Abstract

Introduction: The Finometer records the beat-to-beat finger pulse contour and is the only instrument that has been recommended by the American Heart Association for research studies assessing short-term changes of blood pressure and its variability. Variability measured in the frequency domain using spectral analysis requires the impact of breathing be restricted to high frequency spectra (> 0.15 Hz) so that the data from participants need to be excluded when the breathing impact occurs in the low frequency spectra (0.04–0.15 Hz). We tested whether breathing frequency can be estimated from standard Finometer recordings using:

1. stroke volume oscillation frequency
2. spectral stroke volume variability maximum scores
3. heart period oscillation frequency
4. heart rate variability maximum scores

Methods: Twenty-two healthy volunteers were tested for 270 s in the supine and upright positions. Finometer recorded the finger pulse contour and a respiratory transducer recorded breathing. The oscillation frequencies were calculated manually whereas the spectral maximums were obtained using the software Cardiovascular Parameter Analysis. These estimates were compared with the breathing frequency using the Bland–Altman procedures.

Results: Stroke volume oscillation frequency estimated breathing frequency to less than ± 10% 95% levels of agreement in both supine (– 7.7 to 7.0%) and upright (– 6.7 to 5.4%) postures. The estimates derived from stroke volume variability ¸ heart period oscillation frequency and heart rate variability did not accurately estimate breathing frequency.

Conclusion: Breathing frequency can be accurately derived from standard Finometer recordings using stroke volume oscillations for healthy individuals in both supine and upright postures. The Finometer can function as a standalone instrument in blood pressure variability studies and does not require support equipment to determine the breathing frequency.