Effect of Pre-Hospital Communication Times on Reperfusion in STEMI Patients

Background:

Expedient transfer of a ST-elevation myocardial infarction (STEMI) patient presenting to the Emergency Department (ED) to a cath lab for percutaneous coronary intervention (PCI) is well understood to make a difference in the patient outcome. The American Heart Association has given a goal of 30-30-30 from first medical contact (FMC) to device time, meaning that patients should spend no more than 30 minutes at each step when transported to a hospital, evaluated in an ED and reperfused in a cath lab.

In Los Angeles County, Mobile Intensive Care Unit (MICU) nurses are certified to provide specialty pre-hospital guidance from the ED, which affords them a unique perspective on the relationship between pre-hospital and post-arrival care of patients transported by ambulance. With newly enhanced ability for paramedics to transmit 12-lead electrocardiograms (EKGs) electronically, there is need to evaluate the variables associated with the efficient transfer of a STEMI patient from the field to reperfusion treatment.

Purpose:

To determine the relationship between pre-hospital communication and FMC to Device times in a cohort of STEMI patients undergoing percutaneous coronary intervention (PCI).

Methods:

This study was a retrospective analysis of consecutive STEMI patients who underwent PCI at a single urban, academic medical center from November 2016 to March 2019. Study participants were identified using logs from the cath lab records of patients that had undergone PCI. Using ED and cath lab logs, documentation in the electronic health record and email records, key communication and treatment times of the included STEMI patients were identified. Correlation was evaluated using Spearman coefficients.

Results:

A total of 82 STEMI patients were included in the study. The mean time of FMC to device was 95.99 minutes. A significant correlation was found between cath lab team arrival time and the FMC to device time ($\rho = 0.90, CI \ 0.85-0.97$). A positive correlation was also found between the time it took for the EKG to be transmitted with occurrence of a STEMI activation resulting in cath lab team notification ($\rho = 0.31, CI \ 0.11-0.56$).

Conclusions:

Findings from the study indicate that cath lab arrival times represent a more relevant endpoint for pre-hospital EKG studies as earlier team arrival is associated with earlier reperfusion, but cath lab variables that are unable to be controlled by pre-hospital providers (i.e. ability to cross lesion, location of occlusion) are excluded from the analysis.
Efforts to improve FMC to device time would be most benefited from strategies that are specific to timely and efficient activation of the on-call cath lab team.