CARDIAC VAGAL CONTROL AS A PROSPECTIVE PREDICTOR OF ANXIETY IN WOMEN DiAGNOSED WITH BREAST CANCER

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Abstract

Cardiac vagal control, measured as by respiratory sinus arrhythmia (RSA), indexes individual differences in ability to regulate emotions and respond to environmental demands. Across the literature, low cardiac vagal control has been associated with state and trait anxiety as well as anxiety spectrum disorders. The present study examined the association between resting RSA and anxiety in a sample of 40 women diagnosed with stage 0, I, II, or III breast cancer. At an oncology clinic visit, two 5-minute resting electrocardiographic segments were recorded; RSA values averaged across segments were used in the analysis. Participants completed the Taylor Manifest Anxiety Scale (TMAS) at the initial visit and then again every three months. Data was provided by 106 female participants with stage 0, I, II, or III breast cancer who participated in the study. All participants were tested in conjunction with oncology clinic visits. Participants who were currently taking anxiolytic medications, undergoing cardiac-tropic chemotherapy regimens or taking medications that affect cardiac functioning were excluded from analyses. Additionally, only participants who filled out TMAS on at least 3 occasions were included in the analyses (min number of observations per subject = 3, max number of observations per subject = 5), leaving a final sample of 40 participants (Mean age = 53.5, SD = 9.4; Mean time since diagnosis = 4.5 months, SD = 4 months; mean = 0.5 months, max = 15.9 months).

Introduction

Within the framework of Polyvagal theory (Porges, 1995), cardiac vagal control, as measured by respiratory sinus arrhythmia (RSA), has been linked to regulation of emotion, attention, and communication. Data suggest that reduction in RSA is associated with anxiety-related phenomena. Several lines of research converge to indicate that low RSA is associated with clinical forms of anxiety as well as state and trait anxiety (Cohen & Benjamin, 2006; Friedman, 2007). Despite improvements in cancer treatments, being diagnosed with cancer remains a life-threatening event and cancer patients often experience emotional turmoil and symptoms of depression and anxiety immediately after the diagnosis (McGarvey et al., 1998). Data suggest that the first year post-diagnosis is especially stressful for women with breast cancer as they are faced with multiple stressors of breast cancer treatment and transitioning to survivorship or reentry phase (Stanton et al., 2005).

The present study investigated whether ability to regulate emotions, as indexed by RSA, is associated with ability to modulate anxiety in women coping with significant stressors of breast cancer diagnosis and treatment.

Method

Subjects

A total of 106 female participants with stage 0, I, II, or III breast cancer participated in the study. All participants were tested in conjunction with oncology clinic visits. Participants who were currently taking anxiolytic medications, undergoing cardiac-tropic chemotherapy regimens or taking medications that affect cardiac functioning were excluded from analyses. Additionally, only participants who filled out TMAS on at least 3 occasions were included in the analyses (min number of observations per subject = 3, max number of observations per subject = 5), leaving a final sample of 40 participants (Mean age = 53.5, SD = 9.4; Mean time since diagnosis = 4.5 months, SD = 4 months; mean = 0.5 months, max = 15.9 months).

Procedure

To record the ECG signal, 2 J Amplifier System (Poulso, WA) was used. Gel free Ag – AgCl electrodes were attached to the left and right wrist and the ground electrode was attached to the lower right forearm. A sample rate of 12 Hz was used to record the ECG signal. No instructions on how to breathe were given to the participants.

Two 5-minute resting ECG segments were obtained at the initial visit (T1). RSA values were averaged across two recording segments to produce an average baseline RSA value.

The present study investigated whether ability to regulate emotions, as indexed by RSA, is associated with ability to modulate anxiety in women coping with significant stressors of breast cancer diagnosis and treatment.

We predicted that after accounting for baseline level of anxiety, higher baseline cardiac vagal control, as indexed by RSA, will predict lower emotional adjustment at a 1-year follow-up and will influence the trajectory of change in anxiety over the ensuing year after the initial assessment.

Results

Consistent with the literature on RSA and anxiety in individuals free from cancer diagnosis (Friedman, 2007), higher RSA was associated with a beneficial trajectory in anxiety over time. Those participants with higher baseline RSA evidenced decrease in anxiety, whereas participants with lower baseline RSA appeared to be at a higher risk for stable or increasing anxiety during the first year after being diagnosed with breast cancer.

Two methods were used to investigate predictive power of RSA. Assessment of anxiety after a 1-year period, adjusted for baseline anxiety, produced comparable results to the assessment of change in anxiety at multiple time points, suggesting that RSA may indeed be an index of anxiety modulation in this sample of breast cancer patients.

RSA has been proposed to index emotion regulation and the future studies will need to establish how to factor smay influence the trajectory of change in breast cancer patients as well as in other high-stress/high-risk populations.

References


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