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MYOCARDIAL ISCHEMIA AND INFARCTION

REAL-TIME CARDIAC ELECTRICAL BIOMARKER FOR DETECTION OF AMI

ACC Poster Contributions

Ernest N. Morial Convention Center, Hall F

Sunday, April 03, 2011, 10:00 a.m.-11:15 a.m.

Session Title: Myocardial Ischemia/Infarction -- Basic

Abstract Category: 1. Myocardial Ischemia/Infarction--Basic

Session-Poster Board Number: 1001-329

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Background: Eigenvalue modeling (EVA) of the 12-lead ECG can quantify dipolar forces yielding a cardiac electrical biomarker (CEB). The objective was to test a CEB that quantifies the electrical field of the derived ECG (dECG) to detect AMI.

Methods: This is a blinded, case-controlled non-inferiority study in which ECGs with variable morphologies were interpreted by a cardiologist and an emergency physician (EP) serving as blinded reference standards. Simplex optimization computed the dECG from 3 lead-vectors. The CEB was then computed from the dECG by EVA to detect AMI and then compared to (1) an ECG interpretive algorithm (ECGI), and (2) ST voltage changes (STΔ) consistent with AMI, both of which served as active controls tested against the interpretations of the blinded reference standards. A set of 498 ECGs were analyzed to test the CEB theory. Sensitivities, specificities, and negative and positive predictive values were calculated with 95% confidence intervals for analysis of statistical significance.

Results: The CEB was non-inferior by hypothesis testing, but superiority was demonstrated compared to the standard ECGI and STΔ methods. The diagnostic performance measures are shown below.

Conclusions: The CEB quantifies the electrical field to detect AMI. This CEB is instantaneously computed from the cardiac monitor and displayed in real-time to allow an immediate, cost-effective, and efficient means of identifying patients with AMI who are being monitored in acute care settings.

	Emergency Physician				Cardiologist			
	Sens	Spec	NPV	PPV	Sens	Spec	NPV	PPV
CEB	88.0%	91.3%	95.0%	80.2%	82.1%	81.3%	93.6%	57.7%
ECGI	54.3%	77.4%	80.9%	49.0%	57.7%	75.3%	85.1%	42.1%
STΔ	59.5%	68.6%	80.7%	43.5%	61.1%	67.1%	84.4%	37.3%