

Issues related to reliability of HRV analysis and effect of spontaneous saliva swallowing on HRV

To the Editor,

The aim of this letter is to emphasize some of the most important factors that may affect the reliability of heart rate variability (HRV) analysis and to share the initial findings of our recent study on the effects of spontaneous saliva swallowing on HRV and the reliability of HRV analysis.

The reliability of HRV analysis is controversial (1). Despite this, more than 28,000 papers related to HRV have been published in SCI. Some of these have been written on the methodology and usage fields of HRV analyses, while some have been examined possible clinical applications. Comprehensive studies have shown that diminished HRV causes mortality and morbidity, and these studies have increased the clinical importance of HRV analysis. However, a significant number of studies have not considered the factors that could affect the reliability of their studies.

It has been shown that short-term HRV changes with many factors such as respiratory parameters, speech, prandial state, surrounding sounds, postural stress or physical activities, and emotional state. The reliability of HRV analysis can be increased by various measures. Signal recording should be performed in a quiet and calm environment in the resting position, and the subjects should not be speaking. Records should be taken 3–4 h after the last meal of the subjects. It will be useful to ensure that subjects do not breathe quickly or slowly during recording; if possible, paced breathing can be used.

During our previous studies, we have observed that HRV mostly follows respiratory movements with a small phase difference (2, 3). However, in some signal regions on the tacho-

gram, we encountered sudden changes such as tachycardia that do not conform to this general finding. After realizing that these changes are caused by swallowing, we began to investigate the effects of swallowing on HRV. We came across only a few studies on the effects of swallowing on HRV, most of which were case studies. Recently, it has been reported that voluntary swallowing changes some HRV parameters (stdRRR, LF, and HF power) significantly even in healthy people (4) and effortful swallowing increases LF power and the LF/HF ratio (5).

In our recent research, we have seen that spontaneous saliva swallowing changes some short-term HRV parameters significantly in even healthy people. Our study has also shown that the saliva swallowing rate can vary greatly from person to person (0.4–2.2 swallows/min). Using in-class correlation analysis, we have also shown that spontaneous saliva swallowing reduces the reliability of HRV analysis.

Through detailed research, we have found only two studies in the literature have excluded the signal region affected by swallowing from their analysis. Therefore, it can be said that the effect of swallowing on HRV analysis has been largely ignored in the literature. In our opinion, swallowing-affected signal parts should not be included in HRV analysis. Alternatively, a signal processing method for elimination of the effect of swallowing on HRV analysis can be used.

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