

DOI: 10.5281/zenodo.1465926

UDC: 616.12-008.313.2-073.97+612.172.2



New approach to heart rate variability analysis based on cardiophysiological biomarkers

*¹Ludmila Sidorenko, MD, PhD Applicant; ²Ivan Diaz-Ramirez, MD, PhD;
¹Victor Vovc, MD, PhD, Professor; ²Gert Baumann, MD, PhD, Professor

¹Department of Physiology, Nicolae Testemitsanu State University of Medicine and Pharmacy
Chisinau, the Republic of Moldova

²Department of Cardiology and Angiology, Charité University Clinic, Berlin, Germany

*Corresponding author: ludmila.sidorenko@usmf.md. Received September 10, 2018; accepted October 22, 2018

Abstract

Background: The heart rate variability (HRV) analysis is a well-known method demonstrating its value over the years in different medical fields. However, it still has its known limitations.

Material and methods: The new approach to HRV analysis is based on a complementary HRV standard analysis with new cardiophysiological biomarkers. The biomarkers are assessed on cardiogram obtained by a 5-minute ECG recording using a specialized hardware (Polyspectrum-HRV-device, Neurosoft).

Results: A possible applicative value of the biomarkers is shown on examples of how a prognosis for recurrence of atrial fibrillation (AFib) could be made. When in a rest-state cardiogram are observed LF drops and are followed by a pathological counterregulation, prognostically, recurrence of atrial fibrillation is expected. When in a cardiogram LF drops are observed and are followed by a physiological counterregulation, prognostically, sinus rhythm is expected. Physiological background of the biomarkers: increased central modulation of the heart in rest state of a patient, a sympathetic overflow of the heart in calm state and insufficiency of compensatory parasympathetic counteractivation. Limitations of the paper: this is a methodological paper without description of patients. This paper will be followed by a clinical paper in which we are going to describe the validation of these cardiophysiological biomarkers on patients with AFib.

Conclusions: Complementary to the standard HRV analysis, cardiophysiological biomarkers should be assessed: LF drops and HF counterregulation could be used for prognosis construction in cardiology.

Key words: cardiophysiological biomarkers, heart rate variability.