VASCULAR FUNCTION/AORTIC DISEASE

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Relationship between carotid intima media thickness, cytokines and multilevel atherosclerosis
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Multilevel arterial atherosclerotic stenoses (lumen reduction >50%) become an important issue in clinical practice in view of ageing populations. The present study aimed to investigate interrelation between the extent of atherosclerosis, selected inflammatory markers, and known indicator of atherosclerosis - carotid intima-media thickness (CIMT).

Methods: 154 consecutive patients (102 men, aged 64.5±8.7 years with significant atherosclerotic stenosis (>50%) in one or more vascular territories detected with angiography in coronary and renal arteries, or with ultrasonography in carotid, iliac/femoral arteries. Triglycerides (TG), high (HDL) and low-density lipoprotein (LDL) cholesterol, high-sensitivity C-reactive protein (hsCRP), serum levels of interleukines 6 (IL-6) and 10 (IL-10), tumor necrosis factor alfa (TNF-alfa), transforming growth factor beta (TGF beta) were evaluated.

CIMT assessment was performed in common, the bulb and internal carotid segments and expressed as the mean value.

Results: No significant lesions in any of examined territories were found in 24 (15.6%) patients. 1-level atherosclerosis was found in 58 (37.7%), 2-level in 30 (19.7%) and 3 or more-level in 34 (22.1%) patients. The significant positive correlation between the number of involved territories and serum levels of: creatinine (p=0.001), hs-CRP (r=0.001), glucose (0.01), IL-6 (p=0.05) and TGF beta (p=0.021) was found. No correlation was found for IL-10, TNF-alfa and lipid profile. Patients with carotid involvement had higher IL-6 (p=0.006) and TNF-alfa (p=0.05) levels, as compared to other territorial involvements. CIMT correlated with number of involved territories (p<0.001, r=0.751) and was related to hs-CRP (p=0.001, r=0.220), IL-6 (p=0.004, r=0.229), and IL-10 (p=0.001, r=0.260), but not to TNF-alfa and TGF beta levels.

Conclusions: Inflammatory biomarkers levels as well as CIMT correlate with the extent of atherosclerosis. Differences in relationship between specific cytokines and territorial involvement are observed, that may suggest some territorial specificity in biomarkers engagement.

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Local arterial wave speed at carotid artery level is representative of carotid-femoral pulse wave velocity and aortic stiffness: evidence by a new echo-tracking approach
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Local "carotid artery stiffness has been reported to be associated with major cardiovascular risk factors. Recently a new ultrasound technique capable to provide real-time arterial waveform analysis with high temporal and spatial resolution ("E-track"). Alokia Tokyo, Japan) has been developed. When calibrated for blood pressure (BP), arterial stiffness parameters such as Young’s modulus of stiffness ("Beta"), pressure-strain elastic modulus ("Epsilon") and a single point local wave speed (WS) are obtained. Aim of this study was to verify whether or not WS measured at common carotid artery level (CCA) may be representative of the standardized CF-PWV.

Methods: Thirty-one consecutive patients free of clinical cardiovascular disease, with or without atherosclerotic risk factors (16 males; mean age 55±12, and 15 females; mean age 57±7) were studied. All patients underwent right common carotid artery scanning by high resolution linear US probe (7.5 to 10 MHz, Aloka SSD-5500) for E-track evaluation. Single-point WS at CCA level (70-90 MHz) was measured. CAD/CAM filter was applied, and the filter was calibrated for blood pressure (BP), arterial stiffness parameters such as Young’s modulus of stiffness ("Beta"), pressure-strain elastic modulus ("Epsilon") and a single point local wave speed (WS) are obtained.

Results: Mean difference between WS and CF-PWV was 1.15±3.58, with all measurements but one within ±2sd. Both Beta and Epsilon derived by E-track also correlated directly with CF-PWV (r=0.60 and 0.55, respectively, p<0.001) but not with CR-PWV. Finally, the known correlations with age and pulse pressure were confirmed for both CF-PWV and WS (r between 0.40 and 0.65).

Conclusions: Common carotid artery stiffness and local wave speed appear as representative of aortic stiffness as estimated by CF-PWV. New techniques for arterial wall tracking implemented on cardiovascular ultrasound equipments can expand information provided by carotid artery scan in echo-lab.

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Aortic valve replacement for aortic stenosis is associated with improved aortic sensibility at long-term follow-up
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Background: Aortic valve stenosis (AS) is the most frequent form of valvular heart disease. The number of studies evaluating the effect of aortic valve replacement (AVR) for AS on an aortic vascular function is limited. The aim of the present study was to examine alterations in aortic sensibility in AS patients during a one-year follow-up after AVR.

Methods: Twelve patients with severe AS who underwent AVR were prospectively investigated (mean age 65±11 years, 7 males). Systolic and diastolic ascending aortic diameters (SD and DD, respectively) were recorded in M-mode 3 cm above the aortic valve from a parasternal long-axis view. The SD and DD were measured at the time of maximum anterior motion of the aorta and at the start of the QRS complex, respectively. Aortic stiffness index (AI) was defined as the natural logarithm of (SBP/DBP)/(SD-DD), where SBP and DBP are the systolic and diastolic blood pressure values.

Results: Data are presented in the table.

Conclusions: AVR in AS patients is associated with a progressive improvement in aortic sensibility to one year values similar to age, gender and risk factor-matched controls.

Table 1

<table>
<thead>
<tr>
<th>Time</th>
<th>Controls</th>
<th>Before AVR</th>
<th>3 weeks after AVR</th>
<th>6 months after AVR</th>
<th>12 months after AVR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Left ventricular mass (g)</td>
<td>234±4.5</td>
<td>397±288</td>
<td>284±100</td>
<td>241±58</td>
<td>229±129</td>
</tr>
<tr>
<td>Peak aortic blood pressure (mm Hg)</td>
<td>150±4.8</td>
<td>154±5.2</td>
<td>154±5.4</td>
<td>150±4.8</td>
<td>150±4.8</td>
</tr>
<tr>
<td>Mean aortic blood pressure (mm Hg)</td>
<td>90±5.2</td>
<td>135±10</td>
<td>135±10</td>
<td>135±10</td>
<td>135±10</td>
</tr>
</tbody>
</table>

*p<0.01 compared to before AVR, &p<0.01 compared to 3 weeks after AVR, SD = systolic aortic diameter, DD = diastolic aortic diameter, AVR = aortic valve replacement.