Physical vascular therapy affects heart rate and heart rate asymmetry in patients with coronary heart disease

László Hejjel¹, Zita Kreska², Balázs Németh², Zénó Ajty¹,²

¹Heart Institute, University of Pécs, Pécs, Hungary
²Zsigmondy Vilmos SPA Hospital, Harkány, Hungary

Methods:
- Written informed consent, Regional Ethics Committee University of Pécs
- n=22 chronic ischemic heart disease patients, with previous intervention
- 59.8±8.6 years, 8 female
- Regular medication not ceased
- Inward cardiac rehab. with 9x20 min physical vascular therapy
- HRV and HRA analysis on the first treatment
- III. Generation BEMER (B.Box Professional with B.body Pro applicator)

- 15 min postural adaptation in supine position prior to recording
- Acquisition from 8AM to 10AM (diurnal influences)
- High resolution ECG on the first treatment: right before start, right after start, before end, right after finishing
- 5x6 min records by PIC18F46J50 microcontroller-based, battery-powered handheld data acquisition system (developed by LH)
- Off-line analysis by ECGDet v.2.1 (LH), Varian v.2.2 (LH) and MS Excell with StatistiXL package: MeanRRI, SDNN, RMSSD, Guzik and Porta indices
- Non-invasive blood pressure in the mid-portion of each epoch
- Average breathing frequency by FFT (Varian v.2)
- Friedman-test (p<0.5), post hoc Wilcoxon-test with Holm-Bonferroni correction

Results**:

Conclusions:
Physical vascular therapy (BEMER) can influence autonomic regulation of the heart rate
- MeanRRI: sign. increase (bradycardia) during treatment
- SDNN: tendenciously elevation during and after treatment
- Guzik index: sign. transient increase at the begin of treatment
- Novel result: the systemic actions of BEMER
- Increased HRV can be a beneficial cardiological end-point

Mechanism of autonomic actions
- RMSSD no change → no vagus actions
- Heart rate↓ and SDNN elevation → sympathetic↓
- Increased peripheral arteriole and venule pulsation
- Vertebral and/or other ganglia
- Direct actions on brain stem (vegetative nuclei, FR)

Further investigation is needed
- Record more signals (breathing, plethysmogram, SO₂, etc.)
- Higher volume of patients and healthy volunteers

Funding: the presenter’s participation on ESM-EVBO 2019 was sponsored by Bemer Int. AG, Thies, Liechtenstein.

www.microcirculation.tips