

STEMI SYSTEM

60 Day System Review

Contra Costa 60 Day STEMI System Review “A Great Launch with Challenges Ahead”

What’s been happening?

- 33 patients through the system
- 9 females/24 males
- 28 patients to STEMI Centers
- 23 went to cath labs for intervention
- 21 received interventions
 - **19 had treatable lesions**
 - 2 had no detectable lesions
- 5 to non-STEMI Centers
 - 3/5 were likely false positives
 - 1 STEMI responded to thrombolytics

On the Prehospital Side

- 23 STEMI Alerts Documented
- 32 STEMI's Identified in the Field
- 4 STEMI false positives to STEMI Centers

Our Average Times	Be Proud!!!!
EMS* to Intervention (PCI) Time	82 minutes
National Benchmark	< 90 minutes
EMS* Scene Time	14 minutes
Local EMS Performance Goal	< 15 minutes
EMS* to Intervention (PCI) Time	82 minutes
Local EMS Performance Goal	< 90 minutes
911 Call to Intervention (PCI) Time	91 minutes
National Benchmark	< 120 minutes

EMS* = First contact with EMS provider



Team STEMI: The Work of Managing a STEMI System

On November 19th, over 25 Fire EMS and STEMI Center Quality Improvement Coordinators met to review the first 60 days of our new STEMI system. The meeting was hosted by the Kaiser Walnut Creek STEMI Center who conducted a tour of its STEMI facilities and a timely presentation about how a patient’s past medical history can influence interventions in the cardiac cath lab. STEMI system improvement opportunities were addressed. Overall the feedback from our stakeholders has been very positive with the successful launch of our STEMI System. The learning curves in bringing up the system have been steep. Fire EMS and STEMI Center QI personnel have been diligent in their follow-up on STEMI patients and performance. As anticipated training has required reinforcement.

An “accountable” and “responsive” CQI process is in place on all levels within the system. Each STEMI Center has rigorous internal QI programs focused on patient safety and reducing door-to-intervention times. On the prehospital side there is an equally rigorous case review and feedback process. Recognition of providers in both prehospital and STEMI Center settings through the “STEMI STARS” recognition program is “built-in” to duly recognize system successes with individual STEMI system providers.

Of course building a STEMI system is quite different than managing one. Best laid plans go sideways. Unanticipated events occur requiring coordinated efforts to review and follow-up. These challenges are a normal part of running a STEMI System and are shared by every other STEMI systems throughout the country. To be effective Fire EMS and STEMI Center providers need to support each other as these challenges are encountered. **Contra Costa’s STEMI system expectation is that providers treat these challenges as learning opportunities that can benefit everyone involved.** Data from these occurrences is captured as part of our QI process helping to identify trends early on. False positives have been a concern that we have followed closely and are the focus of this newsletter. Moving forward will continue to take many dedicated professionals working together to make the system work well on an ongoing basis. STEMI system stakeholders have already demonstrated responsive and accountable QI with all parties are committed to making the system even better.

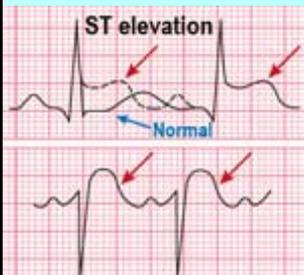
Accentuate the “Positive”

Joe Barger MD, EMS Medical Director

Our STEMI system has gotten off to a very good start, and we are proud of what we have accomplished so far. In our system, STEMI activations depend heavily on the computerized readout of the 12-lead ECG machine. Unfortunately, the computer algorithm is not perfect (after all, it was made by humans). As well, our humans (EMS personnel) obtain 12-leads, and there will be times when errors occur in our actions. We have had and will continue to have false-positive STEMI activations and our objective is to minimize the those “operator factors” that we can control.



What is a false-positive activation? This is when a paramedic tells the STEMI Center that a STEMI has been detected on the 12-lead ECG, but upon arrival at the hospital it is determined that the patient’s 12-lead does not show a STEMI. Most of these patients do not need the urgent availability of the catheterization lab. **How does this happen?** These can be divided into two main categories – machine-related and operator-related issues. The patient’s condition can have an impact on both of these. **Machine-related** issues are generally misinterpretation of ST-segments by the computer algorithm, and may include unrecognized paced rhythms or artifact caused by implantable defibrillators, ST-elevation with supraventricular tachycardia or other fast rhythms (e.g. atrial fibrillation), or other conditions, including multiple PVCs or blocks that may lead to ST-elevation that is detected by the algorithm though it does not truly indicate a STEMI. We are not asking paramedics to override or ignore STEMI-type messages (e.g. ***Acute MI Suspected***) but it is important that the presence of a pacemaker, internal defibrillator, or the presence of a rapid rhythm or multiple PVCs be discussed at the time of the STEMI report. At this point, we cannot modify the computer algorithm, but we can alert the hospital about issues that may be “red flags.”



The most common **operator-related** issue causing false activation we have seen is the failure to note significant baseline artifact on the ECG. It is important to know that patient movement in just the right time can lead to false readings by the machine. ECG complexes in all 12-leads should be reviewed and all need to have a nearly-horizontal baseline. In some cases, repeated ECGs have clarified the matter, and it is critical that we strive to get the best ECG possible. In some patients, level of distress or lack of ability to cooperate may make a good ECG difficult to obtain. If the quality of the ECG is not ideal, that needs to be reported to the hospital.

Lastly, it’s important to remember that the computerized readout will never say “STEMI.” The ***Acute MI Suspected*** or ***Acute MI*** messages are the only ones that we want to recognize as STEMI. There are a wide variety of other messages that may suggest ischemia or infarct, but these aren’t STEMI and do not merit activation. We have had errors both in “overreading” what the computer said (calling it a STEMI when it wasn’t) and in “underreading” (not recognizing that it actually was a STEMI when the *** message came up).

In the first two months since startup of the STEMI system, our false-positive activation rate was in the 20% range, which is on par with many other systems. This represents very good system performance, yet we know some of these could have been prevented. We’ll never be 100% accurate, but our hope is that we improve over time by giving feedback to all in a constructive manner and by mainly focusing on those areas we can fix (operator errors). As well, by reporting on pacemakers, internal defibrillators and heart rate and rhythms to the STEMI Centers, we can give them more information on which to base their activation decisions.

STEMI False Positives...Collaboration needed

False positive STEMI activations are frustrating experiences for all involved. So what can you do in the emergency department if you find yourself in this situation?



All STEMI Centers repeat a 12-lead to confirm STEMI patients who arrive from the field. **ED Physicians and paramedics are encouraged to consult which each other when a “False Positive” occurs to determine if this was a “machine generated” false positive versus something that could have been done differently in the field.** This not only helps the EMS provider fine tune their skills, but supports collaborative relationships between the field and STEMI Center.