Role of Magnetocardiography in Emergency Room

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In the emergency room, a patient should be diagnosed as quickly as possible with higher diagnostic accuracy for an appropriate therapy to the patients with acute coronary syndrome and also for avoiding unnecessary hospital admissions. At present, electrocardiography (ECG) and biochemical markers are generally used to detect myocardial infarction and coronary angiography is the gold standard to reveal the degree of narrowing of coronary artery. On the other hand, magnetocardiography (MCG) has been proposed as a novel and non-invasive diagnostic tool for the detection of cardiac electrical abnormality associated with myocardial ischemia. In this study, we examined whether the MCG can be used for the detection of coronary artery disease (CAD) in patients, who were admitted to emergency room with acute chest pain. MCG were recorded from 36 patients admitted to the emergency room with suspected acute coronary syndrome. The MCG recordings were obtained using a 64-channel SQUID MCG system in the magnetically shielded room. Three patients out of 36 patients were excluded because of excessive metal after permanent teeth replacement, no angiography data and non-cardiac related chest pain. Remaining 33 patients (23 CAD patients, 10 symptomatic patients) were diagnosed by the classification algorithm based on prior probability distribution. In the results, sensitivity, specificity, positive and negative predictive value were 82.6, 80.0, 90.5 and 66.7 %, respectively, for the detection of CAD in the emergency room. In conclusion, our study showed that the MCG can be helpful for clinical use in the emergency room to screen CAD patients requiring coronary angiography with a long exposure to X-ray irradiation.

Keywords : Magnetocardiography, acute chest pain, coronary artery disease, myocardial ischemia, and diagnostic accuracy