Caring for the STEMI Patient:

Primary PCI and Other Considerations

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• Conflicts:
  – None but looking

• Disclosures:
  – Chairman of the National Association of EMS Physicians Standards and Practice Committee
  – Medical Advisory Council of the Kansas Board of EMS
Objectives

• Upon completion of this activity, learners will be able to:
  – Identify and understand their role in systems of care for "Time Critical" conditions.
  – Identify and understand their role in systems of care for "Time Critical" conditions.
  – Relate current and most effective interventions to Evidence-Based Practice in ACS.
My **REAL** Objectives

• The participants will:
  – Become a bit uncomfortable
  – Disagree and be a little pissed off
  – Question their own practices and policies
  – Worry that they might be doing the wrong thing
  – Get defensive

  – And in the end, think critically about our work
Objectives

This is NOT a review of the science
Walk with me…

“Close enough. Let’s go.”
The Issues

- 911 activation
- Who to send
- On scene/enroute tasks for EMS
- Destination/Intercepts
- Pre-notification/Over-calling STEMI's
- 12 Lead Transmission/Interpretation
- Referring Hospital tasks
- Transfer arrangements
- Receiving Center Variability
Just to get us started…

- You’re in the middle of a case while working in a small referral center with one doc and two nurses about 45 minutes from a receiving center.

I’ll catch you up to speed…
GET TO THE CHOPPA!
DO IT NOW!
What are our objectives?
What are our objectives?

- Make Diagnosis
- Start treatment
- Get to definitive care
- Safety
- Efficiency
- Accuracy
What are our objectives?

• Make Diagnosis
• Start treatment
• Get to definitive care
• Safety
• Efficiency
• Accuracy
Get to Definitive Care
Get to Definitive Care

- What are your thoughts?
- What are the options?
- What threatens to screw up the plan?
- What info do we need to pick a plan?
Who ya gonna call?

18 min

50 min

29 min

13 min
Get to Definitive Care

Wha Ya Gonna Call?
Get to Definitive Care

That's your final answer??
Let's do another one

- List the tasks that the ED team has to do in order to get this patient started and out the door
ED Tasks

• The Doc:

• Nurse/Tech/Staff:

(Get out a sheet of paper…and borrow a pencil from one of the prepared kids)
ED Tasks

• The Doc:
  – Make Dx
  – Communicate to team
  – Tell patient (family)
  – Write orders
  – Destination decision
  – Transport decision
  – Doc to Doc call
  – Transfer certification
  – Transport PCS
  – Write chart

• Nurse/Tech/Staff:
  – Register patient
  – Triage
  – Perform EKG
  – Start IV
  – Give meds
  – Transfer packet
  – Package patient
  – Hand off to EMS
  – Nurse to nurse call
So we’re starting to get it…

• Lets try a hard one
Lights and Siren?
Lights and Siren?
Lights and Siren?
Keep ‘em comming

Receiving Center
Variability
Keep ‘em comming

• Receiving Center Variability
What do we agree on?

- ASA is good
- Cath is good
What do we disagree on?

• Heparin
  – [Bolus and drip] or [just drip]
  – [Bolus with max dose] vs [full weight based dose]

• Ticagrelor, Clopidogrel, Prasugrel

• Morphine for pain
  – Morphine found to increase mortality in NSTEMI (CRUSADE), not studied in STEMI

• Beta-Blocker
  – Oral, IV, none
  – What about inferior distribution?

• Direct to cath lab or stop in ED

Variability between facilities (and even individual docs) make it very difficult to address these issues in protocols.
What are we starting to question?

