

## **High-Frequency QRS Analysis Improves Specificity of Exercise ECG in Women Referred for Angiography**

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**Introduction:** Exercise ECG testing in women with suspected coronary artery disease (CAD) is limited by low diagnostic accuracy. Consequently, women referred for coronary angiography often have normal coronary arteries or non-obstructive lesions. Analysis of the high-frequency components of the QRS complexes (HFQRS) has been reported to provide a sensitive, gender-independent indication of myocardial ischemia. This study compared the diagnostic performance of HFQRS with conventional exercise ECG in detecting stress-induced ischemia in women referred for angiography.

**Methods:** The study included 113 female patients (age 64±9 years) referred for non-urgent angiography. Patients performed a symptom-limited treadmill exercise test prior to angiography. High-resolution ECG was acquired during the test and used for both HFQRS and conventional ST-segment analyses. HFQRS diagnosis was determined by computerized analysis, measuring the stress-induced reduction in HFQRS intensity in each ECG lead. The diagnostic performance of HFQRS, ST-segment analysis and clinical interpretation of the exercise test were compared using angiography as gold standard.

**Results:** HFQRS was more specific than both ST segment analysis and clinical interpretation (80% vs. 54% and 55% respectively,  $P < 0.005$ ) with similar sensitivities (70% vs. 70% and 73%). The number of ECG leads with ischemic HFQRS response correlated with the severity of CAD. HFQRS was highly specific (93%) in patients who achieved their age-predicted target heart rate, and retained its diagnostic accuracy in subgroups of patients with resting ECG abnormalities or inconclusive exercise ECG.

**Conclusion:** HFQRS analysis, as an adjunct technology to exercise stress testing, may improve the diagnostic value of the ECG, and reduce the number of unnecessary imaging and invasive procedures