One Year Outcomes of a Pre-Hospital Myocardial Infarction Alert 3 Process

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National guidelines recommend that hospitals treating patients with ST Elevation Myocardial Infarction (STEMI) should achieve a door to balloon (D2B) time of less than 90 minutes. Emergency Medical Services (EMS) play an integral part in the initial care of STEMI patients. We initiated a Pre-hospital Myocardial Infarction Alert 3 (MI-3) process in which trained paramedics interpret a 12-lead electrocardiogram (ECG) in the field and notify the emergency physician (EP) allowing for earlier activation of the existing MI Alert process. Six EMS Advanced Life Support (ALS) units took part in a 12-lead ECG and MI-3 process training class in order to extend an already existing in-hospital MI Alert process to the pre-hospital setting.

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Study Objectives:
National guidelines recommend that hospitals treating patients with ST Elevation Myocardial Infarction (STEMI) should achieve a door to balloon (D2B) time of less than 90 minutes. Emergency Medical Services (EMS) play an integral part in the initial care of STEMI patients. We initiated a Pre-hospital Myocardial Infarction Alert 3 (MI-3) process in which trained paramedics interpret a 12-lead electrocardiogram (ECG) in the field and notify the emergency physician (EP) allowing for earlier activation of the existing MI Alert process. Six EMS Advanced Life Support (ALS) units took part in a 12-lead ECG and MI-3 process training class in order to extend an already existing in-hospital MI Alert process to the pre-hospital setting.

Results:
A total of 243 MI Alert activations were reviewed, of which 140 were ED MI Alert activations and 103 were pre-hospital MI-3 activations. Of the 140 ED MI Alerts, 62 (44%) arrived by ambulance, and the remaining 78 (56%) arrived by other means. Of the 103 pre-hospital MI-3 activations 93 (90%) arrived by ambulance, 8 (8%) arrived by air medical, and two (2%) arrived by other means. Of the 103 pre-hospital MI-3 activations, 10 (10%) were vetoed by the EP due to incorrect ECG interpretation by pre-hospital personnel or an identified exclusion criteria. None of those vetoed had percutaneous coronary intervention (PCI), or discharge diagnoses of STEMI. All patients vetoed by the EP survived to discharge. Of the 62 ED MI Alert activations that arrived by ambulance, 13 did not qualify for PCI; the remaining 49 achieved an average D2B time of 72 minutes. Of the 83 pre-hospital MI-3 activations that arrived by ambulance, 10 did not qualify for PCI; the remaining 73 achieved an average D2B time of 51 minutes, t (122) = 3.873, p = 0.010. Mortality, inclusive of all patient modes of arrival, totaled nine (6.4%) of the ED MI Alert activations, and six (6.5%) of the pre-hospital MI-3 activations.

Methods:
This was an Institutional Review Board approved retrospective cohort study of all patients who presented to our institution with a STEMI between July 1, 2008 and June 30, 2009. Our hospital is a 968 bed academic tertiary community medical center accredited by the Society of Chest Pain Centers which has an annual emergency department (ED) census of 74,000 patients. Outcomes queried from the database included: total MI Alert activations, total ED MI Alert activations, total pre-hospital MI-3 activations, number in each group arriving by ambulance, number of pre-hospital MI-3s that were vetoed by EP, D2B times, and mortality rate.

Conclusions:
One year after implementation trained ALS providers correctly activated the MI-3 process in the majority of cases. Pre-hospital implementation of the process resulted in a statistically significant decrease in D2B times.