 Minutes
- EKG to STEMI diagnosis & activation: Immediate
- STEMI activation to cath lab <35 Minutes
- Cath lab to balloon <35 minutes
- Door to balloon <90 minutes

WE ARE NOT GOOD, WE ARE EXCELLENT!!
EXCELLENCE = <75 MINUTES

ER (MD) Call "CODE STEMI" Cath Lab Team Activated

Form Fast Forms: Packet 355 & 356

House Sup/Dir
Manage flow of responding staff
Acquire post case patient Room
Manage and direct additional tasks and staff as needed.

Registrar
ER admission paperwork & stickers
Inpatient paperwork & stickers

Operator
Call Code STEMI team in
Confirm cath staff is en-route
Notify security
Page "Code STEMI" over head

Nursing
Pull protocols
Obtain EKG
2-IV’s, extension tubing, NS
Attach monitors
Dress patient in gown

Radiology
Wait outside ER room
2-IV’s, extension tubing, NS
Attach monitors
Dress patient in gown

Respiratory
02 tank
Maintain airway until excused by ER or Cath MD or RN

Laboratory
Draw, deliver and run labs “STAT”

ER Physician
Contact cardiac Interventionist on call.
Manage patient care/ physician to physician hand off

Security
Report to ER/Respond to STEMI
Assist in patient transport to Cath Lab
Show family to the waiting area

EMS takes PT straight to Cath Lab if ready (2 IV’s, admitted)
• STEMI kit
  • Grab and Go from pyxis
  • Medications, IV solutions/tubing, paperwork

• ED staff education
  • Education with entire ED team

• “Code STEMI” team education
  • Ongoing education with all members of the STEMI team
4- Performance Improvement

**Goal:** to improve care from the field to admission/discharge
  - Communication is Key

**Focus:** look at every step of care
  - Review quality metrics
  - Review patient case studies
  - Involve Training Captains/ Battalion Chiefs at each Fire Agency
Hospital/EMS STEMI Review

- Meet every other month
- All EMS medical training officers from surrounding agencies invited to attend
- On duty EMS crews
- ED Physician
- Cardiologist
- Cath lab
- Ancillary Departments
• Benefits of EMS/Hospital STEMI Review

• Collaboration with EMS

• Direct contact and education from Cardiologist

• Review Quality Data (transparency)

• Improve Patient Care
  • Call STEMI in field if unable to transmit (2011)
  • Decreased EMS scene times
EMS Scene times

EMS scene times in mins

EMS scene times in mins
Linear (EMS scene times in mins)
5- EMS Education and Feedback

• EMS Education
  • 12 lead EKG education/review
    • Offered yearly
    • All EMS agencies and ED staff
    • Review of pre-hospital 12 lead EKGs
    • Patient Case Studies

Jordan Valley Medical Center
West Valley Campus
In Partnership With Physician Owners

EMS Continuing Education

STEMI: What is and what isn’t!
Advanced EKG

Presented by:
Dr. Trenten Thorne, MD, FACEP
(PVH ED Physician)
Holly Burke, RN, BSN

Please join us for breakfast or lunch and a review of 12 lead EKGs, recognizing STEMI patients and other cardiac emergencies.

6 class times to choose from:

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<th>Tues., November 3, 2015 (B)</th>
<th>Wed., November 11, 2015 (C)</th>
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<tr>
<td>1200-1330</td>
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Location: Jordan West Valley
2460 S Pioneer Parkway (3980 W)
Conference Room (next to cafeteria)

Please RSVP for food count to Holly at 801-755-3317 (call/text) or hburke@aristohealthcare.com
Code STEMI initiated prior to arrival
95% RCA- stent placed
D2B- 62 minutes
Code STEMI initiated prior to arrival
100% LAD- thrombectomy and stent placed
D2B- 43 minutes
• **EMS Education**
  • ACLS/ PALS recertification

