Laughter therapy cardiac rehabilitation in patients with stable coronary artery disease: a randomized clinical trial
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Background: Different non-pharmacological strategies have been studied in patients with stable coronary artery disease (CAD). However, the potential benefits of laughter therapy cardiac rehabilitation (LTRehab) for patients with stable CAD have not been fully investigated, especially through randomized clinical trials (RCT).

Purpose: This study aimed to evaluate the impact of LTRehab on functional capacity, endothelial function, and inflammatory biomarkers in CAD patients.

Methods: This is a randomized, parallel-design, examiner-blinded, controlled clinical trial conducted from August 2016 to December 2020. Peak oxygen uptake (VO2peak) and flow-mediated dilation (FMD) were measured using maximal cardiopulmonary exercise testing (CPET) and ultrasound, respectively. Inflammatory biomarkers, including interleukin (IL)-6, IL-10, tumor necrosis factor (TNF)-alpha, vascular cell adhesion molecule (VCAM), and intercellular adhesion molecule (ICAM), were measured. Thirteen patients were assigned to the LTRehab group, who watched two self-selected comedy sessions per week, and thirteen patients to the control group (CG), who watched two neutral documentaries (24 movies per group). Generalized Estimated Equations were used to identify the main factors of Group, Time, and the interaction between Group*Time. The Bonferroni correction was applied to identify differences. P < 0.05 was considered statistically significant. This study was approved by the Institutional Review Board (protocol No. 13-0124). Furthermore, it was conducted in accordance with Resolution no.466/12 of the National Health Council.

Results: A total of 26 CAD patients (69% male; mean age of 63.58 ± 9.97 years) were included in the study. There was a significant interaction between Group*Time (P<0.01) for VO2peak (LTRehab group: 19.09±0.85 to 21.06±1.00 vs. CG: 23.21±1.74 to 22.24±1.96 mL.kg-1.min-1). There was a mean difference of 1.98±0.45 between times for the LTRehab group with significant Bonferroni correction (P<0.01), but not for the control group (-0.96±0.75, P=0.20). Nitroglycerin-mediated vasodilation (endothelium-independent function) and VCAM showed significant differences in the Time factor (P = 0.02 and P = 0.05, respectively). All CPET tests reached maximal criteria (R>1.10).

Conclusion: This is the first RCT to evaluate the impact of LTRehab on CAD patients, showing an increase in VO2peak and improvements in endothelium-independent function and inflammatory biomarkers. LTRehab may constitute an effective form of cardiac rehabilitation in this patient population.