386 Ventriculo-arterial coupling in uncomplicated obesity: a wave interval analysis study

E. Malash 1, C. Monzio 1, M. Kozakova 1, E. Muscilli 1, S. Camastra 1, AG. Fraser 1, C. Palombo 1, E. Ferrannini 1

1University of Pisa, Internal Medicine Dept., Pisa, Italy; 2Wales University, Cardiovascular Research Institute, Cardiff, United Kingdom

Obesity is an insulin resistance (IR) state associated with increased risk of heart failure (HF). Large aorta stiffness may contribute to HF through an unfavourable ventriculo-arterial (VA) coupling. A role of IR in promoting large artery stiffness independent of other risk factors in obesity is not yet established.

Aim: To explore hemodynamic and metabolic correlates of large artery stiffness, and its impact on VA coupling, in otherwise healthy subjects with isolated obesity and normals.

Methods: Eighty-one objects (age 41 ± 12; 36 males; BMI 32 ± 9, range 19-59 kg/m²; BP 126 ± 15/76 ± 10 mm Hg), free of heart disease, diabetes, dyslipidemia were studied. LV pump function (CO and EF) was assessed by 2D Eco. Arterial mechanics was evaluated at carotid level by vascular ultrasound (Aloka SSD-5500) implemented with a double beam tracking system providing dispersion waveforms, diameter-derived pressure and flow. Pressure independent stiffness index (β) and pulse wave velocity (PWV) were estimated. By wave intensity analysis (time-dependent product of first derivatives of BP and flow), an index of LV inotropic function was obtained by the amplitude of the early-systolic peak (forward compression wave, FCW). Insulin sensitivity was estimated from plasma glucose and insulin responses to O-GTT (OGIS index).

Results: From increased BP more than from an independent effect of IR. Increased carotid stiffness paralleling visceral adiposity resulting in obesity. Visceral adiposity and changes in systemic hemodynamics are associated with IR. Increased carotid stiffness paralleling visceral adiposity results from increased BP more than from an independent effect of IR. WI analysis, but not established indices of LV performance, discloses an unfavorable VA coupling in obesity.

387 Increased Aorta Stiffness Alters The Left Ventricular Rotation In Patients With Dilated Cardiomyopathy

A. Patranikos 1, F.I. Partenakis 1, J. Karalis 1, G. Lyarakis 1, P. Kafarakis 1, E. Foukarakis 1, A. Zaharaki 1, P. E. Vardas 1

1Heraklion, Greece; 2Heraklion University Hospital, Cardiology Dept., Crete, Greece

Aim: The characteristic aortic implosion is a major determinant of the heart-arterial interaction. During the cardiac systole the myofibers shorten longitudinally thickens radial and after rotates about its long axis. The magnitude and characteristics of this torsional deformation have been described to be sensitive to changes in both regional and global LV function. We hypothesized that increased proximal aorta stiffness would affect this LV rotation.

Methods and patients: We examine 34 angiographically proven non-ischemic dilated cardiomyopathy patients (NIDC, aged 52.6±13.9 years) and 38 chemic dilated cardiomyopathy patients (NIDC, aged 52.6±13.9 years) and 14 healthy volunteers. We evaluate the proximal aorta pulse wave velocity (PWV) as an index of aorta stiffness using a new echo-method. From the suprasternal view, the distance between ascending and descending AO was measured with 2D and the AO flow wave transit time (TT) was measured with pulsed-wave Doppler (recording sweep speed at 200 mm/s) and PWV was calculated as AO distance/TT.

The LV diastolic function was evaluated by PW-Doppler, while tissue Doppler velocities from the septal and the base lateral wall were obtained. The cardiac rotation and rotation rate was evaluated by speckle-echocardiography fracture in a parasternal short-axis view at the level of the papillary muscles by automatic frame-to-frame tracking of gray-scale speckle patterns (EchoPac,GE). Rotation and rotation rate was calculated as the average area change of 6 myocardial regions (anterior, anteroseptal, lateral, posterior, inferior and septal).

Results: Patients showed increased PWV (6.7±2.1 vs 5.2±1.4 m/s, p<0.01) and decreased systolic cardiac rotation (2.6±0.2 vs 4.7±1.7, p=0.01) and systolic rotation rate (38.6±18.7 vs -51.7±22.3 degrees/sec, p=0.04) early 28.1±20 vs 49.9±36.2 degrees/sec, p=0.01) and [late (24.9±13.2 vs 39.7±10.8 degrees/sec, p=0.002)] diastolic unwinding rate compared to the controls. LV ejection fraction showed no correlation with the LV rotation and rotation rate in NIDC patients.

In NIDC patients the PWV showed to related with the early transmitted (PW-Doppler) to E' (mean TDI velocity of the septal and the lateral wall) ratio, the segmental and averaged systolic (r=0.52, p<0.001) and the early diastolic (r=0.207, p=0.05) rotation rate.

Conclusion: In this pivotal study we found that NIDC patients had increased aorta stiffness which impairs the systolic LV rotation movement thus further affecting the LV systolic and diastolic function. Destroying such vascular therapeutic measures may be beneficial in heart failure patients.

