This study aimed to differentiate the effect of central blood volume and muscle mechanical afferents stimulation on cardiac baroreflex sensitivity (BRS) during dynamic passive exercise. Systolic arterial pressure (SAP) and pulse interval (PI) were measured continuously and noninvasively in 11 subjects at rest and during upright and supine passive cycling. The arterial baroreflex was evaluated with the cross-correlation method (xBRS) for the computation of time-domain BRS on spontaneous SAP and PI variability. During passive exercise in the supine and upright posture there was a parallel increase in heart rate (HR, from 59 ± 13 to 73 ± 19 bpm, and from 67 ± 16 to 71 ± 17 bpm, respectively; P < 0.05 ) and mean arterial pressure (MAP, from 92 ± 4 to 96 ± 6 mmHg, and from 90 ± 9 to 97 ± 7 mmHg, respectively; P < 0.05). At rest, the postural changes from supine to upright evoked an increase in HR ( 8 bpm; P < 0.05), while MAP did not change significantly. This shifting from the supine to the upright posture at rest reduced xBRS from 23.4 ± 12.9 to 16.4 ± 12.1 ms/mmHg, respectively (P < 0.05). Similarly, xBRS was attenuated during both supine and upright passive exercise (10.0 ± 8.0 and 12.5 ± 9.0 ms/mmHg; P < 0.01 and P < 0.05, respectively) compared to rest. The respective regression lines relating SAP to PI shifted rightward. No differences in xBRS were observed between supine and upright passive exercise. Postural changes during passive exercise did not affect significantly the mechanoreflex-induced HR and MAP augmentations. These data suggest that central blood volume expansion increases xBRS but activation of the mechanoreflex overrides this effect resulting in xBRS reduction during passive exercise.

Keywords: Posture, Cardiovascular System, Exercise