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THE EFFECTS OF HEART-RATE VARIABILITY BIOFEEDBACK ON LEVELS OF THE TUMOR MARKER CEA IN METASTATIC COLON CANCER: A PILOT CONTROLLED STUDY

Yori Gidron, PhD, Medicine and Pharmacy, Free University of Brussels - VUB, Brussels, Belgium, Marijke De Couck, PhD, Mental Health and Wellbeing, Medicine and Pharmacy, Free University of Brussels - VUB, Brussels, Belgium, Inge De Leeuw, MSc, Medicine and Pharmacy, Free Univ of Brussels - VUB, Brussels, Belgium, Kees Blase, MSc, Heartfocus, Heartfocus, Loosdrecht, Utrecht, The Netherlands, Leen Vanacker, MD, Oncology, UZ Brussels Hospital, Brussels, Brussels, Brussels, Belgium

Background: High activity of the vagus nerve, indexed by heart-rate variability (HRV), predicts better prognosis in many cancers. Furthermore, in several studies, an intact vagal nerve causes less metastasis. This pilot study tested the effects of vagal activation via HRV-biofeedback (HRV-B) on levels of a tumor marker in patients with metastatic colon cancer.

Methods: This preliminary pilot study used a matched-controlled pre-post design. Three patients with stage 4 colon cancer performed HRV- B for approximately 20 min/day, during 3 months. They were guided to increase their vagal nerve activity via paced slow breathing with an HRV-B device. These patients were matched with three others on 1. Cancer type; 2. Cancer stage; 3. Type of chemotherapy treatment; 4. Baseline CEA (the tumor marker of colon cancer). Data were extracted from medical files. CEA level was the main outcome variable.

Results: Levels of CEA did not change in controls, while they declined in the HRV-B condition, a difference approaching statistical significance at 3 months ($p = 0.055$). Patients in the HRV-B condition were able to perform this self-intervention daily and it appeared feasible.

Conclusions: The results of this preliminary matched-controlled pilot study suggest that vagal nerve activation via HRV-B is feasible and may possibly have promising effects on tumor burden in colon cancer. However, before claiming any positive effects with certainty, this requires testing HRV-B in a large randomized controlled trial, which is planned.