Tracking Cardiovascular Responses To Anticipation Of An Exercise Test In Cardiac Rehabilitation: A Preliminary Test

S.N. Fraser¹ and M. Lefebvre²
¹Athabasca University, ²University of Alberta

Abstract
Cardiovascular reactivity (CVR) refers to relatively high heart rate (HR) and blood pressure (BP) increases in the face of a mental stressor. CVR may be a concern for heart patients since it may precede ischemic events and CVR may be an indicator of relatively poor prognosis. Anticipation of an exercise tolerance test (ETT) results in rapid increases in HR and BP and has been used as a stressor in heart patient to study CVR. However, it is not clear how CVR changes associated with an ETT change after a course of cardiac rehabilitation (CR).

Hypotheses
• Enter cardiac rehabilitation and it is not known how these cardiovascular responses change as a patient goes through the course of CR.

Introduction
Strike and Steptoe (2003) concluded that “one third to one half of patients with CAD” (p. 12) experienced silent myocardial ischemia as a result of mental stress, regardless of the severity of the patient’s CAD (cf. Krantz et al., 1996). Further, the mental stressors reviewed by Strike and Steptoe mimicked stressors that one could expect to encounter in a typical day. Cardiovascular responses to mental stress is known as cardiovascular reactivity (CVR) and these responses are thought to precede ischemic events. Yet little CVR research has been conducted with patients entering cardiac rehabilitation and it is not known how these cardiovascular responses change as a patient goes through the course of CR.

Methods
Participants:
• Participants were 76 men (mean age = 60, SD = 10.4) and women (mean age = 61.4, SD = 10.9) at baseline and 23 men and women at follow-up.

Procedures:
Exercise tolerance test procedures
When the patient arrived for their ETT they were met in the waiting room and taken to an exam room for resting HR and BP measurements. Measures were taken by an automated cuff after the participant had been seated alone quietly for 5 minutes. The patient was then readied for an ETT and met in the exercise stress testing lab. Standing HR and BP measures were remotely taken after 1 and 3 minutes of standing on the treadmill immediately prior to beginning exercise.

Results
• Figures 1 and 2 show how HR, SBP, and DBP changed from resting to anticipation of the ETT.
• Anticipation of exercise resulted in significant increases (all p’s < .002) in CV parameters with an average CVR for baseline at 4.0 bpm, 16.6 mmHg, and 13.5 mmHg, respectively. CVR after a course of CR for HR, SBP and DBP were 4.3 bpm, 15.9 mmHg, and 9.2 mmHg (p < .001).
• Differences between baseline and post-CR CVR was significant only for the change in DBP (p = .05) which decreased from 15.5 mmHg to 9.2 mmHg (see Figure 3).

Conclusion
• Patients responded with a predictable increase in HR and BP in anticipation of an ETT before and after a course of CR. After CR, DBP increases in anticipation of an ETT were lower in magnitude than before CR. Future research should examine specific components of CR that may help reduce CVR.

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References