SPACE LIFE SCIENCES SYMPOSIUM (A1)
Poster Session (P)

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A NEW INDEX FOR MORPHOLOGICAL MEASUREMENT OF FINGER PHOTOPLETHYSMOGRAM DURING -6 HEAD-DOWN BED REST

Abstract

This paper studies the morphological measurement of finger photoplethysmogram (PPG) during medium-term or short-term simulated microgravity using a novel morphological index. PPG from twenty-one healthy male volunteers was examined on the 6th day countdown (-6 d) before the -6 head-down bed rest (HDBR) and on the 22nd day (22 d) during HDBR. Define the area under the main wave's descending segment as S1, and the area under the line that between the starting point and ending point of the main wave's descending segment as S2. Then the area ratio Rt=(S2-S1)/S2 was calculated. PPG morphology of the area ratio Rt and the PPG amplitude ratio K'=(Mean-Min)/(Max-Min) was compared between -6 d and 22 d, respectively. Compared with -6 d, Rt decreased significantly (analysis of covariance (ANCOVA), P=0.0160) and K' increased significantly (ANCOVA, P=0.0179), indicating that the dicrotic wave was suppressed and the main wave's descending segment had liner trending. The specific changes in PPG indicate that HDBR increases periphery resistance to blood flow and decreases cardiac function on the 22nd day during HDBR.