Classification of Magnetocardiographic Maps in Coronary Artery Disease (CAD) Diagnosis

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The diagnostic management of patients with chest pain remains a clinical challenge. Magnetocardiography (MCG) has been proposed as a new non-invasive method for detection of myocardial ischemia. To date, however, MCG technique is not intensively introduced for clinical use. One of the main reasons might be the absence of statistically valid and diagnostically clean criteria, which can determine the presence of certain heart disease. In this work, we suggested a new method to classify the diagnostic value of MCG for the detection of coronary artery disease (CAD) in patients with chest pain. Instead of the simple discrimination between healthy subjects and CAD patients, we evaluated a probability, in which parameters can be classified into each group based on the distribution function of the parameter in each group. For all parameters, sum of probabilities was compared between groups to determine the presence of CAD. MCG was recorded for three groups (healthy subjects and patients without and with CAD) by means of the 64 channel SQUID gradiometer system installed at a hospital. From the measured field distribution, current and magnetic field vectors were generated during the ST-T interval. Using several parameters, which were found to be significantly different between groups, our classification method show that the MCG can be a useful tool to predict the presence of CAD with sensitivity and specificity of higher than 80 % each.

keywords : SQUID, Magnetocardiography, Coronary Artery Disease, Magnetic field map, Classification