

**LETTER**

# Heart rate variability analysis and weaning from mechanical ventilation: lessons from exercise physiology

Andry Van de Louw

See related research by Huang *et al.*, <http://ccforum.com/content/18/1/R21>

In the previous issue of *Critical Care*, I read with interest the article by Huang and colleagues, who suggested that heart rate variability (HRV) changes might predict the success of ventilator weaning [1]. Although this perspective is attractive, a methodological issue must be highlighted.

The fast Fourier transform, as used by the authors to assess HRV, produces a spectrogram of power spectral density characterized by two peaks of variability - low frequency and high frequency (HF) - the latter of which is centered at the respiratory rate [2,3]. The recommendation of the Task Force [4] to use the range of 0.15 to 0.4 Hz (9 to 24 respirations per minute) to compute HRV in the HF band assumes that this range will include the respiratory rate, which is true in most clinical situations. However, in more extreme conditions, like heavy exercise, the actual respiratory rate may be out of this range, and therefore most studies on HRV during exercise used a range from 0.1 to 0.8 (or even 1) Hz to compute HRV in HF [5,6]. Likewise, patients undergoing weaning from mechanical ventilation can be tachypneic; the authors used a respiratory rate as high as 35 respirations per minute as a criterion for a failed spontaneous breathing trial (SBT), and such respiratory rates are obviously outside the range (0.15 to 0.4 Hz) chosen to compute HF HRV. We suggest that, in patients failing an SBT or extubation, respiratory rate may increase and shift the HF peak of HRV toward the right of the spectrogram, above 0.4 Hz, mistakenly decreasing the HF HRV if computed in the range of 0.15 to 0.4 Hz. This might account for the lack of difference in HF HRV between successful/failed weaning, while a difference in total power was observed. I believe that future studies should take this methodological issue into consideration.

**Abbreviations**

HF: High frequency; HRV: Heart rate variability; SBT: Spontaneous breathing trial.

**Competing interests**

The author declares that he has no competing interests.

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Correspondence: [avandelouw@hmc.psu.edu](mailto:avandelouw@hmc.psu.edu)  
Division of Pulmonary and Critical Care Medicine, Penn State Milton S Hershey Medical Center, 500 University Drive, Hershey, PA 17033, USA