

A Novel Heart Rate Variability Algorithm for the Detection of Myocardial Ischemia: Pilot Data from a Prospective Clinical Trial

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Background:

Detecting myocardial ischemia in patients without known coronary heart disease (CHD) is complex and current modalities have either, low sensitivity and specificity, or involve exposure to radiation and have a significant cost. Heart rate variability (HRV) analysis has been shown to be a predictor of all-cause mortality.

Objective:

We hypothesized that new HRV analysis algorithms, as used by the HeartTrends device, may be superior to conventional exercise stress testing (EST) for the detection of myocardial ischemia in this population.

Methods:

We report pilot data of the first 100 patients enrolled in a prospective clinical trial conducted at Sheba Medical Center. Enrolled patients were referred for EST with myocardial perfusion imaging (MPI) due to suspected CHD. All patients underwent HRV testing with a Heart Trends device >1 hour prior to EST with MPI. Sensitivity, specificity, positive and negative predictive values (PPV and NPV, respectively) were calculated for the EST and HRV tests, regarding MPI as the gold-standard for non-invasive detection of myocardial ischemia. The study was approved by the local Helsinki Committee and all patients gave written informed consent.

Results:

The average cohort's age was 61 (± 10.2) years. 59% were males. 53% had hypertension, 64% had dyslipidemia, 21% had diabetes mellitus, and 43% had family history of CHD. In our cohort, 15% had a pathologic MPI. HRV showed superior sensitivity, PPV, and NPV to standard EST, while the specificity of the 2 tests was similar (**Table**).

	EST	HRV
Sensitivity	53%	85%
Specificity	85%	86%
PPV	40%	50%
NPV	90%	97%

Conclusion:

Our pilot data suggest that the novel HeartTrends HRV algorithm may be useful for noninvasive evaluation of myocardial ischemia in patients without known CHD.