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## Analysis of heart rate variability seems to be one step ahead of cardiac reflex tests for investigating cardiovascular autonomic neuropathy

To the Editor,

We read with great interest the paper by Javady et al. (1) entitled "Cardiovascular autonomic neuropathy in rheumatoid arthritis assessed by cardiovascular autonomic function tests: A cross-sectional survey" published as Epub Ahead of print in *Anatol J Cardiol* 2015; 15: 722-6. They aimed to investigate cardiovascular autonomic neuropathy (CAN) by cardiac reflex tests (CARTs) in patients with rheumatoid arthritis and reported no CAN in these patients.

CAN is defined as an impairment of cardiovascular autonomic control in the absence of other reasons causing dysautonomia. Although CAN has been considered as an important cause of morbidity and mortality in patients with diabetes mellitus since the 1970s, it has recently been shown that CAN has a prognostic importance for some diseases such as myocardial infarction and sudden cardiac death (2, 3).

The Toronto Consensus reported the five most sensitive and specific methods [heart rate variability (HRV), baroreflex sensitivity, muscle sympathetic nerve activity, catecholamine plasma level, and cardiac sympathetic mapping] to diagnose CAN (2, 3). The presence of CAN can be established with two or more abnormal tests. However, these tests except HRV are not easy to perform. These days, cardiovascular autonomic reflex tests (CARTs) demonstrating RR interval variability beat-to-beat which is experimentally induced and HRV parameters (time- and frequency-domain methods showing spontaneous RR variability) are accepted methods in clinical practice (2, 3).

CART's demonstrate HRV alteration during four maneuvers including (I) deep breathing, (II) Valsalva, (III) orthostatic test, and (IV) orthostatic hypotension and indicated in the autoimmune autonomic neuropathy. The first three maneuvers predominantly investigate the parasympathetic activity, and the last one determines the sympathetic tonus in contrast to knowledge given by Javady et al. (1) in the article.

HRV analysis described as RR interval variability beat-to-beat is a valuable non-invasive method for the evaluation of autonomic dysfunction and might be affected by various factors (4, 5). In the study by Javady et al. (1), it is very difficult to state no CAN in patients with rheumatoid arthritis without considering influential factors on HRV such as body weight, body mass index, insulin resistance, and blood

lipid levels. We supposed it is necessary to present the data showing no statistically significant difference between the patients and control subjects with regard to influential factors.

Finally, the international Toronto Consensus supports the spectral analysis of HRV beyond CARTs, which are currently accepted as the gold standard (2). We think that the presence of CAN in patients with rheumatoid arthritis is shown with the spectral analysis of HRV as well as the reflex tests used in the study by Javady et al. (1).

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