• **Push To Survive**
  • High Performance CPR
    • MICC (Minimally Interrupted Chest Compressions)
    • <5 seconds off chest at any time during arrest
    • Passive airways
    • Work code on scene for 30-40 minutes
    • ETCO2 > 10mmHg
    • Pit Crew method
    • Crew reviews on all full arrests

**Pit Crew Layout**

- Airway Man has enough room to manage airway concerns
- Monitor is placed at patient’s shoulder, angled toward feet
- Patient man with Med box are set up near patient’s feet, away from compression zone
- IV / IO access on limb(s) on same side as monitor
EMS Feedback

- **STEMI Patient Update/Review**
  - Patient update/case review of every EMS patient that goes to the cath lab from the ED
    - Done at EMS station with crew that responded and treated patient
  - Cardiac cath results
    - Before and After Pictures
    - Review of Cath CD (live pictures)
  - Times & metrics reviewed

- Information HIPAA compliant
Age/Sex: 44 y M  Date of Service: 8/26/16  GD
Responding Agency: WJFD # 55 / ME # 107 ( A platoon)
Crew: Klint Ashby, Sharee Rosqvist, Jim Potter
Dispatch/at patient (FMC)/transport times: 1014/1023/1034
P12L obtained/received time: 1027 and repeated at 1037/1038
EMS arrival to hospital/EKG in ED: 1048/1052
Code STEMI initiated: 1040
Patient arrived in cath lab/Reperfusion Time: 1107/1122
Door to Balloon Time: 34 minutes
First Medical Contact (FMC) to Balloon Time: 59 minutes

Case details and outcome: Mr. D had sudden onset of chest burning that gradually increased over the past 90 minutes and he and called his wife. His wife called 911. On arrival of EMS he was lying in the front seat of his vehicle and stated CP was 8/10 but now 2/10. 12 lead EKG done showing ST depression but no elevation. He denied any dizziness or n/v. He mentioned his father has hx of MI x 3. When moving to stretcher he had "placed his hand on his chest and stated he was feeling dizzy and appeared pale and diaphoretic". Placed on the gurney in the engine and 12 lead EKG repeated showing STEMI- CP 8/10. **Code STEMI initiated from the field PTA in the ED.** Unable to establish IV en route, O2, ASA given and NTG held d/t no IV access. In the ED the cardiologist was present on arrival and his CP had improved to 3/10. 12 lead done showing continuing STEMI, IV established x2 and he was taken immediately to the cath lab.

Angiography showed 100% distal RCA occlusion. Angioplasty and a drug-eluting stent was placed with excellent results. It was also noted he has 50% stenosis of the LAD. He was d/c to home on 8/28 on dual anti-platelet therapy, other meds and instructions to follow up with cardiology in 2 weeks.

**Great Job WJFD and UFA!!!!**

Questions? Please call 801-562-4244 and ask to speak to an ER staff member.
See real-time, online ER wait time at UtahER.com  I  3580 West 9000 South, West Jordan, Utah 84088  I  JordanValleyMC.com
Age/Sec: 48 y M  Date of Service: 8/14/16  DB

Responding Agency: WVCFD #75 (A platoon)

