

Topic Category: Cardiovascular Physiology

The intra-test reliability of spontaneous cardiac baroreflex sensitivity in healthy young men

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Introduction: Spontaneous cardiac baroreflex sensitivity (cBRS) is a non-invasive and a valuable tool for assessing the baroreflex buffering of beat-to-beat changes in blood pressure. However, the impact of sampling duration is yet to be established. In addition, since body position interacts with cBRS, the necessity of intra-test reliability study is still warranty.

Objective: To examine the intra-test reliability within different time duration analyses and between body positions in cBRS measurements.

Material and Methods: In 6 healthy men (21 ± 3 years of age) beat-to-beat measurements of blood pressure and heart rate were recorded for 10 min in both the supine and seated position. The $cBRS_{all}$, $cBRS_{up}$ and $cBRS_{down}$ were analyzed by sequence technique from a stable 10-minute resting baseline. Randomly, we separate the data analyses in different time durations (1-min, 3-min, 5-min and 7-min) and compared with the standard 10-minute data control. To calculate the relative and absolute reliability we analyzed the coefficients of variation (CV), the technical error of the measurement (TEM) and the intraclass correlation coefficients (ICC).

Results: The cBRS was lower in the seated position than in the supine position ($P < 0.05$). All cBRS values were similar between each sampling duration compared to the 10-min control ($P > 0.05$). The ICC indicated moderate to excellent ($cBRS_{all}$: 0.71-0.99; $cBRS_{up}$: 0.79-0.99 and $cBRS_{down}$: 0.71-0.98) in supine position and good to excellent ($cBRS_{all}$: 0.93-1.00; $cBRS_{up}$: 0.87-1.00 and $cBRS_{down}$: 0.90-1.00) in seated position between each sampling duration and 10-min control. Additionally, the data reliability decreased progressively with the shortening of sampling duration. The CV and TEM increases for supine [($cBRS_{all}$: 7%, 6%, 12%, 16% and 8%, 8%, 12%, 21%); ($cBRS_{up}$:

11%, 8%, 10% 11% and 13%, 9%, 15%, 15%) and (cBRS_{down}: 8%, 7%, 12%, 23% and 8%, 9%, 15%, 26%)] and for seated position [(cBRS_{all}: 3%, 4%, 6%, 13% and 5%, 4%, 8%, 17%); (cBRS_{up}: 6%, 4%, 11%, 25% and 8%, 3%, 20%, 36%) and (cBRS_{down}: 2%, 6%, 7%, 12% and 3%, 6%, 7%, 17%)].

Conclusions: A minimum of 3-min of data sampling duration in seated position provides more reliable measures of cBRS than all-time durations measures in supine position. The poorer reliability observed in supine position could be due to cardiopulmonary baroreceptor loading via elevations in central venous pressure and/or from significant reductions in the magnitude of spontaneous blood pressure fluctuations, which would induce a more tonic loading of the arterial baroreflex.

Keywords: Intra-test, spontaneous cardiac baroreflex sensitivity, healthy young men

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