Endothelial function in adolescents with newly diagnosed essential hypertension

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Introduction: Hypertension is associated with higher risk of atherosclerosis. Microvascular endothelial dysfunction is considered to be an early indicator of atherosclerotic changes preceding the morphological alterations, commonly associated with elevated blood pressure. However, the findings regarding the cause-effect question remain controversial and the pathophysiology of this relation is still not fully understood. Therefore, we aimed to study the endothelial function in adolescents at the onset of essential hypertension using peripheral arterial tonometry.

Methods: Fifteen nonobese adolescent males (age: 17.4 ± 0.4 years, BMI: 22.9 ± 0.6 kg/m2) with newly diagnosed essential hypertension and 15 age-matched healthy adolescents as a control group were examined. Continuous recording of the pulse wave amplitude was performed using peripheral arterial tonometry device EndoPAT 2000 (Itamar Medical, Israel) under standard conditions during three 5-minute phases: baseline period, ischemic phase, postischemic phase. Reactive hyperemia index (RHI) was calculated automatically by the EndoPAT software.

Results: Statistical analysis revealed no significant differences in the RHI between hypertensive and control group (2.12 ± 0.14 vs. 2.18 ± 0.10, p=0.384). Both values were within physiological range (RHI 1.67 and above).

Conclusions: Microvascular endothelial function indexed by RHI was not altered in adolescents with newly diagnosed essential hypertension compared to healthy controls. We suggest that endothelial production of nitric oxide likely remains at the physiological level in newly diagnosed hypertension or other endothelial substances could compensate its deficit. Therefore, these findings could support the hypothesis of endothelial dysfunction being rather the effect than the cause of hypertension. Large longitudinal studies are needed to confirm this assumption.

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