ABSTRACT

THESIS: Prevalence of abnormal heart rate acceleration in an asymptomatic, self-referred adult population

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Purpose: Little is known about the heart rate (HR) responses at the onset of exercise, at peak exercise, and recovery in apparently healthy men and women. The purpose of this study was to determine the prevalence of abnormal HR acceleration at the onset of exercise, define the HR acceleration profile, determine if traditional cardiovascular disease (CVD) risk factors are associated with abnormal HR acceleration, and identify whether abnormal chronotropic responses cluster with abnormal HR acceleration in an asymptomatic, self-referred, adult population. Methods: A retrospective examination of a symptom-limited maximal treadmill test was performed for participants of a university-based fitness program between 1990 and 2006. Records were analyzed for various HR responses from individuals (N=947) of both sexes who represented a broad range of age and fitness levels (mean VO$_2$: 32.9±9.4ml·kg$^{-1}$·min$^{-1}$). Abnormal HR acceleration at minute 1 and ⅓ total exercise time was defined as a HR increase from standing rest of ≤14 and ≤28 beats respectively. Results: The prevalence of abnormal HR acceleration at minute 1 and ⅓ total exercise time was 30.6% and 31.3% respectively. The mean HR increase
during the first minute and ⅓ total exercise time was 20.5 ± 10.3 and 33.7 ± 10.4 beats respectively. Abnormal accelerators had a significantly better CVD risk factor profile (lower systolic and diastolic blood pressure, BMI, total cholesterol, triglycerides, higher VO₂, and higher percent of regular exercise) than normal accelerators, despite consisting of a greater percentage of current smokers. Lastly, abnormal HR acceleration showed higher prevalence with abnormal HR recovery than with chronotropic incompetence. **Conclusions:** In the present study cohort, a lower HR increase at the onset of exercise was associated with a better CVD risk factor profile but the same differences were not seen at ⅓ total exercise time. **Key Words:** GRADED EXERCISE TEST, HEART RATE RESPONSE, AUTONOMIC NERVOUS SYSTEM