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DOUBLE SENSOR TEMPERATURE MEASUREMENTS CORRELATE WELL WITH HEMODYNAMIC CHANGES DURING SUSTAINED ACCELERATION THE USE OF A HEAT FLUX TEMPERATURE PROBE IS A RELIABLE INDICATOR OF HEMODYNAMIC ACTIVITY DURING +GZ

Abstract

Introduction The purpose of this study was to test the reliability of the a new heat flux temperature probe (Double sensor) as a new method of monitoring during sustained acceleration in a short arm human centrifuge (SAHC). Methods 20 subjects, were exposed to two rounds of +Gz in a SAHC. The G force profile followed a plan of nine phases of varying +Gz exposure. Each subject began with a baseline +0Gz exposure, followed by step by step +Gz accelerations. The first phase was a climb to +1Gz for five minutes, followed by another acceleration to +2Gz for an additional five minutes. At descent to baseline, the subjects were exposed a last round of +1Gz. The baseline phase of +0Gz lasted for five minutes before the sequential second phase profile of +Gz occurred. Of the 20 subjects, 14 completed the +Gz phase profile in its entirety. In addition to non-invasive hemodynamic monitoring via Beatscope, a heat flux double sensor was employed to monitor thigh skin surface temperatures in all subjects during +Gz exposure. Results Skin surface temperature data via Double sensor correlated significantly well with cardiovascular data. Double sensor skin surface temperatures showed positive correlations (p¡0.001) with cardiac output (CO) and stroke volume (SV) during +Gz exposure. Very strong negative correlations (p¡0.001) were found between diastolic blood pressure, mean arterial pressure (MAP), and total peripheral resistance medical units (TPR med). There were no sig. correlations found between heart rate (HR), left ventricular ejection time (LVET), systolic blood pressure. Discussion These results show that data from a dual flux heat sensor correlates well with cardiovascular parameters during use in +Gz centrifuge exposure. This instrument is non-invasive, easy to employ, and gives information regarding vascular filling status, in conjunction with classic cardiovascular monitoring.