Detection of Stress-Induced Myocardial Ischemia Using Analysis of Depolarization Abnormalities

Tali Sharir [1], Konstantine Merzon [1], Iren Kruchin [1], Andrzej Bojko [1], Haim Silber [2], Pierre Chouraqui [3]

[1] *Procardia, Maccabi Healthcare Services,* [2] *Maccabi Healthcare Services, Tel Aviv,* [3] *Nuclear Cardiology, The Heart Institute, Chaim Sheba Medical Center, Ramat Gan, Israel*

Detection of stress-induced myocardial ischemia typically focuses on changes in the repolarization phase of the ECG, manifested in the ST segment. However, ischemia also induces changes in the depolarization phase, which can be quantified by analysis of high-frequency mid-QRS components. We aimed to determine incremental diagnostic value of this technique over standard ECG exercise testing. **Methods.** Exercise SPECT myocardial perfusion imaging (MPI) was performed in 941 consecutive pts (630 men) referred for evaluation of CAD at 2 medical centers and used as gold standard of ischemia. Conventional exercise ECG was combined with high resolution ECG acquisition, which was digitized and analyzed using the HyperQ™ System (BSP, Israel). A 50% decrease in the intensity of high frequency QRS components (HyperQ) during exercise was used as an index of ischemia. Logistic regression was used to assess incremental diagnostic value of HyperQ data over conventional ST analysis. **Results.** Moderate/severe MPI ischemia was found in 52 pts. HyperQ index was more sensitive than ST segment analysis (69% vs 48%, p=0.03) with similar specificity (84%). HyperQ index offered significant incremental diagnostic value over clinical and exercise test data (fig) and correlated to ischemia severity (R^2=0.8, p<0.001). **Conclusions.** HyperQ analysis provides a significant improvement over conventional ST segment analysis in detecting ischemia, and may thus aid in enhancing the non-invasive diagnosis of ischemic heart disease.