388 Normal vascular aging evaluated by a new tool: e-tracking

S. Caren 1, C. Nipote 1, C. Zambaldi 1, C. Zito 1, L. Sutera Sardo 1, G. Dattilo 1, G. Oreo 1, F. Aringo 1

1Pollicito Universitario, Cardiology Dept., Messina, Italy

Background: Aging exerts a number of significant changes in the cardiovascular system, particularly on the large arteries. Previous studies have suggested that stiffness index increase linearly with age.

Objective: The aim of our study was to assess the usefulness of a new tool (e-tracking, Aloka-Japan) for the evaluation of stiffness vascular index, used as a common function in general-purpose ultrasonic diagnostic units. In this system a radio frequency signal is used to provide an high accuracy of 0.01 mm resolution at 10 MHz transmission/reception. Changes in the arteries diameters is evaluated by measuring the distance between two tracking gate. Measurements have been carried out at the level of common carotid artery before the bifurcation. The following parameters have been calculated: Beta (stiffness parameter); Ep (pressure-strain elasticity modulus); AC (arterial compliance); AI (augmentation index); PWV (pulse wave velocity). The value of blood pressure (systolic and diastolic), measured in the left arm, has been included in the system for the evaluation of the parameters.

Methods: We studied 60 healthy patients (mean age 34.5±12.9, 29 Men).

Data were analyzed with SPSS software. To provide the relationship between age and the IMTa stiffness, data were grouped according to decades of age.

Results: The results are reported in Table I. All parameters show an age-related increase, with the exception of AC that is reduced (Figure 1).

Conclusions: The results suggest that relevant age-related changes occur in vascular system. Our data are similar to previous results obtained by other invasive or non-invasive tools. E-tracking is a potentially useful, no-time-consuming tool for the clinical diagnostic routine evaluation of arterial stiffness quantitative parameters. Further research is necessary to validate the role of this technique in larger populations.

Table 1

<table>
<thead>
<tr>
<th>Age groups (years)</th>
<th>BETA</th>
<th>Ep</th>
<th>AC</th>
<th>AI</th>
<th>pH</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;30</td>
<td>Mean</td>
<td>5.1±1.8</td>
<td>59.1±20.5</td>
<td>1.3±0.5</td>
<td>0.8±0.9</td>
</tr>
<tr>
<td>31-40</td>
<td>Mean</td>
<td>6.6±2.5</td>
<td>78.8±24.2</td>
<td>0.9±0.2</td>
<td>3.5±9.1</td>
</tr>
<tr>
<td>41-50</td>
<td>Mean</td>
<td>7.3±3.3</td>
<td>97.8±48.4</td>
<td>0.9±0.3</td>
<td>16.4±15.1</td>
</tr>
<tr>
<td>51-60</td>
<td>Mean</td>
<td>9.2±2.2</td>
<td>115±27.6</td>
<td>0.8±0.9</td>
<td>24.2±14.7</td>
</tr>
<tr>
<td>&gt;60</td>
<td>Mean</td>
<td>9.4±1.7</td>
<td>129±33.2</td>
<td>0.6±0.9</td>
<td>26.6±5.9</td>
</tr>
</tbody>
</table>

p 0.002 <0.001 0.004 <0.001 <0.001

Age related increase of stiffness parameters.

3-D ECHO

389 Three-dimensional-contrast ultrasound in the evaluation of carotid atherosclerosis

B. Cosyns 1, M. Menassé 1, S. Veleg-Roa 1, D. De Clercq 2

1CHRREC - Site De Braine, Cardiology Dept., Braine l'alleud, Belgium
2Physiological Medical System, Brussels, Belgium

Background: The use of ultrasound (US) contrast agents in the lumen of the carotid artery permits a clearer visualization of the intra-media thickness (IMT) and plaque luminal morphology (PM). 3-D US improves the understanding and the measurement of morphological abnormalities in these vessels. Although 3D is used with other techniques, it has not been studied in this setting. We studied the diagnostic value of 3-D US in carotid atherosclerosis compared to 2-D US with and without contrast.

Methods: We have prospectively studied 18 patients (mean age: 65±8: 10 male). All patients underwent an examination of their carotid arteries baseline and every month. The use of ultrasound (US) contrast agents in the lumen of the carotid artery permits a clearer visualization of the intra-media thickness (IMT) and plaque luminal morphology (PM). 3-D US improves the understanding and the measurement of morphological abnormalities in these vessels. Although 3D is used with other techniques, it has not been studied in this setting. We studied the diagnostic value of 3-D US in carotid atherosclerosis compared to 2-D US with and without contrast.

Results: The results show that 3-D US with contrast improved intra-observer agreement compared to 2-D US when back to back to back to back (kappa 0.98 vs 0.89). There was a good correlation between 2-D and 3-D severity scores. With 2-D, the IMT anterior (a) and posterior (p) were also measured.

Results: 1: PM: 3-D contrast has improved intra-observer agreement compared to 2-D (kappa 0.98 vs 0.89). There was a good correlation between 2-D and 3-D severity scores. With 2-D, the IMT anterior was not measurable in 80% of patients without contrast. The IMT assessment was not feasible in 3D without contrast injection. In 2-D with contrast, IMT was significantly higher than IMT (1 ± 0.3 vs 0.8 ± 0.2, p<0.001) and there was no correlation between IMT and IMT. The 3-D with contrast allowed measuring the maximal IMT on each segment.