

Autonomic Imbalance during Exercise and Stress Testing Heart Attack and Stroke

Lisa Andrew*

Department of Cardiology, University of Helsinki, Yliopistonkatu 4, 00100 Helsinki, Finland

Abstract

Exercise stress testing (EST) has limited diagnostic power for obstructive coronary artery disease (CAD). The analysis of heart rate variability (HRV) may improve the sensitivity of CAD detection. The purpose of this study was to look at the relationship between short-term HRV and myocardial ischemia during EST, specifically the acceleration, maximum and recovery stages of heart rate (HR). HRV during EST was compared in 19 healthy (RHC) subjects and 35 CAD patients (25 with insignificant CAD (iCAD) and 10 with significant CAD (sCAD)). As a result, at the maximum stage, all HRV indices decreased and no significant differences between iCAD and sCAD were discovered.

Keywords: Diagnostic power • Myocardial ischemia • Heart rate

Introduction

Most HRV indices had smaller relative changes between maximum HR and recovery stage in the sCAD group than in the RHC group, particularly LF, the standard deviation of all normal to normal intervals (SDNN) and the standard deviation in the long axis direction of the Poincaré plot analysis (SD2). The LF recovery slope in the sCAD group was significantly lower than in the RHC group. The findings suggest that monitoring short-term HRV during EST can help patients with significant CAD understand their cardiovascular autonomic imbalance. The relative change in autonomic tone, particularly the delayed sympathetic recovery, could be used to help diagnose myocardial ischemia.

Description

Coronary artery disease (CAD), defined as a narrowing or obstruction of the coronary arteries, is the leading cause of death worldwide. As a result, early detection of CAD is critical in the primary prevention of cardiac death. CAD causes abnormal electrocardiograms (ECGs) and arterial waveforms [1-3]. Exercise accentuates the abnormal features of a CAD patient. In exercise stress testing, the effects of exercise on the heart can be monitored using an ECG for a subject running on a treadmill. As a result, EST is frequently used as a clinical approach to diagnosing CAD.

The diagnostic accuracy of EST, on the other hand, can be influenced by the patient's age, gender, or clinical characteristics. When compared to diagnostic imaging tests, EST has limited ability to rule in or rule out obstructive CAD. In practise, EST has a 68% sensitivity and a 77% specificity for detecting CAD. Because of the high false positive rate, positive EST results should be treated with caution. According to the 2019 European Society of Cardiology (ESC) Guidelines for Diagnosis and Management of Chronic Coronary Syndromes, EST should only be used to assess risk rather than to diagnose CAD. Heart rate variability (HRV), on the other hand, is a relevant

***Address for Correspondence:** Lisa Andrew, Department of Cardiology, University of Helsinki, Yliopistonkatu 4, 00100 Helsinki, Finland, E-mail: LisaAndrew99@gmail.com

Copyright: © 2022 Andrew L, This is an open-access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.

Received: 01 September, 2022, Manuscript No. jspd-23-86091; **Editor assigned:** 03 September, 2022, Pre QC No. P-86091; **Reviewed:** 16 September, 2022, QC No. Q-86091; **Revised:** 21 September, 2022, Manuscript No. R-86091; **Published:** 28 September, 2022, DOI: 10.37421/2684-4575.2022.4.133

marker reflecting cardiac variation by the sympathetic and vagal components of the autonomic nervous system. Autonomic dysfunction, which involves the development of cardiovascular disease or the progression of metabolic disease, is directly related to the morbidity and mortality caused by CAD [4,5].

Vagal-mediated HRV indices, for example, can be used to distinguish between healthy and diseased states and have been found to be inversely related to metabolic diseases such as diabetes, central obesity, dyslipidemia and hypertension. Long-term HRV was largely used to predict sudden cardiac death in the vagal-mediated HRV analysis. Short-term HRV is also used to improve risk assessment in low- to intermediate-risk individuals who do not have known CAD. HRV appears to be sensitive and responsive to acute stress, including exercise, as a dynamic marker while experiencing different loads.

Conclusion

However, the diagnostic potential of exercise-related HRV in diagnosing CAD remained controversial. It was discovered that HRV indices corrected by mean heart rate (HR) and respiratory frequency could improve the accuracy of EST by 76% to 95%. However, previous research found that the values of HRV indices alone or corrected with HR were insufficient for detecting CAD. As a result, the purpose of this study was to assess the relationship between short-term HRV and myocardial ischemia during EST, including the acceleration, maximum and recovery stages of heart rate.

References

1. Hein, H. O., P. Suadicani and F. Gyntelberg. "Physical fitness or physical activity as a predictor of ischaemic heart disease? A 17-year follow-up in the Copenhagen Male Study." *J Intern Med* 232 (1992): 471-479.
2. Min, Jiang-Yong, Yinke Yang, Matthew F. Sullivan and Qingen Ke, et al. "Long-term improvement of cardiac function in rats after infarction by transplantation of embryonic stem cells." *J Thorac Cardiovasc Surg* 125 (2003): 361-369.
3. Bersell, Kevin, Shima Arab, Bernhard Haring and Bernhard Kühn. "Neuregulin1/ErbB4 signaling induces cardiomyocyte proliferation and repair of heart injury." *Cell* 138 (2009): 257-270.
4. Welch, Sara, David Plank, Sandra Witt and Betty Glascock, et al. "Cardiac-specific IGF-1 expression attenuates dilated cardiomyopathy in tropomodulin-overexpressing transgenic mice." *Circ Res* 90 (2002): 641-648.
5. Kannel, William B., Albert Belanger, Ralph D'Agostino and Ilana Israel. "Physical activity and physical demand on the job and risk of cardiovascular disease and death: The framingham study." *Am Heart J* 112 (1986): 820-825.

How to cite this article: Andrew, Lisa. "Autonomic Imbalance during Exercise and Stress Testing Heart Attack and Stroke." J Surg Path Diag 4 (2022): 133.