

Impaired mood reduces sympathetic overactivity indexed by electrodermal activity in hypertensive adolescents

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Introduction: Exaggerated activity of the sympathetic nervous system plays a key role in the pathomechanisms of essential hypertension. Several studies found increased cardiovascular sympathetic stimulation in hypertensive adolescents, however, there is lack of knowledge about the changes of central sympathetic regulation in hypertensive children. Recently, elevated blood pressure was found to be associated with mood disorders in adult population. Therefore, we aimed to study potential relationships between impaired mood and sympathetic regulation in hypertensive adolescents using electrodermal activity (EDA) as a noninvasive index of central cortical and subcortical sympathetic regulation reflecting the effects of various psychophysiological processes.

Methods: Studied population included 40 adolescent boys aged 13-16 years with excluded effect under/overweight. EDA was continuously recorded using ProComp Infinity (Thought Technology Ltd., Canada) during 5 minutes of supine rest. Depressive mood was assessed using Children's Depression Inventory (CDI). Afterwards, participants were divided into four groups: normotensives with normal mood (CDI: 2.9 ± 0.6 , $n=10$), normotensives with impaired mood (CDI: 12.0 ± 0.5 , $n=10$), hypertensives with normal mood (CDI: 3.3 ± 0.6 , $n=10$), hypertensives with impaired mood (CDI: 12.0 ± 0.6 , $n=10$).

Results: Normotensive adolescents with impaired mood had significantly reduced EDA compared to normotensive adolescents with normal mood ($p < 0.05$). EDA in hypertensive adolescents with normal mood was significantly higher compared to normotensives with normal mood ($p < 0.05$). EDA in hypertensive patients with impaired mood was significantly lower compared to hypertensive as well as normotensive adolescents with normal mood ($p < 0.001$, $p < 0.05$, respectively).

Conclusions: Our results revealed increased sympathetic activity indexed by EDA in hypertensive adolescents compared to their healthy peers. In contrast, the impaired mood significantly reduced sympathetic over-activation in adolescent hypertension potentially masking the effects of hypertension-related autonomic dysregulation, which is considered to be an important risk factor for later cardiovascular complications. With respect to recently found increased prevalence of depressive symptoms in patients with hypertension, attention should be paid to potential effects of impaired mood on autonomic regulatory integrity in the evaluation of cardiovascular risk in adolescent hypertension. Support: VEGA 1/0044/18.