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Pilot of Stress Reduction Strategies for Patients After a Coronary Event

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Background: Chronic psychosocial stress has become increasingly recognized as a significant risk factor for coronary artery disease (CAD). Interest in stress as a risk factor for cardiovascular disease has surged following the INTERHEART Study findings comprising results from over 52 countries and over 30,000 patients revealing that psychosocial stress ranked second only to lifetime smoking as a risk factor for major cardiac events.

Purpose: This study was designed to assess the effects of two interventions selected for their potential to impact the stress responses of men and women with documented heart disease and to improve subclinical markers of CAD. The effects of these interventions on markers, and the potential benefits of a Web site to facilitate stress reduction, were evaluated to build a foundation for a planned randomized clinical trial (RCT) submission to NHLBI.

Methods: From the cardiac clinic at a large tertiary care institution in the Midwest, 21 patients were recruited and assigned to one of three groups of 8-week intervention:

(1) a mindfulness-based stress reduction (MBSR) program (4 men and 7 women)
(2) a women-only weekly psychoeducational support group (SG) (6 women)
(3) a stress reduction Web site (4 men) with no meetings except an introduction and weekly site-use logs.

The following measures were assessed at baseline and after 8 weeks of intervention participation: subjects' stress reactivity (NHLBI protocol), including measures of salivary cortisol and amylase; psychosocial measures (Spielberger's state anxiety, ENRICHD emotional support, PSS for perceived stress, SF-12 PCS and MCS, CES-D for depression, and Cantril Ladder); and serum biomarkers including BNP, HS-CRP, endothelin, cortisol, catecholamines, interleukin-6, and platelet reactivity (BL only). Patients' perceptions of program effectiveness and quality were assessed at 8 weeks and psychosocial measures were again assessed at 6 months (data not included). The feasibility, safety, and efficacy of obtaining laboratory measures of endothelial function and structure were also assessed in a small subset of participants; measures included flow-mediated dilation, reactive hyperemia-peripheral arterial tone, and pulse-wave velocity and analysis.

Results: The intervention programs were completed by 90% of subjects. One male patient died of noncardiac causes (MBSR group), and one other man dropped out of the MBSR group. Analysis of baseline to 8-week follow-up data was done across the whole sample for stress reactivity and by the whole sample and by group for the other variables. Overall, for all participating subjects, depression, physical function, perceived quality of life, and perceived stress improved; however, there were no significant pre-to-post changes across groups in the serum biomarkers. The SG had 84% attendance over time; in this group, the psychological and biological variables showing pre-to-post improvement included the ENRICHD support scale, SF-12 PCS, and serum cortisol (P = .026, .043, and .043, respectively). In the MBSR group, HS-CRP, PSS, and the SF-12 physical component improved from baseline (P = .017, .046, and .021, respectively). Two men dropped out of the Web-based group; in this group there were pre-to-post improvements in PSS, CES-D, STAI, and ENRICHD, but no statistical analyses were done since only 2 subjects remained in the group. Across all groups, the quality and helpfulness of the intervention programs were assessed uniformly positively. The stress reactivity protocol was successful in inducing stress, with elevations in blood pressure and heart rate as well as an increase in salivary amylase in 80% of subjects.

Conclusions and Recommendations: Participation in the SG was associated with improvement in emotional support and physical functioning and reductions in serum cortisol. The MBSR program was helpful in improving perceived stress, physical functioning, and inflammatory markers. The stress reactivity protocol was effective in inducing the stress response and elevations in heart rate, blood pressure, and salivary amylase, despite the use of beta-blockers by some patients. Laboratory evaluations were assessed to be feasible and safe, and they generated fully meaningful/interpretable data. Survey, serum, and laboratory measures that were judged sensitive to stress reduction interventions in this small pilot will be employed in a larger pilot, and strategies to increase the use and effectiveness of the Web site will be employed in preparation for a larger pilot and subsequent RCT.

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