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Wireless ST-Segment Analysis in an Acute Myocardial Infarction Study

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Abstract

Our objective was to look at the impacts of executing a completely mechanized remote organization to lessen entryway to-mediation times (D2I) in ST-portion height myocardial localized necrosis (STEMI). Our objective was to investigate the effects of implementing a fully automated wireless network on the reduction of ST-segment elevation myocardial infarction (STEMI) door-to-intervention times (D2I). The network received 80 ECGs with a suspicion of STEMI from June to December 2006. Triaged to the catheterization laboratory were twenty patients with ECGs that were consistent with STEMI.When compared to the data from 2005, there was improvement in the mean door-to-cardiologist notification door-to-arterial access time-to-first angiographic injection and D2I times. The benefit of reducing door-to-balloon times (D2B) in acute ST-segment elevation myocardial infarction (STEMI) has previously been widely reported.

Keywords: Wireless ST-Segment • ECG • Telehealth

Introduction

However, strategies to reduce D2B times are frequently limited by multiple time-consuming steps. ACC/AHAAmerican College of Cardiology/American Heart AssociationD2Adoor-to-arterial accessD2Bdoor-to-balloonD2Idoor-to-interventionEDemergency department EMS. Although it has recently been demonstrated that implementing wireless electrocardiogram (ECG) transmissions from the field to the emergency department (ED) significantly reduces D2B times, ED staff must still transmit the ECG to the cardiologist. The goal of the STAT-MI project, which stands for "ST-Segment Analysis Using Wireless Technology in Acute Myocardial Infarction," was to show that newer wireless technologies and software connected in a network can speed up door-to-intervention (D2I) times by simultaneously transmitting high-resolution ECGs to the emergency department and off-site cardiologists [1-3].

Literature Review

For the evaluation and management of STEMI, as well as its application in reducing D2I times, we report on the initial results of implementing this completely automatic notification and response system. At the University of Medicine and Dentistry in New Jersey—University Hospital, a group of people worked together to create the STAT-MI network. The group was led by cardiologists and included members of the emergency department (ED), hospital administration, hospital information and technology, telecommunications, medical informatics, and physician staff. The implementation of this network was assisted by Verizon Wireless (phones, wireless network, paging) and Medtronic Corporation, LifeNet Receiving Station, Minneapolis, Minnesota).

Using the newly developed STAT-MI network, all patients with suspected STEMI identified by EMS personnel in the field were included from June to December 2006.For primary percutaneous intervention (PCI), all confirmed STEMI patients were brought to the cardiac catheterization (cath) lab. As historical controls, all STEMI patients transported by EMS in the previous year were used. depicts this fully automated network, which was initiated by EMS personnel in the field acquiring an electrocardiogram (ECG). Bluetooth-enabled LIFEPAK defibrillators from Medtronic automatically transmitted the 12-lead ECG to Motorola E815 phones from Verizon Wireless that EMS personnel wore. The 12-lead ECGs were sent to the Life Net Receiving Station (Medtronic) by E815 phones, which then automatically printed the ECGs for local review, converted the ECGs to Adobe PDF format, sent the ECGs to predetermined cardiologists' email addresses via University Hospital's secure intranet, and sent an audible text page to the on-call cardiologist. Once EMS activated the system in the field, no personnel needed to intervene. The e-mail with the attached PDF ECG file was accessed by on-call cardiologists using their handheld smartphones (Audiovox XV6700, Verizon Wireless). NotifyLink, a program developed by Notify Technology Corporation and based in San Jose, California, was used for email communication. An embedded telephone number was embedded in the electrocardiograms, allowing for direct communication prior to hospital arrival (Fig.2. The ECG could be magnified and moved on the smartphone screen, which made it possible to conduct in-depth analyses of the ST-segment and other waveforms [4].

Wireless ST-segment provided to beneficiaries during the COVID-19

All patients who were referred to the catheter lab for primary PCI were subjected to the collection of demographic and clinical data. Beginning with the time the ECG was sent, time data were taken. The time from the hospital's arrival to the cardiologist on call's notification was known as the door-to-cardiologist notification time.A negative value was assigned if, as is typical for this network, notification occurred prior to hospital arrival. The time it took to get from the hospital to the femoral arterial access was known as door-to-arterial access (D2A).The time from arrival at the hospital to the first intracoronary injection of contrast was known as the time-to-first angiographic injection. Time-to-wire across lesion was the amount of time it took for the guide wire to cross the infected lesion after the patient arrived at the hospital. The time from hospital arrival to the initial intervention that restored the culprit vessel's patency was known as the door-to-intervention time. The expression "mediation" rather than "swell" was picked as more compatible with "essential percutaneous intercession" and could incorporate angioplasty, stenting, or potentially mechanical thrombectomy.D2A times were looked at for patients with suspected STEMI but no interventional procedure. The STAT-MI network was used to transmit 80 ECGs for suspected STEMI from EMS personnel to the cardiologist on call between June and December [5].

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Conclusion

Due to the field's failure to transmit, no STEMIs were missed. Due to a cardiac arrest and prolonged resuscitation prior to intervention, one STEMI patient was excluded. One patient had no obstructive coronary artery disease and three had angiographic ally normal coronary arteries when they were brought to the cardiac catheterization laboratory. In our study, much earlier notification of the cardiologist on call—on average 15 minutes prior to patient arrival at the hospital—was responsible for the majority of D2I time improvements. In active emergency departments, delays in patient evaluations and ECG acquisition and transmission can delay timely treatment of STEMI patients.D2B times have decreased thanks to wireless transmission of prehospital ECGs to the emergency department, which is now widely recommended (9).A prehospital ECG is associated with improved D2B times in the National Registry of Myocardial Infarction (NRMI) (94.0 vs. 110.3 min). By completely automating the process of ECG acquisition and transmission from the field to a handheld smartphone worn by cardiologists, our study took advantage of wireless technology even more. A further improvement that allowed for direct communication between the cardiologist and EMS personnel on the way was the inclusion of the EMS phone number on the ECG.

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Conflict of Interest

The authors declare that there was no conflict of interest in the present study.

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