Exercise and Heart Rate Variability in Cancer Patients: A Systematic Review

Farajivafa V1, Khosravi N1, Molanouri Shamsi M1, Agha-Alinejad H1*

1 Department of Physical Education and Exercise Sciences, Tarbiat Modares University, Tehran, Iran

Abstract

Introduction: Heart rate variability (HRV) is negatively associated with mortality. Decrease in HRV is common in cancer patients. The association between HRV and general survival in cancer patients has made HRV a valuable biomarker for evaluation of the disease prognosis. Exercise is considered an interventional strategy to improve various outcomes in cancer patients. The present paper provides a descriptive review of the literature regarding the effect of exercise interventions on HRV in cancer patients.

Methods: A systematic search was performed according to the Preferred Reporting Items for Systematic Reviews and Meta-analyses (PRISMA) guidelines in PubMed and Google Scholar, from inception since 1950 till October 15, 2018. The terms exercise, training, cancer, neoplasms, heart rate variability, and HRV were used in the search. Eligible studies were those trials using structured exercise intervention and having untrained adult cancer patients. Only English-language papers were included in the review.

Results: Eight studies were included in the review. Of the various HRV parameters, 2 in the time domain (SDNN and RMSSD) and 3 in the frequency domain (LF, HF, and LF/HF) were commonly reported in the studies. Exercise intervention increased SDNN, RMSSD, and HF in all the studies, although the difference did not reach statistical significance in some cases. The results regarding LF and LF/HF were not consistent.

Conclusion: In general, exercise intervention can improve HRV in cancer patients. It is suggested that SDNN, RMSSD, and HF parameters be used in the evaluation of exercise effects on HRV because these parameters a) have prognostic value and b) more suitably reflect the effects of exercise training in these patients.

Keywords: Heart Rate Variability, Exercise Training, Cancer