Impact of underlying cardiopathy on left ventricular remodelling after cardiac resynchronization therapy

B. Vidal 1; M. Sitges 1; V. Delgado 1; J.M. Tolosana 1; M. Azqueta 1; J. Brugada 1; C. Pare 1; L. Mont 1
1 Hospital Clinic - Thorax Institute, Cardiology Dept., Barcelona, Spain

Background: Left ventricle remodelling (LVR) has been demonstrated after cardiac resynchronization therapy (CRT) in many studies. However, scarce information exists about the relationship between the etiology of the underlying cardiopathy and the extent of LVR.

Aim: To analyze if LVR depends on the etiology of the underlying cardiopathy.

Methods: Sixty-four patients (70±8 y.o, 52 (81%) men with LV systolic dysfunction (LVEF 22±5%) and LBBB received CRT and were followed-up during 12 months. An echo-Doppler scan was performed at baseline to measure LV diameters with M mode and LV volumes and EF with the Simpson’s method. Mitral regurgitation (MR) was also quantified with the PISA’s method and, if possible, pulmonary artery pressure (PAP) was determined. The same study was performed at follow-up.

Results: At 12 months follow-up an overall LVR was observed with a significant reduction of LV diameters and volumes, an improvement of LV EF (from 24±5% to 32±10%, p<0.05). When patients were separately analyzed according to the etiology of their cardiopathy, both groups presented a significant LVR as well (see table). Patients with IDC had a LV EDV mean reduction of 6%, a LV ESV reduction of 16% and a LV EF increment of 40%. In p with IC the values were 0.5%, 9% y 34% respectively.

Conclusions: At 12 months follow up patients with severe LV systolic dysfunction and LBBB treated with CRT presented LVR independently of the etiology of their cardiopathy, although the extent of LVR was slightly smaller in patients with IC.

Table 1

<table>
<thead>
<tr>
<th>Idiopathic dilated cardiomyopathy</th>
<th>Ischemic cardiomyopathy</th>
</tr>
</thead>
<tbody>
<tr>
<td>(n = 39)</td>
<td>(IC) (n = 25)</td>
</tr>
<tr>
<td>LV EDV (ml)</td>
<td>Base 12M P</td>
</tr>
<tr>
<td>226±71</td>
<td>201±76 P</td>
</tr>
<tr>
<td>LV ESV (ml)</td>
<td>176±63 P</td>
</tr>
<tr>
<td>LV EF (%)</td>
<td>22±5</td>
</tr>
<tr>
<td>LV EDD (mm)</td>
<td>76±5</td>
</tr>
<tr>
<td>LV ESV (mm)</td>
<td>61±9</td>
</tr>
<tr>
<td>ROA mm</td>
<td>19±1</td>
</tr>
<tr>
<td>P.A. (mp Hg)</td>
<td>38±9</td>
</tr>
</tbody>
</table>
| EDV: end diastolic volume, ESV: end systolic volume, EDD: end diastolic diameter, ROA: mitral regurgitant orifice area.

LV FUNCTION – OTHER

944 Racial differences in left ventricular structure and performance in healthy young adults

P. Pattinson 1; G.M. Pelá 1; F. Ugo 2; A. Borghetti 2
1 University of Parma, Clinical Medicine and Neurology Dept., Parma, Italy; 2Azienda Ospedaliera Universitaria di Parma, Dipartimento del Cuore Dept., Parma, Italy

The goal of this study was to evaluate the racial difference in left ventricular performance and geometry in healthy young black and white males subjects. We examined 44 healthy young subjects, 20 black males (mean age 27.6±4.4 years) and 22 white males (mean age 29.7±9.2 years). All subjects underwent clinical visit and conventional and Doppler tissue echocardiography (DTE) for the study of the morphology and kinetics of left ventricle. DTE-determined velocities were taken from apical 4-chamber view analyzing the excursion of mitral annulus at the lateral and posteroseptal sites. Myocardial wall velocities were sampled during systolic ejection (S) and diastolic (E) ventricular filling and atrial (A) contraction. Besides, we evaluated myocardial performance index (MPI), defined as the sum of isovolumic contraction time (ICT) and isovolumic relaxation time (IRT) divided by ventricular ejection time (ET). Black subjects showed a significant increase in body mass index (25.1±3.1 vs 23.1±1.6 kg/m², p<0.02), in the office diastolic blood pressure (83.0±2.6 vs 77.5±1.6 mm Hg, p<0.008) and heart rate (76.1±14.0 vs 66.3±9.7 bpm, p<0.02). No differences were found in left ventricular diameters, volumes, mass, meridional and circumferential end-systolic stress, total peripheral resistance, stroke volume and cardiac output. The relative wall thickness (RWT) was significantly increase in black (0.47±0.05 vs 0.46±0.05, p<0.0003), a significant correlation between MPI and RWT (r=0.54, p<0.001) and left ventricular mass (r=0.54, p<0.001) respectively were demonstrated. Besides, MPI correlate with Spv (r=0.55, p<0.05) and Spv (r=0.38, p<0.001) waves. In conclusion our data confirm that MPI is increase in black healthy subject and is geometry-dependent, in contrast with current literature. Besides, we found correlations between MPI and systolic indexes derived from DTE. These findings also suggest that racial differences in left ventricular performance and systolic function exist even in absence of other conventional echocardiographic changes.

