

Hostility is associated with cardiovascular reactivity in mental stressors

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Purpose: Exaggerated/diminished reactivity to stress and hostility as a psychological factor have been extensively studied as the cardiovascular risk factors. We aimed to study autonomic reactivity in the interaction with hostility to different mental stressors.

Methods: Seventy one healthy students (40 girls, age: 22.9±08 yr.) were examined. ECG signal and electrodermal activity (EDA) were continuously monitored: rest (P1) – Stroop test (P2) – recovery phase (P3) – mental arithmetic test (P4) – recovery phase (P5) – negative emotion (P6) – recovery phase (P7). Heart rate variability (HRV) parameters and EDA (sympathetic index) were analyzed from each 5-minute period. HRV parameters: RR interval, spectral power in high frequency band (HF-HRV) reflecting cardiovagal control; symbolic dynamics: 0V% - cardiac sympathetic index, 2LV% - cardiovagal index. Trait hostility was evaluated using Cook-Medley Hostility Scale.

Results: The parameters - logHF-HRV, 2LV% were significantly lower and EDA was significantly higher during all stressors compared to rest ($p < 0.05$). Mean RR interval and 0V% index were significantly higher only in cognitive stressors (P2, P4) compared to rest (P1; $p < 0.01$). The 0V% and EDA were significantly higher in recovery phases (P3, P5, P7) compared to rest (P1; $p < 0.05$).

Correlation analysis showed a positive correlation between EDA and hostility in negative emotion and its recovery phase ($r = 0.254$, $p = 0.045$; $r = 0.249$, $p = 0.049$, respectively), and negative correlation between logHF-HRV and hostility in both cognitive stressors ($r = -0.327$, $p = 0.011$, $r = -0.260$, $p = 0.039$, respectively).

Conclusions: Our study confirmed a cardiovagal withdrawal (lower logHF-HRV, 2LV%) and a sympathetic arousal (higher EDA) in response to all mental stressors, while β -adrenergic activity (0V%) increased only to cognitive stressors. Contrary to cardiovagal indices, EDA and 0V% remained higher in recovery phases indicating a potential sympathetic overactivity during stress profile. Importantly, hostility correlated positively with sympathetic reactivity (EDA) to negative emotion, and negatively with cardiovagal reactivity (logHF-HRV) to cognitive stressors reflecting a dependence of personal trait on the type of stressor. We suggest that detailed stress study in the interaction with subjective characteristics could illuminate the pathway via which psychosocial factors may contribute to cardiovascular risk.

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