Transferring Images via the Wireless Messaging Network Using Camera Phones Shortens the Time Required to Diagnose Acute Coronary Syndrome

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Background  Clear images can be sent via e-mail using camera phones. We examined whether camera phones are useful to transmit electrocardiogram (ECG) images.

Methods and Results  ECG images were taken of 20 patients suspected to have acute coronary syndrome. Ten images were sent to a cardiologist by fax. The other 10 images were transmitted using a camera phone. The total time elapsed between image transmission to diagnosis by cardiologists was shorter in the camera phone group than in the fax group.

Conclusions  ECG image transmission by camera phone can be efficiently used in the diagnosis of acute coronary syndrome. (Circ J 2007; 71: 1499–1500)

Key Words:  Acute coronary syndrome; Camera phone; Image transfer

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he speed at which reperfusion treatment can begin is critical in cases of acute coronary syndrome (ACS). Electrocardiograms (ECG) are used to make the diagnosis. The 12-lead ECG has significantly reduced the time it takes patients with chest pain to receive the necessary reperfusion treatment! In the absence of a cardiologist in the emergency room (ER), the ECG image data must be sent to a cardiologist on stand-by outside the hospital. Until now, ECG images were sent from the hospital to the cardiologist by fax, but if a fax machine is not readily available to the cardiologist, they must look for one in order to receive the image data. Therefore, there are disadvantages in the use of a fax in cases of emergency, and a coronary angiography is time-consuming. More recently, camera phones have become very advanced and are able to send and receive high quality images by e-mail. In this study, we examined whether sending ECG images to a cardiologist by camera phone was more efficient than by fax.

Twenty patients participated in this study. They were admitted to the ER with suspected ACS. ECG images were taken of all patients and all patients were subsequently diagnosed with ACS. Patients were divided alternately into 2 groups of 10 patients each: the F group and the CP group. The F group’s ECG images were sent to a cardiologist by fax (n=10) and the CP group’s ECG images were sent by camera phone (n=10). We measured the time taken in transmitting the images from the ER to a cardiologist, the time taken to analyze that image and the total time elapsed from image transmission to diagnosis by the cardiologist. All data presented are mean ± SD. Group comparisons were based on the Student’s t-test.

Images taken with the camera phone were clear (Fig 1). The amount of time taken in transmitting the images from the ER to the cardiologist was longer in the F group (163.8±5.1 s) than that taken by the CP group (71.5±4.6 s) (Fig 2A). However, the amount of time taken by the cardiologist to analyze those images was shorter in the F group (12.9±1.8 s) than that of the CP group (24.1±4.3 s) (Fig 2B). Total time elapsed from image transmission to diagnosis was shorter in the CP group (95.6±8.4 s) than that of the F group (176.7±4.9 s) (Fig 2C).

A history of ischemic-type discomfort is the primary indicator for screening patients with ACS in the ER by 12-lead ECG. In this study, diagnoses could be received more quickly via text message using a cellular phone than by fax,
but the time it took to analyze the images on a camera phone and make a diagnosis was longer because of the small image size. Evidence indicates that for patients undergoing primary percutaneous coronary intervention (PCI) for acute myocardial infarctions, door-to-balloon times in excess of 2 h are associated with increased mortality, emphasizing the need for an expeditious transfer to the catheterization laboratory if primary PCI is selected as the reperfusion strategy.2 Physicians evaluating patients in the ER must confront the difficult task of quickly identifying patients who require urgent reperfusion therapy, triaging lower risk patients to an appropriate facility within the hospital, and not discharging and sending home patients inappropriately while avoiding unnecessary patient admissions3–5.

Our results suggest that using camera phones to transmit ECG images to the cardiologist shortens the time taken to diagnose ACS. Furthermore, camera phones are more advantageous in regards to availability and cost in comparison to fax machines because of the recent popularization of camera phones. Therefore, image transmission by camera phones is more efficient in sending image data to a cardiologist than by fax.

References