ABSTRACT

The overall aim of this project was to investigate the acute cardiovascular post-exercise response in healthy individuals. The aim of the first study was to establish the within day and between day reproducibility of supine and tilt baroreflex sensitivity (BRS) utilising time (sequence) and spectral ($BRS_{\alpha LF}$ and BRS_{TFTG}) indices in 46 healthy adult males employing three repeat measures; baseline, + 60 min and + 24 h. Reproducibility was assessed by the 95% limits of agreement (LOA) to assess the extent of agreement and an alternative approach of estimating the technical error of the measurement (TEM) to assess reproducibility was also undertaken. The LOA indicated same day reproducibility was marginally better than between day reproducibility for spectral parameters while between day reproducibility was marginally better than same day reproducibility for sequence parameters with reproducibility markedly improved across all BRS outcome measures during tilt. Precision expressed by TEM for all spectral outcomes was good in both supine and tilt BRS (< 6 %) although precision was lower, but acceptable, for sequence BRS outcomes in both positions (< 11%). Thus, all BRS outcome measures and the tilt procedure were incorporated into the exercise study. The aim of the second study was to compare the response of supine and tilt BRS following a single bout of moderate intensity exercise and high intensity exercise. Nine healthy adult males, currently undertaking regular chronic exercise training, performed two interval cycle exercise conditions consisting of 40% WR_{max} and 75% WR_{max} of equal work done and a control condition of no exercise. The overall study design included three conditions administered in a counterbalanced order with outcome measures determined pre and post exercise up to + 24 h. R-R interval and BP data was collected over consecutive 10 min periods and analysed by Fast Fourier transformation analysis while participants adopted a supine and tilt position. Sequence and spectral BRS outcome measures were established. A fully repeated measures ANOVA revealed a significant interaction ($p \leq 0.05$) between time and condition in supine for spectral indices $BRS_{\alpha LF}$ (p 0.006) and BRS_{TFTG} (p 0.004) and in tilt for both time indices BRS_{UpUp} (p 0.027) and $BRS_{DownDown}$ (p 0.004) and spectral indices $BRS_{\alpha LF}$ (p 0.001) and BRS_{TFTG} ($p < 0.001$). There were significant differences ($p \leq 0.05$) between all conditions at + 15 min and between control and 75% WR_{max} and between 40% WR_{max} and 75% WR_{max} conditions at + 60 min. At + 15 min BRS was lower in the 75% WR_{max}

condition compared to the 40% WR_{max} condition and the control condition, and the 40% WR_{max} condition was lower than the control condition. No significant differences were found between exercise conditions at baseline, + 120 min, + 180 min and + 24 h and no enhancement in BRS was observed at any time point following exercise. The findings in the present exercise study suggested a possible intensity-dependent relationship in the BRS response following exercise which supported the notion that intensity of exercise may be a determining feature in the acute cardiovascular response following a single bout of exercise. Given the small number of studies that have investigated the BRS response post-exercise, future studies should focus on the time course of the BRS response following exercise, the influence of intensity and duration of exercise and the demographics and fitness of participant groups.