



Diagnostic Testing: ECG Exercise and Sports

HEART RATE VERSUS RR INTERVAL RECOVERY AFTER EXERCISE: WHICH IS MORE PHYSIOLOGIC?

ACC Oral Contributions

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Authors: *Jeffrey J. Goldberger, Haris Subacius, Jason Ng, Northwestern University, Chicago, IL, USA*

Background: The RR interval (RRI) and heart rate (HR) are hyperbolically related ($HR \times RRI = 60000$). However, it is unknown which one is more appropriate for modeling the effects of the autonomic nervous system in the post-exercise recovery period.

Methods: 33 healthy volunteers (19 males, mean age 54 ± 7 years) underwent bicycle exercise testing on 4 separate days. During each test, the following were administered during exercise - 1) no drugs; 2) complete parasympathetic blockade (PB) with 0.04 mg/kg atropine; 3) complete β -adrenergic blockade (β B) with 0.2 mg/kg propranolol; 4) complete double blockade (DB). The nonautonomic components of HR and RRI recovery were modeled by the DB data. Parasympathetic and sympathetic effects were modeled as the absolute difference between the β B and DB and the PB and DB data, respectively, by minute during the first 10 minutes of recovery from exercise.

Results: See figure. Parasympathetic effects based on HR and RRI recovery showed significant ($p < 0.001$) increasing magnitude in early recovery consistent with the expected rapid parasympathetic reactivation following the end of exercise. Sympathetic effects based on HR and RRI recovery were discordant with the expected decrease with HR recovery and a paradoxical increase with RRI over time in recovery.

Conclusion: The results matched the physiologic processes of the autonomic nervous system when HR, but not RRI, was used. Further evaluation of the prognostic role of HR vs RRI changes is therefore needed.

