

The impact of measurement timepoint on autonomic function testing in male and female individuals

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The autonomic nervous system has a role in regulating gastrointestinal function and blood pressure (BP) homeostasis, with alterations in autonomic function (AF) being implicated in the pathogenesis of type 2 diabetes⁽¹⁾ and as an indicator of cardiovascular disease⁽²⁾. Consequently, AF assessment is widely used to characterise participant cohorts, or detect effects of interventions aiming to improve these chronic diseases. As part of a wider study, AF was measured in 33 healthy adults (18–60y; 20F:13M) in the morning after an overnight fast (~8am; PRE) and in the post-absorptive state 4 h after a 75 g oral glucose challenge (~1pm; POST). To optimise the design of future studies, the present sub-study assessed whether systolic (SBP) and diastolic blood pressure (DBP), mean arterial pressure (MAP) and heart rate (HR) when semi-recumbent, and after 1 and 2 minutes of standing, were similar PRE and POST (assessed using an automated oscillometric device). Data are expressed as the median [25th–75th percentile range] or effect size. Females (22 [19–27] y) were younger than males (27 [23–47] y; $P < 0.05$), but BMI was not different (24 [21–30] vs. 24 [23–27] kg/m² respectively). PRE, semi-recumbent SBP (114 [106–130] vs. 123 [116–129] mmHg; $P = 0.078$), DBP (66 [64–77] vs. 76 [69–79] mmHg; $P = 0.062$) and MAP (84 [81–93] vs. 91 [88–97] mmHg; $P = 0.053$) tended to be lower in females, with HR being higher (71 [67–79] vs. 57 [52–66] BPM; $P < 0.001$). Across the 2-minute stand, SBP and MAP did not change from semi-recumbent values, although DBP ($P < 0.005$) and HR ($P < 0.001$) increased; DBP at 1 and 2 minutes being +3.0 and +1.7 mmHg respectively, with HR being +12 and +11 BPM at these timepoints. These responses to standing did not differ between sexes. Compared to PRE, semi-recumbent SBP and HR in females were not different POST, but DBP (-3.8 mmHg; $P < 0.05$) and MAP (-2.8 mmHg; $P < 0.05$) were lower. In males, semi-recumbent HR was similar POST, but SBP (-6.7 mmHg; $P < 0.05$), DBP (-7.5 mmHg; $P < 0.001$) and MAP (-6.5 mmHg; $P < 0.005$) were lower, with reduction in DBP tending to be ($P = 0.074$), and MAP being greater than in females ($P < 0.05$). However, responses to standing POST were similar when compared to PRE and were not different between sexes.

Although cardiovascular response to postural change did not differ between PRE and POST, absolute values for BP variables were impacted, with effect on males potentially being greater. Sex differences in BP and HR have been reported previously⁽³⁾. However, circadian fluctuation in these do not appear to differ between sexes (3). Therefore, other factors, such as relaxation status and glucose ingestion, may be implicated in changes observed at POST. Findings suggest that AF in research protocols should be measured at the same time point across repeat visits, ideally in the morning after an overnight fast

References

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