

Letter to the Editor

Novel heart rate turbulence parameters

Dear Editor,

Heart rate turbulence (HRT) is the return of heart rate to equilibrium after a premature ventricular contraction (PVC). It consists of a brief speed up period in heart rate, followed by a slow decrease back to the baseline rate. The concept of HRT was introduced to the medical community by Schmidt et al in 1999. While studying PVC characteristics researchers had noticed that heart rate seemed to speed up after a PVC. Since, then, HRT has been investigated in a variety of clinical conditions. In their well written manuscript Song et al investigated HRT in patients with masked hypertension (MH), essential hypertension (EH) and white-coat hypertension (WCH). Compared to normotensive patients they found statistically significant lower HRT parameters in all hypertensive patients¹.

Heart rate turbulence is a recently defined index of heart rate variability. Classically there are two major HRT parameters. Turbulence onset (TO) measures whether or not there is a brief tachycardia in the average of two normal heart beat intervals after, compared with before the PVC. Second parameter is Turbulence slope (TS) which measures the degree to which there is a slower oscillation in heart rate after the PVC. Clinical trials such as the EMIAT and the MIPP showed that decreased TO and TS had strong predictive value for mortality². Besides these there are other adjunctive parameters of HRT validated in various clinical studies³.

Turbulence dynamicity quantifies the relationship between turbulence slope and underlying heart rate. Turbulence frequency decrease measures HRT in the frequency domain. Turbulence timing is the first beat number of the 5-beat RR sequence giving the maximum regression slope. Turbulence jump is a parameter which quantifies the maximum difference between adjacent RR intervals⁴. Incorporating novel HRT parameters in this study would render the results more accurate and precise.

Conflict of Interest

The Authors declare that they have no conflict of interests.

References

- 1) SONG CL, ZHANG X, LIU YK, YUE WW, WU H. Heart rate turbulence in masked hypertension and white-coat hypertension. *Eur Rev Pharmacol Sci* 2015; 19: 1457-1460.
- 2) SCHMIDT G, MALIK M, BARTHEL P, SCHNEIDER R, ULM K, ROLNITZKY L, CAMM AJ, BIGGER JT JR, SCHÖMIG A. Heart-rate turbulence after ventricular premature beats as a predictor of mortality after acute myocardial infarction. *Lancet* 1999; 353: 1390-1396.
- 3) WATANABE MA. Heart rate turbulence: a review. *Indian Pacing Electrophysiol J*. 2003; 3: 10-22.
- 4) WATANABE MA, SCHMIDT G. Heart rate turbulence: a 5-year review. *Heart Rhythm* 2004; 1: 732-738.

U. Kucuk¹, H. Olgun Kucuk², O. Uz¹, M. Yalcin¹, Z. Isilak¹

¹Department of Cardiology, Gulhane Military Medical Academy, Haydarpasa Training Hospital, Istanbul, Turkey.

²Department of Cardiology, Siyami Ersek Thoracic and Cardiovascular Surgery, Training and Research Hospital, Istanbul, Turkey.