• Time to cath lab

Results: “Despite improvements in door-to-balloon times, there was no significant overall change in unadjusted in-hospital mortality or in risk-adjusted in-hospital mortality, nor was a significant difference observed in unadjusted 30-day mortality.” (numerics omitted)
And my favorite…

What do we agree on that doesn’t make any sense?
The beginning of time
Iowa Mission: Lifeline
Statewide STEMI Guideline for Non-PCI Hospitals

STEMI Criteria:

- ST elevation at the J point in
  - Men: at least 2 contiguous leads of ≥2 mm (0.2 mV) in leads V2–V3 and/or ≥1 mm (0.1 mV) in other contiguous chest leads or the limb leads.
  - Women: ≥1.5 mm (0.15 mV) in leads V2–V3 and/or ≥1 mm (0.1 mV) in other contiguous chest leads or the limb leads.

- Signs & Symptoms of discomfort suspect for AMI (Acute Myocardial Infarction) or STEMI with a duration >15 minutes <12 hours.

- Although new, or presumably new, LBBB at presentation occurs infrequently and may interfere with ST-elevation analysis, care should be exercised in not considering this an acute myocardial infarction (MI) in isolation. If in doubt, immediate consult with PCI receiving center is recommended.

- If initial ECG is not diagnostic but suspicion is high for STEMI, obtain serial ECG at 5-10 minute intervals.

If ECG is transmitted from the field (EMS) and a STEMI is identified, the following should be done prior to patient arrival:

- Alert on-call provider if not in-house
- Activate Transferring agency (Air or Ground)
- Notify Receiving PCI Hospital Emergency Dept. Physician
- If Arrived by EMS, Leave Patient on Ambulance Cot

1st ECG time goal: 10 minutes from patient arrival

**PRIMARY PCI Pathway**
- FMC to P < 120 minutes – ACTIVATED CATH LAB
  - Goal: Door-in to Door-out in < 30 minutes

**FIBRINOLYSIS Pathway**
- FMC to T < 90 minutes anticipated to be > 25 minutes
  - Goal: Door to Needle < 30 minutes followed by immediate transfer to PCI hospital

Patient Care Priorities Prior to Transport or During Transport

- Titrate oxygen (starting at 2L/min) to maintain SpO2 between 90%-94%
- Aspirin 324 mg PO chewable
- Cardiac Monitor & attach hands-free defibrillator pads
- Obtain vital signs and pain scale
- NTG 0.4mg SL every 5 min or Nitropaste PRN for chest pain (hold for SBP < 90)

**ABSOLUTE CONTRAINDICATIONS FOR FIBRINOLYSIS (TNK) IN STEMI**

1. Any prior intracranial hemorrhage
2. Known structural cerebral vascular lesion (e.g., arteriovenous malformation)
3. Known malignant intracranial neoplasm (primary or metastatic)
4. Ischemic stroke within 3 months EXCEPT acute ischemic stroke within 3 hours
5. Suspected aortic dissection
6. Active bleeding or high-flow hemodynamic (not including trauma)
Why do we use FMC?

…and what’s the problem with it?
911 Activation / Who to Send
911 Activation / Who to Send

- How many ambulances are in your system?
- What’s the time frame between first responders and the ambulance?
- What are the practice levels of your various provider levels?
I’d like to play a game...
911 Activation / Who to Send

• 17 y/o female with no history and no drug use calls 911 for chest pain for one hour.
  – What is likely wrong with this girl?
  – What would your system send?
911 Activation / Who to Send

• What can your First Responders do for this girl?
• What can your BLS providers do?
• ALS providers?

Is your crew going to go screaming down the road with lights and siren running?

Are they going to give this girl an aspirin?
Wanna play again?
911 Activation / Who to Send
911 Activation / Who to Send

• What can your First Responders do for this guy?
• What can your BLS providers do?
• ALS providers?

