Sažetak sa skupa / Meeting abstract

Utjecaj srčane frekvencije na reproducilnost varijabilnosti srčanog ritma

Heart rate influences reproducibility of heart rate variability

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Varijabilnost srčanog ritma (HRV) izračunata iz RR-intervala u inverznom je odnosu sa srednjom vrijednosti frekvencije srca (HR). Međutim, matematičkim modifikacijama može se pojačati, oslabiti ili čak promijeniti smjer ove povezanosti. Cilj ove studije je bio istražiti utječu li takve izmjene na poboljšanje reproducibilnosti HRV.

Analiza je izvršena na seriji od 948 RR-intervala (svaki se sastojao od 512 intervala) od 24 zdrava dobrovoljca (14 muškaraca; srednja dob SD 31,1±10,3 godina) u sjedećem položaju dva puta dnevno u isto vrijeme ujutro (do 10 sati) i

Heart rate variability (HRV) calculated from RR-intervals is inversely dependent on average heart rate (HR). However, by mathematical modifications one may strengthen, weaken or even inverse this dependence. The aim of the study was to explore if such modifications improve reproducibility of HRV.

The analysis was performed on 948 RR-interval series (each consisted of 512 intervals) taken from 24 healthy volunteers (14 men; mean age SD 31.1±10.3 years) in a sitting position twice daily at the same time in the morning (before

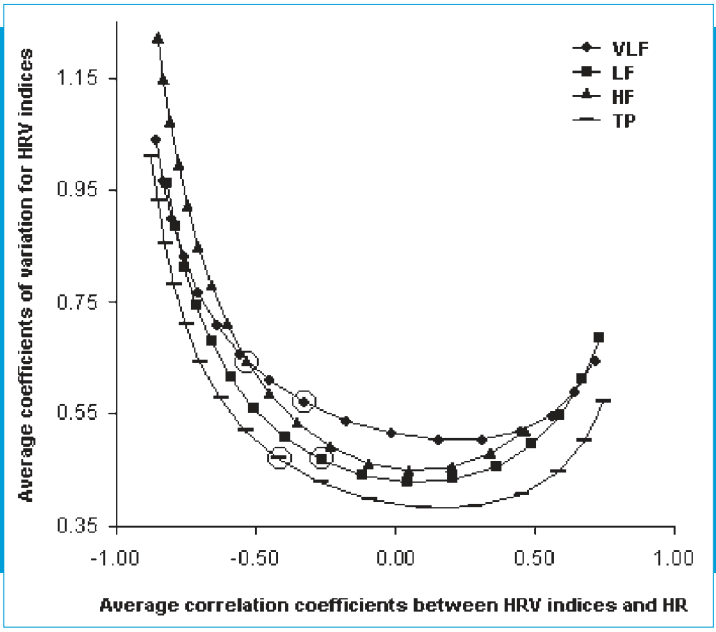

Figure 1. *Relationship between average values of coefficients of variation for spectral HRV indices and their correlation coefficients with HR are shown. The indices presenting the lowest dependence on HR (i.e. correlation coefficients close to zero) exhibit the best reproducibility (i.e. the lowest coefficients of variation). To facilitate visualization, points of the respective HRV indices are connected with lines - the circles correspond to standard HRV indices. Coefficients of variation for respective HRV indices significantly differ, p<0.00001 (Friedman ANOVA test).*

uvečer (nakon 18 sati) tijekom 30 dana (39,5±2,3 snimaka/osoba). Procijenjeni su sljedeći HRV spektralni indeksi, tj. vrlo niske frekvencije (VLF), niske frekvencije (LF), visoke frekvencije (HF) i ukupna snaga (TP). Korištenjem matematičkih izmjena, izračunato je 17 klasa indeksa s različitim povezanostima s HR. Njihovi prosječni koeficijenti korelacije s HR (pojedinačno za svaku klasu) su iznosili: 0.66, 0.58, 0.48, 0.36, 0.22, 0.06, -0.1, -0.25, -0.39*, -0.5, -0.59, -0.66, -0.72, -0.76, -0.8, -0.83, -0.85 (prosječni koeficijent korelacije za klasu sa standardnim HRV indeksima označen je s *). Za usporedbu promjenjivosti, izračunati su koeficijenti varijacije (CV) za svaku HRV kod svakog pacijenta.

Slika prikazuje prosječan CV u odnosu na prosječne koeficijente korelacije za određeni indeks. HRV indeksi koji predstavljaju najnižu ovisnost o HR (tj. koeficijente korelacije blizu nule) pokazuju najbolju obnovljivost (tj. najmanji CV).

Zaključno, HR utječe na obnovljivost HRV i isključivanje utjecaja HR na HRV poboljšava obnovljivost spektralnih HRV indeksa.

Ključne riječi: varijabilnost srčanog ritma, frekvencija srca, RR-interval.

10 a.m.) and evening (after 6 p.m.) over 30 days (39.5±2.3 recordings/person). The following HRV spectral indices were estimated, i.e. very low frequency (VLF), low frequency (LF), high frequency (HF) and total power (TP). Using mathematical modifications, 17 classes of these indices with different association with HR were calculated — their average correlation coefficients with HR (for each class respectively) were: 0.66, 0.58, 0.48, 0.36, 0.22, 0.06, -0.1, -0.25, -0.39*, -0.5, -0.59, -0.66, -0.72, -0.76, -0.8, -0.83, -0.85 (the average correlation coefficient for the class with standard HRV indices is marked with *). To compare the reproducibility, coefficients of variation (CV) were calculated for each HRV index for each patient.

Figure shows average CV plotted against average correlation coefficients for a given index. The HRV indices presenting the lowest dependence on HR (i.e. the correlation coefficients close to zero) exhibit the best reproducibility (i.e. the lowest CV).

To conclude, HR influences HRV reproducibility and the exclusion of HR impact on HRV improves the reproducibility of spectral HRV indices.

Keywords: heart rate variability, heart rate, RR-interval.

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