Crew: Rosenkrantz, Reilly, Royal, Stubbs, Kissell

Dispatch/At patient (FMC)/Transport times: 1459/1504/1516

P12L obtained/received time: 1517/1521

EMS arrival to hospital/EKG in ED: 1548 (JVMC)/1555

Code STEMI initiated: 1525 at J-WVC/1534 at JVMC

Patient arrived in cath lab/Reperfusion Time: 1604/1631

Door to Balloon Time: 43 minutes

First Medical Contact (FMC) to Balloon Time: 87 minutes

**Case details and outcome:** Mr. B. has a hx of stents x 3 placed in Feb. and had sudden onset of CP after eating. He called 911 after CP x 20 min. On arrival of EMS he in obvious distress with c/o 9/10 sharp CP and very diaphoretic. Difficulty in obtaining 12 lead d/t diaphoresis. ASA and O2 given on scene and 12 lead EKG done en route to J-WVC ED - 12 lead sent and **Code STEMI initiated PTA of patient.** On arrival to J-WVC the ED did 12 lead EKG showing continued STEMI, labs drawn, heparin, dilaudid, zofran given and then the cath lab called stating that the STEMI patient currently on the cath lab table had now coded and to transfer patient to JVMC ED/cath lab. WVCFD then transferred pt to JVMC. **Code STEMI initiated at JVMC PTA of patient to ED.** In the JVMC ED another 12 lead EKG showed continuing STEMI with CP 7/10. NTG given by EMS during transport. He was taken immediately to the cath lab accompanied by ED physician and cath lab staff. He had periods of V-tach.

Angiography showed 100% LAD in-stent stenosis with thrombus. Aspiration thrombectomy attempted multiple times but “large thrombus burden not responding to multiple aspirations. Additional drug-eluting stent deployed for revascularization. Pulmonary edema complicated procedure requiring multiple doses of IV diuretics.” He was d/c to home on 8/17 with dual anti-platelet therapy, other meds and instructions to follow up with cardiology in 1-2 weeks.

**Great Job WVCFD!!!!**
• Benefits of STEMI patient update/reviews

• Face to Face time with Crew Members

• Dialogue to Improve Care

• Patient Follow-up Information

• Address concerns immediately

• Education and Recognition
  • Patient Update form posted in EMS and ED breakrooms
• **EMS Amazing Save Award**

  • Recognize crew for outstanding performance

  • Formal recognition ceremony at hospital

  • Survivor and Family participation

  • Hospital Administration and Board members attend

  • Fire Chiefs and City Officials invited to attend
Our EMS Amazing Save Award goes to South Jordan Fire Department, Station 62-C Platoon, Captain Josh Sellers, Engineer Jared Velez, Paramedics Jon Stone and Kate Harvath, AEMTs Joe Johnson and Dave Nelsen and to an Off-duty Sandy City Fire Fighter AEMT Darren Schmidt.

On October 24, 2015, Shawn Noble and his wife Kim were driving home from a party. Shawn was driving and told Kim that he had some indigestion and arm pain. He suddenly became unconscious and crossed through traffic and hit another car. Off-duty Sandy City firefighter Darren Schmidt witnessed the accident and was almost hit by their car. He immediately went to check on the occupants of the car and noticed Shawn was unconscious and without a pulse. He pulled him out of the vehicle and immediately started good quality CPR. On arrival Station 62 assumed care and continued CPR. They noted that there were no obvious signs of trauma, attached an ECG patch to see his heart rhythm and noted he was in ventricular fibrillation. They immediately delivered the first of several life-saving shocks, continued to follow ACLS protocol and immediately loaded him into the ambulance and headed to Jordan Valley Medical Center. Care was continued in the back of the ambulance, including continued CPR, starting an Intra-osseous line, administering medications and another shock was delivered but his heart rhythm deteriorated to PEA.

Upon arriving at the Emergency Department, Dr. Giles, nurse Baker and the ED staff quickly took over care. Shawn was intubated, medications were given and he suddenly converted to a wide complex rhythm with a pulse and a good blood pressure. Hypothermia protocol was initiated, a 12-lead EKG was done immediately, showing a STEMI; a life-threatening heart attack. The Code STEMI team was activated. Shawn started to wake up and fight the breathing tube and so medications were given to calm him. Other medications were given and he was taken to the cath lab immediately.

In the cath lab, Dr. Verma and the cath lab team took over care and proceeded quickly with angiography. This showed a 100% occlusion of his circumflex coronary artery. Aspiration thrombectomy was performed to remove the clot and restore blood flow to the vessel. A drug-eluting stent was then placed with excellent results. He went to the ICU to recover and he woke up with only limited forgetfulness and mild confusion. He was discharged to his home just five days later.

Today, he is doing “great.” He has lost 37 pounds, is eating healthy and feeling much better. He still has some tenderness in his chest and ribs from the CPR, and some fatigue. He returned to work four weeks ago.