This thought process answers the Intercept question too!
911 Activation / Who to Send

• If this is how you feel, raise your hand.
...but seriously, who to send?
Emergency Medical Dispatch

10 CHEST PAIN (NON-TRAUMATIC)

KEY QUESTIONS
1. Is s/he completely alert (responding appropriately)?
2. Is s/he breathing normally?
   a. (No) Does s/he have difficulty speaking (crying) between breaths?
3. Is s/he changing color?
   a. (Yes) Describe the color change.
4. Is s/he clammy (cold sweats)?
5. Has s/he ever had a heart attack or angina (heart pains)?
6. Did s/he take any drugs or medications in the past 12 hours?
   Cocaine (or derivative)
   Medications

POST-DISPATCH INSTRUCTIONS
a. I’m sending the paramedics (ambulance) to help you now.
   Stay on the line and I’ll tell you exactly what to do next.
b. (≥ 1 + D-1, 2, 3) If there is a defibrillator (AED) available, send someone to get it now in case we need it later.
c. (Patient medication requested and Alert) Remind her/him to do what her/his doctor has instructed for these situations.

Stay on the line with caller if her/his condition seems unstable or is worsening.
Utilize the Aspirin Diagnostic & Instruction Tool – if authorized by local Medical Control and the patient is alert and ≥ 16 years old.

DLS * Link to X-1 unless:
INEFFECTIVE BREATHING and Not alert ———— ABC-1

LEVELS # DETERMINANT DESCRIPTORS CODES RESPONSES MODES

D 1 Not alert 10-D-1
2 DIFFICULTY SPEAKING BETWEEN BREATHS 10-D-2
3 CHANGING COLOR 10-D-3
4 Clammy 10-D-4

C 1 Abnormal breathing 10-C-1
2 Heart attack or angina history 10-C-2
3 Cocaine 10-C-3
4 Breathing normally ≥ 35 10-C-4

A 1 Breathing normally < 35 10-A-1

NOT LICENSED FOR USE IN ANY ON-LINE CALLTAKING POSITION
On scene / Enroute Tasks (STEMI)

- ASA
- EKG
- IV start
- Nitro
- Morphine
- Heparin/Plavix
- Pressors
- Transport
Pre-hospital Cath Lab Activation
Pre-hospital Cath Lab Activation

YOU SHALL NOT PASS
Pre-hospital Cath Lab Activation
EKG Interpretation

• What’s good enough for cath lab activation?

(Why?)
EKG Interpretation

• EKG Interpretation
  – Paramedic interpretation
  – Computer interpretation
  – Transmission (Physician interpretation)

• What does your system do?
  (Mine does the first two)
But what about over-calling STEMI!!!
Triage

- Over-triage: directing a patient to resources that they don’t need
- Under-triage: not directing a patient to a resource that they do need
Principles of Detection

- Sensitivity and Specificity
Our friends in trauma surgery want less than a 3% over-triage rate…

…and tolerate a 50% over-triage rate to get it.
Bringing it all together…

• As we build STEMI systems, there are a whole mess of cause and effect relationships we need to consider.

…and it’s a lot more complicated than just “get to the cath lab fast.”
If you bring up these issues with people who think they are doing everything right they’re gonna get mad at you and say that you’re an idiot.
Cause and Effect 2/8

Cause

If we keep sending all levels of EMS to every call

Effect

we will not have resources available for the next patient who needs us
If we focus only on First Medical Contact,

we will be treating STEMI’s in different clinical timeframes and will cloud our data.
If we write overarching protocols and mandate that everyone follows them, sub standard care will occur in areas with unusual geography or unique circumstances.
Cause

If receiving hospitals continue to demand different treatments/processes than each other

Effect

patients will receive different care depending on destination and the referring hospital staff may have to delay patient care to talk with accepting staff
If we ask our EMS crews to “load and go” when they detect a STEMI, we need to be prepared that traditional EMS tasks might not get completed prior to arrival at the hospital.
Cause

If we don’t allow field activation of the cath lab (with bypass of the ED)

Effect

our actions will show others that we don’t believe in a “minutes count” mentality
...and last but not least...
If we continue to come together and work on the hard issues

we will improve outcomes and SAVE LIVES!!!
Questions?

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