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Sedentary Behavior Is Associated with Impaired Cardiac Parasympathetic Modulation in Patients with Stage III–IV Colorectal Cancer: A Pilot Study

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Colorectal cancer (CRC) and its treatment are frequently associated with autonomic nervous system (ANS) dysregulation, characterized by alterations in heart rate variability (HRV) and insufficient levels of physical activity (PA). This cross-sectional, single-center observational study (Phase 1) evaluated patients with Stage III–IV CRC from the Abdominal Surgery Service of Erasto Gaertner Hospital over a 9-month follow-up period. We investigated the association between objectively measured PA, assessed via accelerometry (ActiGraph GT9X), and HRV temporal-domain parameters derived from RR interval analysis (Polar V800). Eight patients of both sexes were included, with a mean age of 51 ± 7.7 years. Accelerometry provided data on Sedentary Time (ST) and Moderate-to-Vigorous Physical Activity (MVPA). ST ≤ 99 counts/min and MVPA ≥ 1952 counts/min were considered, with analyses conducted for total time, weekdays, and weekends. The median ST was 387 (217–468) minutes per day, representing 67.2% ± 9.9% of wear time. Median MVPA was 74 (28–195) minutes per day, corresponding to only 1.7% ± 2.1%, indicating a low overall PA level. The mean resting heart rate (HR) was 77 ± 11.2 bpm. A strong negative correlation was found between ST and RMSSD (root mean square of successive differences), a marker of parasympathetic activity ($r = -0.74$; $p = 0.005$), suggesting that higher sedentary time is associated with poorer parasympathetic autonomic modulation. No significant associations were observed between MVPA and HRV parameters.In conclusion, the high sedentary time observed in patients with CRC is strongly associated with reduced cardiac parasympathetic modulation. These findings underscore the importance of interventions aimed at reducing sedentary behavior to improve autonomic regulation and potentially enhance prognosis and quality of life in this population.

Keywords

colorectal cancer; physical activity; sedentary behavior; heart rate variability.

Conflict of Interest & Ethical Approval

yes

Abstract submitters declaration

yes

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