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Cognitive–behavioral stress management increases benefit finding and immune function among women with early-stage breast cancer

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Abstract

Objective: This study examined the effect of a cognitive–behavioral stress management (CBSM) intervention on emotional well-being and immune function among women in the months following surgery for early-stage breast cancer. **Method:** Twenty-nine women were randomly assigned to receive either a 10-week CBSM intervention ($n = 18$) or a comparison experience ($n = 11$). The primary psychological outcome measure was benefit finding. The primary immune function outcome measure was in vitro lymphocyte proliferative response to anti CD3. **Results:** Women in the CBSM intervention reported greater perceptions of benefit from having breast cancer compared to the women in the comparison group. At 3-month follow-up, women in the CBSM group also had improved lymphocyte proliferation. Finally, increases in benefit finding after the 10-week intervention predicted increases in lymphocyte proliferation at the 3-month follow-up. **Conclusion:** A CBSM intervention for women with early-stage breast cancer facilitated positive emotional responses to their breast cancer experience in parallel with later improvement in cellular immune function.
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Introduction

For years, psychologists have studied negative psychological states associated with the diagnosis and treatment of breast cancer [1,2]. Although the diagnosis and treatment of breast cancer can be stressful at a number of levels, there is evidence that effectively working through this crisis may have positive psychological effects [3–5]. Cancer patients have reported that the experience of having cancer has led to fortified personal resources and skills, stronger spirituality, closer relations with significant others, a clearer sense of purpose and changes in life priorities [6–11]. Tedeschi and Calhoun [12] suggest that individuals who have struggled with negative life challenges and developed creative solutions to them report that their struggles have had positive effects on their lives.

No intervention studies had demonstrated that psychological intervention might facilitate the process by which these positive psychological effects develop until the study by Antoni et al. [13]. In the Antoni et al. study, women with early-stage breast cancer who participated in a 10-week cognitive–behavioral stress management (CBSM) intervention reported increases in finding benefit from the cancer experience compared to the comparison group women [13]. We wondered if these positive changes might result in improved physical health.

How might positive psychological changes result in improved physical health? Epel et al. [14] propose a theoretical model where working through stressful experiences can change a person's appraisal of subsequent stressors from a sense of threat to a sense of challenge. This "toughening up" of the stress response renders the individual more resistant to future stressors. Resistance to future stressors could then lead to improved biological outcomes.

At this point, however, the literature offers only a hint that experiencing benefits and growth may have beneficial physical manifestations as well as psychological ones. One

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longitudinal study reported that HIV-positive gay men who were able to find meaning through bereavement of a partner or close friend had a slower rate of CD4 cell decline and had lower AIDS-related mortality at 2–3-year follow-up compared to men who did not find meaning [15].

Changes in immune function may be important for breast cancer patients. While these results must be interpreted with caution as causality has not been determined, there is provocative evidence that deficiencies in immune function, including poor in vitro lymphocyte proliferative response, are related to the course of breast cancer. For example, lymphocyte proliferation in response to autologous tumor antigen was shown to be a significant predictor of 13-year relapse free survival among 77 Stages I and II breast cancer patients [16]. In an earlier study with 142 breast cancer patients, the same group found that patients with a good lymphocyte response to PHA were more likely to have lymphocyte immunity against tumor antigens. Patients with lymphocyte immunity to tumor antigens were more likely to be long-term disease-free survivors [17]. There is also evidence suggesting that an increase in lymphocyte proliferation in response to PHA, measured preoperatively and 1-year postoperatively, is associated with a decreased rate of recurrence at 2-year follow-up among women with Stages I–III breast cancer [18].

The studies above all measured nonspecific mitogen (PHA) stimulation of lymphocyte proliferation. It would be interesting to measure in vitro proliferation in response to specific activation of the T cell receptor, CD3, because this type of stimulation is a closer approximation of the in vivo proliferation mechanism [19].

In sum, participating in a CBSM intervention while "working through" a life stressor such as the diagnosis of breast cancer has been shown to facilitate finding benefit in the cancer experience [13]. There is also reason to believe that finding benefit in a stressful experience could lead to improved immune function and health [15]; however, to the best of our knowledge, no studies have shown that a psychosocial intervention can enhance benefit finding in parallel with improving immune function. Immune function, including lymphocyte proliferation, may be associated with the course of breast cancer. Thus, it might be important if psychological interventions that improve psychological well-being also improve immune function among breast cancer patients.

The study reported here tested the effects of a 10-week CBSM intervention on benefit finding and lymphocyte proliferation in response to specific activation of the T cell receptor, CD3, among early-stage breast cancer patients in the months after surgery and adjuvant therapy. We hypothesized that (a) women participating in CBSM would show increases in benefit finding over the intervention period, and (b) in vitro lymphocyte proliferation to anti-CD3 would increase among women in the CBSM condition 3 months after the intervention (about 6 months postsurgery), after potentially confounding adjuvant treatments were completed. Finally, we hypothesized that (c) increases in benefit finding during intervention would predict increases in lymphocyte proliferation 3 months later.

Method

Design and procedures

This study was added to, and begun midway through, a larger, preexisting clinical trial examining the effects of a 10-week CBSM group intervention among women who had recently been treated for Stage I or Stage II breast cancer. Antoni et al. [13] have described this study in some detail. The present study was designed to test the effects of the CBSM group intervention on immune function among a subset of women ($N = 29$) from the larger trial. The women who participated in the present study were accrued in the following manner: At the time of initial contact for the larger clinical trial, women who agreed to participate were asked if they were interested in participating in an additional component of the study that would assess their immune system. Women who volunteered for the present study did not differ from the larger group on any demographic or medical variable (all P's $> .10$), except age. The mean age of the women who participated in the present study (47.52, S.D. = 6.39) was younger than the mean age of women in the larger study (51.95, S.D. = 9.77) [$t(108) = 2.27$, $P < .05$].

Initial self-report psychosocial assessment was conducted 4–8 weeks after surgery and immediately prior to randomization (T1). Participants were then randomly assigned to begin either the 10-week intervention condition or the comparison condition. Psychosocial assessment was repeated 10 weeks later (T2), and again 3 months after that (or about 6 months postsurgery, T3). Change in benefit finding was measured from T1 to T2 to capture the proximal effects of the 10-week intervention among intervention women [13]. Immune function assessment was conducted at T1 and T3 to avoid the confounds of adjuvant therapy. This delayed immune function assessment design has precedent in the study by Fawzy et al. [20] where malignant melanoma patients participating in a 6-week psychosocial intervention had blood drawn for immune function assessment 6 months after the completion of the intervention. Therefore, the primary outcome variables for benefit finding were analyzed at T1 and T2, while the outcomes for immune status were analyzed at T1 and T3.

Participants

Data reported here come from 18 women in the intervention condition and 11 women in the comparison condition. Seventeen additional women (12 intervention and 5 comparison group) had blood drawn at some point in the study but did not have immune data at both T1 and T3. The reasons for lack of data at both T1 and T3 included

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