The quick response and immediate delivery of CPR by off-duty firefighter Darren Schmidt followed by the quick, decisive and intuitive actions of Captain Josh Sellers, Engineer Jared Velez, paramedics Jon Stone and Kate Harvath, AEMTs Joe Johnson and Dave Nelsen and to off-duty Sandy City fire fighter AEMT Darren Schmidt made a difference in the outcome of Mr. Noble. The expertise of Dr. Giles, Dr. Verma, the Emergency Department, cath lab and ICU staff ensured the best survival of Shawn Noble.

We at Jordan Valley Medical Center are proud to be partners in healthcare which such a great fire department and incredible paramedics. They are the first responders in our community and an integral part of the treatment and survival of patients.

We honor them today. Congratulations!
Jordan Valley Medical Center West Valley Campus—
EMS Amazing Save

Our EMS Amazing Save Award goes to Unified Fire Authority, Station 111-C platoon: Captain Anthony Barker, Engineer Roland Gilmore, Firefighter Nicholas Hafen and paramedics Bill Wimmer and Glenn Tendler.

On June 19th, 2014, Jose Gomez was working on a habitat for humanity job site when he suddenly grabbed his chest in pain. He asked a co-worker to drive him to the hospital. As they were driving to the hospital, his pain worsened and they pulled the car over and called 911. Medic ambulance and Ladder 111 were dispatched on the chest pain patient. When they arrived, they found Mr. Gomez with his hand on his chest. He was pale and diaphoretic. He complained of pain to the left side, radiating to his left arm. They immediately put him on a gurney and into the back of the ambulance. All of the sudden, Mr. Gomez became unconscious. A monitor was placed which showed that he was in a life-threatening ventricular fibrillation rhythm. CPR was initiated and ACLS protocol was followed as they immediately started transportation to the hospital. The monitor was charged and a shock was given. CPR continued, an IV was placed and oxygen given. Another life-saving shock was administered and CPR continued as they arrived at the Jordan Valley Medical Center West Valley Campus Emergency Department.

On arrival to the Emergency Department, CPR continued and Dr. Thorn and nurse Martineau assumed care of Mr. Gomez. He had return of spontaneous circulation immediately on arrival to the hospital and began breathing on his own. An immediate EKG was done which was abnormal. The Code STEMI protocol was immediately activated. A second IV was established and medications were given. He was taken immediately to the cardiac cath lab.

In the cath lab, Dr. Elhaddi and the cath lab team quickly proceeded with an angiography. This showed a 100% mid proximal LAD occlusion with thrombus. An aspiration thrombectomy removed the clot, restoring blood flow to the vessel. A drug-eluting stent was then placed in the LAD and was successful. The door to balloon time, or time that blood flow was re-established to the heart, was 49 minutes—41 minutes faster than the national benchmark. From 911 call to balloon time was only 54 minutes. He was admitted to the ICU for monitoring and started on medications.

Mr. Gomez was discharged to go home on June 22nd in good condition. He had no neurological deficits noted. He followed up with cardiology two weeks after discharge and then again this month for a routine follow-up exam.

Today Mr. Gomez is doing well. He is back to work and feeling great. He is enjoying spending time with his girlfriend, daughter and three grandchildren.

The quick and decisive actions of Captain Anthony Barker, engineer Roland Gilmore, firefighter Nicholas Hafen, paramedics Bill Wimmer and Glenn Tendler ensured the best survival of Mr. Gomez.

The expertise of Dr. Thorn, Dr. Elhaddi, the Emergency Department, cath lab and ICU staff all contributed to the excellent care and survival of Mr. Gomez.

We at Jordan Valley Medical Center West Valley Campus are proud to be partners in healthcare with such a great fire department and excellent paramedics. They are the first responders in our community and an integral part of the treatment and survival of patients. We honor them today. Congratulations!
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I Work with the BEST!!