Effects of Prehospital Communication Times in STEMI Patients

Melissa Connor, MPH, BSN RN, CEN, MICN; Kate Hurley, MSN, RN, CEN, MICN; Ning Yao, BS; Theresa Nicholson, MHA, BSN, NEA-BC; Morgan Harris; Tyler Rodriguez, BS; Nicholas J. Jackson, PhD, MPH; Pamela S. Miller, PhD, RN

Emergency Department, Ronald Reagan UCLA Medical Center, Los Angeles, CA

**BACKGROUND**

- Definitive treatment for a patient having a ST-elevated myocardial infarction (STEMI) is percutaneous coronary intervention (PCI) in a cardiac cath lab. The time between the first medical contact (FMC) with a pre-hospital provider and the time of successful PCI is recorded as FMC to device.
- Identification of a STEMI on a 12-lead ECG is essential for mobilizing resources to perform PCI. ECGs performed by prehospital paramedics can be transmitted to the receiving hospital to determine if cath lab activation should occur.
- Nursing plays a pivotal role in affecting ECG times. Acquisition of the hospital EKG is performed under the supervision of RNs and the paramedics communicate with Mobile Intensive Care Nurses while en route to hospital with STEMI patients.

**PURPOSE**

- Assess for an association between paramedic communication times and ECG transmission with FMC to device time.
- Assess for an association between paramedic communications and ECG transmission with STEMI activation time.

**METHODS**

- Retrospective cohort study using data from 82 STEMI patients arriving by ambulance to the ED at Ronald Reagan UCLA Medical Center from January 1- July 31, 2017.
- Outcomes of FMC to Device time and STEMI activation time were examined compared to the following independent variables: (1) the time between ECG acquisition and when it was transmitted, (2) the time between the ECG acquisition and when the receiving hospital was notified that a STEMI patient was en route, (3) the time between notification to the hospital and ambulance arrival.
- Spearman correlation coefficients were used to describe the associations between response times.

**RESULTS**

**Time Variables Compared to FMC to Device (p Spearman coefficient):**

Legend:
- Outcome -
- Significant relationship -
- Non-significant relationship -

**Time Variables Compared to STEMI Activation Time (p Spearman coefficient):**

**DISCUSSION**

- Several steps occur between a patient’s activation of emergency medical services and reperfusion of an occluded vessel in the cath lab.
- Earlier ECG transmissions and notifications by prehospital personnel had no significant association with FMC to device times. In contrast, earlier ECG transmission and phone communication to the receiving hospital was correlated with an earlier STEMI activation time – a process which notifies cath lab personnel to come to the hospital and prepare the cath lab for a PCI.
- Correlation of the same independent variables with one outcome but not the other in a process where one step naturally leads to the other may have several explanations.
- STEMI activation time may be a better metric for use in studies examining prehospital communications and ECG transmissions.
- Variables between the cath lab team arrival and reperfusion of an occluded artery are generally outside the control of ED teams.
- Efforts aimed to improve ED processes should consider using STEMI activation time as a measure within their control.
- This study may be underpowered, as evidenced by the significant association between FMC to device with STEMI activations but none of the independent variables when considered separately.

**IMPLICATIONS FOR PRACTICE**

- Efforts to improve FMC to device times should not exclusively focus on prehospital communications and ECG transmission times as there may be alternative variables that have a significant impact on reducing reperfusion times.
- Use of the STEMI activation time may be recommended as an outcome metric for quality improvement projects in the ED.

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