Model-Based Medical Expert System for Diagnosing Myocardial Ischemia Based on a Newly Developed Ischemia Parameter

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The documented ECG parameters such as ST-shift and T-wave inversion are weakly related to the presence and the extent of myocardial ischemia. Therefore, their presence is not always indicative specifically of the myocardial ischemia. In this study, a new parameter called ischemia parameter has been developed based on the differences in electrical conductivities between normal and ischemic tissue. Equations are derived in a new model to determine this ischemia parameter. The model is incorporated in a medical expert system which is interfaced with measuring device. All the required ECG measurements are listed in scp file for analysis by the expert system.

Clinical trial of this noninvasive technique (expert system + measuring device) shows that this technique can accurately (sensitivity $>$93.6% and specificity 80.4%) diagnose chronic, acute (angina) and silent myocardial ischemia and determine its numerical severity.

This medical system can differentiate between cardiac and noncardiac chest pain.

Accurate and noninvasive diagnosis can find many clinical applications including the assessment of the open heart surgery CABG, the efficiency of the stent ,the need of angiography .etc