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THROMBOCYTIC CONCENTRATIONS OF DIADENOSINTETRAPHOSPHATE CORRELATE TO CAROTID INTIMA-MEDIA-THICKNESS IN PATIENTS WITH ESSENTIAL HYPERTENSION
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An increased intima-media-thickness of large arteries is an early vascular wall alteration in patients with essential hypertension. Diadenosin-polyphosphates (APnAs) are endogeneous vasoactive substances. Data from our studies showed that thrombocytic concentrations of (APnAs) are increased in essential hypertension. Additionally, AP4A has been shown to stimulate proliferation of vascular smooth muscle cells. We investigated a possible relation between concentrations of diadenosin-polyphosphates and carotid intima-media-thickness in patients with essential hypertension.

In 17 patients (age 46 ± 3 years, BMI 26 ± 1 kg/m²) with mild, never treated essential hypertension thrombocytic concentrations of AP3A, AP4A, AP5A and AP6A were quantified by HPLC and related to content of β-thromboglobulin (β-T). By high-resolution ultrasound (8 MHz, Biosound 2000) three segments of the carotid artery were studied and the maximal intima-media-thickness (IMTmax) was measured.

Results were as follows (MW±SEM): SBP/DBP 155±4 / 91±3 mmHg, IMTmax 1,05±0.05 mm, AP3A: 52±6, AP4A: 149±27, AP5A: 52±6, AP6A: 9±1 ng/µg β-T. A significant positive correlation was found between IMTmax of the carotid artery and thrombocytic concentrations of AP4A (r=0.48 p<0.05). Correlations to the other APnAs did not reach statistical significance.

We found a significant relation between carotid intima-media-thickness and thrombocytic concentrations of AP4A in untreated patients with mild essential hypertension. We conclude therefore that increased thrombocytic concentrations of diadenosintetraphosphate may contribute to structural alterations of the carotid artery in hypertension.

Key Words: diadenosintetraphosphate, intima-media-thickness, hypertension

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ARTERIAL STIFFNESS AND GRADIENT OF BLOOD PRESSURE AT ESSENTIAL HYPERTENSION
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The two major causes of increased large artery stiffness are aging and high blood pressure. This study was designed to assess the modifications in large artery elastic properties and their hemodynamic resistance at essential hypertension (EH). The pulse wave velocity (PWV) was evaluated in the following distance: carotid-femoral artery, femoral-posterior tibial artery and carotid-radial artery by piezoelectric detectors. The gradient of arterial pressure (AP) was analyzed in the distance: brachial-finger artery and brachial-posterior tibial artery applying auscultatory method (using acoustic system). And, simultaneously, the gradient of systolic BP was evaluated according to volume oscillations. Data were analyzed in supine position, when intravascular pressure was modified by rising and lowering the extremity referring to the heart level, and when subjects was passively tilted up to 70° with and without unilateral thigh arterial occlusion for 5 min. Group of 78 patients with EH (38-57 yrs aged men) and 31 age and gender matched controls were studied.

Antihypertensive treatment, if any, was interrupted 8 days before the examination. In EH pts mean AP gradient in the distance of brachial-finger artery was increased (14.1 ±1.4 vs. 8.7 ±1.7 mmHg; P<0.02), whereas systolic and pulse pressure on tibial artery comparing to brachial artery was increased (Franc’s phenomenon) and this increase was more expressed in EH pts (35.2 ±5.4 vs. 18.5 ±2.3 mmHg; P<0.02) and related (r=0.63; P<0.01) to systemic AP level. Upper extremity lowering and subjects tilting was related with less than expected (calculated hydrostatic pressure) increase of AP in distal parts. This difference disappeared on background of unilateral reactive hyperemia. At upper extremity elevation, decrease of finger AP corresponded to expected hydrostatic pressure decrease in both groups. In all analyzed distances PWV values were increased in EH pts comparing to controls (P<0.001) and were related to systemic arterial (brachial) pressure level (r=0.51-0.59; P<0.01). Modifications in regional AP caused by hydrostatic effect was related with corresponding PWV changes (r=0.8 in EH pts and r=0.72 in controls).

This study suggests that alongside increased wall stiffness the hemodynamic resistance of large arteries is increased at EH and modifications in smooth muscle tone maintain important role in systemic and regional hemodynamic reactions.

Key Words: arterial pressure gradient, pulse wave velocity, hypertension

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ARTERIAL ELASTICITY AMONG NORMOTENSIVE SUBJECTS AND TREATED AND UNTREATED HYPERTENSIVE SUBJECTS
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The aim of this study was to determine arterial elasticity in normotensives and hypertensives.

In addition to blood pressure, other parameters serve as markers for vascular disease. Arterial elasticity is one parameter that can be determined by a modified Windkessel model of the circulation. This model estimates from a computerized pulse contour analysis the proximal (capacitive) elasticity of the large arteries and the distal (reflective) elasticity of the small arteries.

A prospective, multicenter, controlled clinical study evaluated large artery and small artery elasticity indices among 4 groups: 1) normotensives without a family history of hypertension; 2) normotensives with a family history of hypertension; 3) treated and controlled hypertensives; and 4) untreated and uncontrolled hypertensives. Blood pressure, using a mercury manometer, and arterial elasticity, using a CVProfilerTM DO-2020 Cardio Vascular Profiling System (Hypertension Diagnostics, Inc., Eagan, MN), were measured supine in triplicate 3 minutes apart in a randomized sequence.

There were 212 evaluable subjects. Mean age was 46 years, and 57% were women, 51% Caucasian, and 33% African American. Comparing normotensives without a family history of hypertension to hypertensives, both large artery and small artery elasticity indices were significantly different (p<0.0001). A significant linear trend (p=0.0001) across the 4 groups was detected for both large and small artery elasticity indices, after controlling for age and body surface area.

As hypertension status worsened, large and small artery elasticity indices decreased, suggesting the potential for the diagnostic use of arterial elasticity determinations.

Key Words: arterial compliance, diagnosis, blood pressure measurement