

In this thesis, detailed investigation into the electrical field of the heart is presented in patients with various manifestations of myocardial ischemia. Methods of standard scalar electrocardiography and body surface potential mapping were used through statistical and mathematical analysis in order to compare their diagnostic performance. Body surface mapping proved to be more powerful research and diagnostic tool than standard electrocardiography and also constituted a framework for data entering the computer electrical model of the human heart and torso.

Global and local ischemic changes were the primary objectives of the individual studies of this thesis. Different patient populations were studied including post myocardial infarction population, patients with variant angina and patients referred for percutaneous coronary angioplasty, and the population of patients suffering from ventricular arrhythmias related mostly to their postinfarction status. Traditional depolarization and repolarization changes were studied together with novel diagnostic parameters such as minimal potential loss within the QRS complex, single-beat cardiac micropotentials and distribution of the QT interval on the human thorax. Critical appraisal and error performance of so called QT interval dispersion was another important objective.

In summary, however clinical electrocardiography is established and indispensable in clinical practice, and most likely beyond its zenith as a research tool; computerized analysis of electrical heart field keeps opening new areas of interest and valuable insight into the clinical problems. We regard body surface potential mapping as a powerful laboratory research tool and a framework for entering further stage of electrocardiographic analysis using realistic computer electrical model of the human heart and torso. Utilizing such model together with novel 3-dimensional imaging reconstructions might bring new realistic imaging technique into the clinical practice – electrocardiographic imaging.

