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Detection of Exercise-Induced Ischemia by Measurement of NT-proBNP

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Objective: Electrocardiographic exercise testing is the most widely used noninvasive screening test for coronary artery disease (CAD); however, both positive and negative predictive values for this procedure are hampered by relatively low sensitivity and specificity, leading to significant numbers of false negative and false positive studies. We hypothesized that NT-proBNP, a neurohormone secreted by cardiac myocytes in the ventricular wall in response to increased wall stress, would rise as a result of exercise-induced ischemia. If this were true, the enhancement of exercise testing by analysis of this plasma biomarker may offer significant improvement in the diagnostic accuracy of this procedure.

Methods: Fifty-two sequential patients with known CAD, normal ventricular function, and normal baseline NT-proBNP levels who were referred for exercise testing with radionuclide perfusion imaging were enrolled. Blood was drawn immediately before and within one minute after maximal symptom-limited exercise. Samples were centrifuged and the plasma separated, aliquoted, and frozen at -80^{o}C until ready for NT-proBNP determinations using the Roche 1010 assay. Exercise-induced ischemia was defined as the presence of reversible defects on radionuclide imaging. We compared the post-exercise change in NT-proBNP levels (delta BNP) in the subgroup that had reversible defects with the change in the subgroup without such defects.

Results: Median delta BNP was nearly 4-fold higher in the group with reversible defects by nuclide imaging than in the group without defects (14.5 vs. 4 pg/ml, p = 0.0006). Sensitivity and specificity of delta NT-proBNP for the detection of ischemia were 83% and 68%, compared to 26% and 46% for EKG alone.

Conclusions: Measurement of exercise-induced increase in NT-proBNP significantly improved the ability of the exercise stress test to detect inducible ischemia. Refinement of this technique may lead to a more accurate diagnostic test for the presence of CAD.