MYOCARDIAL VELOCITY IMAGING (DMI) – LV FUNCTION

945 Hypercholesterolemia and myocardial function: an experimental ultrasonic strain and strain rate study

G. Di Salvo 1; A. Carlucci 1; L. Cigliano 1; B. Castelli 1; G. Paciolo 1; P. Abrescia 1; C. Pedone 1; R. Calabro 2
1 Naples, Italy; 2University of Naples Federico II, Biological Science - Section of Phys Dept., Naples, Italy; 3Second University of Naples, Cardiology Dept., Naples, Italy

Background: Despite changes in life style and the use of new pharmacologic approaches to lower plasma cholesterol concentration, cardiovascular disease continues to be the principal cause of death in the developed world. Major classic risk factors for cardiovascular diseases include hyperlipidemia, elevated levels of LDL cholesterol, decreased HDL cholesterol. The effects of hypercholesterolemia on the myocardium per se include electrophysiologic and mechanical alterations.

Aim of the study: We evaluated the changes in myocardial deformation properties in cholesterol-fed rabbits.

Methods: Male New Zealand White rabbits (n=6) aged 9 wk and weighing 1.91 kg were studied. Rabbits were housed individually in standard stainless-steel cages at 24°C with a 12-h light: dark cycle (lights on, 0630-1830 h). Rabbits had free access to food and tap water. All experiments were performed in accordance with the protocols approved by the standing committee on animals of Cardarelli Hospital. Preceding the study, all rabbits consumed the same diet (Harlan Teklad, Madison, WI) for 1 wk. All rabbits underwent normal diet with high cholesterol (2%). Rabbits underwent standard echocardiographic study and ultrasonic derived one-dimensional Strain and Strain rate analysis. The echocardiographic evaluation was performed baseline and every two weeks for a study period of 45 days. At the end of experiment, all rabbits were deprived of food overnight and killed under anesthesia. Blood was collected by heart puncture. Wholeblood and serum were prepared for laboratory analysis. The major organs and aorta of each rabbit were harvested, washed with ice-cold isotonic saline and weighed. Serum and tissue samples were stored at -20°C until used for analysis.

Results: After 2 weeks of diet rabbits showed a significant increase in total cholesterol, in LCAT, while apolipoprotein was significantly reduced. Standard Echocardiographic parameters did not change significantly compared to baseline for the whole study period. After 45 days of diet both systolic and diastolic myocardial deformation properties were significantly worsened compared to baseline (Systolic Strain: Baseline =35±10%; 45 days =18±8%, p<0.05). Systolic Strain Rate was significantly correlated with total cholesterol (p<0.05). Conclusion: This study demonstrated that Strain and Strain Rate is feasible in rabbits and is able to detect earlier than standard echocardiography hypercholesterolemia-induced cardiac contractile dysfunction.

LV FUNCTION – OTHER

946 Early abnormalities of left ventricular myocardial characteristics associated with subclinical hyperthyroidism

V. Di Bello 1; A. Di Cori 1; E. Talini 1; C. Palagi 1; M.G. Delle Donne 1; L. Antonangeli 1; F. Agnini Lombardi 1; A. Barsotti 1
1University of Pisa, Cardiac and Thoracic Dept., Pisa, Italy; 2Pisa, Italy

Background: If cardiovascular abnormalities are well known in overt hyperthyroidism; the involvement of cardiovascular system in subclinical hyperthyroidism (sHT) is still debated.

Impact of underlying cardiopathy on left ventricular remodelling after cardiac resynchronization therapy

B. Vidal 1; M. Sitges 1; V. Delgado 1; J.M. Tolosana 1; M. Azqueta 1; J. Brugada 1; C. Pare 1; L. Mont 1
1 Hospital Clinic - Thorax Institute, Cardiology Dept., Barcelona, Spain

Conclusion: Solid improvement in EF, EDV, VO2 was found early at 1 month follow up, however at 12 months no persistent improvement was observed. Oxygen consumption does not parallel the alterations in LV geometry.