BHBI-Funded Research*

Abstract 1

Biofeedback in Coronary Artery Disease, Type 2 Diabetes, and Multiple Sclerosis

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Biofeedback-mediated stress management can be used to train patients to regulate their autonomic nervous system. Particularly in diseases where sympathetic activation has been shown to be excessive and parasympathetic activation insufficient, biofeedback may be a useful method for balancing autonomic nervous system input. Coronary artery disease, type 2 diabetes and multiple sclerosis are all diseases of increasing prevalence in the US population, and all are diseases where heart rate variability (HRV) has been shown to be decreased, suggesting an inappropriate balance of sympathetic/parasympathetic nervous system activation. We hypothesize that biofeedback-assisted stress management can be used to restore a healthy balance of autonomic activation in patients with these three diseases, and that less sympathetic and more parasympathetic input will result in altered symptoms of each disease, as well as enhanced quality of life. In this ongoing study, we are enrolling 180 patients, with 60 in each of the three disease groups, and randomizing them to receive eight sessions of biofeedback-mediated stress management or usual medical care. All participants, regardless of treatment group, receive an initial and final assessment of physiologic reactivity to three mental stressors and complete the Medical Outcomes Study 36-Item Short-Form Health Survey (SF-36), the Patient Health Questionnaire (PHQ-9), and the Generalized Anxiety Disorder 7-Item Scale (GAD-7). In addition to disease-specific markers, we are also measuring HRV, plasma norepinephrine (NE), plasma C-reactive protein (CRP), and plasma tumor necrosis factor alpha (TNF) in all patients before and after the biofeedback training period. Across all three groups of patients, we will test the hypothesis that biofeedback-mediated stress management will result in decreased sympathetic nervous system activity (as evidenced by changes in HRV and plasma NE) and increased parasympathetic nervous system activity (as evidenced by changes in HRV and the inflammatory markers CRP and TNF). The overall goal of the study is to demonstrate that, regardless of disease etiology, biofeedback training can effectively restore a healthy balance of autonomic nervous system input, retard disease progression, and significantly improve clinical status and quality of life.

* BHBI = Bakken Heart-Brain Institute

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