THE RIGHT HEART

1042
The influence of age on right ventricular Tissue Doppler parameters in healthy persons

M. Tsverava; D. Tsverava
1Georgia Medical Academy, Cardiac Rehabilitation & Sports Medicine Dept., Tbilisi, Republic of Georgia; 2Georgia State Medical Academy, Internal Medicine Dept., Tbilisi, Republic of Georgia

Purpose: The aim of this investigation was to determine influence of age on the right ventricular tissue Doppler parameters in normal persons.

Methods: We investigated from 6 to 82 year old, 258 normal persons, 114 female and 144 male. Right ventricular systolic and diastolic velocities at lateral portion of tricuspid annulus were acquired in apical four-chamber view at the function of the right ventricular free wall and the anterior leaflet of the tricuspid valve, using Doppler Tissue Imaging (TDI).

Results: The mean of maximal velocity (cm/sec) for isometric contraction (S) was 21.55±5.90, for ejection (E) -19.46±3.80 for early relaxation (A) -20.59±3.99 and for atrial contraction (Aa) -18.70±5.59 cm/sec. The difference in TDI parameters between male and female was not significant. The E/A ratio in 27.5% of normal persons was less than 1. The frequency of E/A<1 was greater in older persons and raised with age. In 20-29 year persons it’s frequency is 3.9%, in 30-39 year persons - 12.30%, in 40-49 - 34%, in older than 50 year persons - 89.19%. It was positive correlation of right ventricular TDI parameters with the same parameters of left ventricular TDI. E/A ratio was in positive correlation with EchoCG determined pulmonary artery pressure and in negative correlation with age.

Conclusions: The frequency of E/A<1 on right ventricular TD was greater in older persons and raised with age. This change is more prominent and begins in younger age then the changes of the same parameter on left ventricular TD.

1043
Comprehensive evaluation of right ventricular function in acute myocardial infarction by tissue Doppler echocardiography. Is Ventricular interdependence exist?

H. Badran; A.K. Mostafa; S. Shalaby; W. Farid; H. Hassan; N. Faheem
1University of Queensland, Cardiology Dept., Brisbane, Australia

Introduction: Right ventricular dysfunction (RVD) is difficult to evaluate in pts with inducible right coronary territory ischemia. Tissue Doppler-derived strain (ESS) and strain rate (SR) may be used to quantify function of the RV free wall (RV). We sought to use these parameters to evaluate the RV response to dobutamine stress echocardiography (DSE).

Methods: We selected 157 pts undergoing DSE; group R (n=66, 68 years) had inducible RCA ischemia, group L (n=26, 66 years) had inducible LAD ischemia and group N (n=66, 66 years, matched for risk factor profile) had normal studies. All groups had normal resting RV wall motion. Deformation (end systolic strain - ESS, peak SR, time to peak SR) and velocity (peak systolic velocity) were measured at rest and peak stress in the basal segments of the RV and LV (interventricular septum). Comparisons of means between groups and between rest and peak stress were made with Mann-Whitney U test.

Results: Resting peak SR for the RV was similar between groups R (1.33±0.5, L (1.57±0.5) and controls (1.47±0.4). At rest, the RV SR was unrelated to the presence of scar identified by wall motion analysis. At peak stress (Table 1), group R had lower RV peak SR compared to controls (p=0.037). In contrast, peak SR in group L was not different to controls. Peak stress tissue systolic velocity was similar across all groups. Time to peak SR and ESS were similar between group R and L.

Conclusion: Assessment of myocardial deformation may identify inducible subclinical RV dysfunction.

| Group | RV FW (mm/sec) | Group | LV FW (mm/sec) | p value *
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>N (n=66)</td>
<td>7.6±1.3</td>
<td>R (n=660)</td>
<td>8.7±2.7</td>
<td>0.001</td>
</tr>
<tr>
<td>L (n=26)</td>
<td>7.3±1.0</td>
<td>L vs N</td>
<td>1.07±0.6</td>
<td>0.037</td>
</tr>
</tbody>
</table>

Table 1. Peak stress parameters

Note: *Mann-Whitney U Test

Eur J Echocardiography Abstracts Supplement, December 2006
1045

The effect of levosimendan on right ventricular systolic and diastolic function in ischemic heart failure patients: a tissue doppler study

H. Duygu1; F. Ozkeran1; S. Nabartigl1; M. Zoghli1; A. Akil1; M. Akim1
1Izmir, Turkey

Purpose: Levosimendan is a novel positive inotropic calcium sensitizer agent used in acute heart failure. Although its favorable effects on right ventricular dysfunction were suggested, they were not supported with objective evidence. In this prospective, randomized, double-blind study, the effect of levosimendan on the right ventricular systolic and diastolic function were evaluated by tissue Doppler comparing them with dobutamine in patients with ischemic heart failure.

Methods: Patients having an acute heart failure attack with ischemic cardiomyopathy and LVF ejection <40% were included to the study. Patients were randomized to levosimendan (12.4 µg/kg loading, 0.1 µg/kg/min 24-hours IV infusions, n=30, mean age: 64±10, 63% male) and dobutamine groups (5-10 µg/kg/min 24-hours infusion, n=32, mean age: 68±6, 54% male). Before and 24 hours after treatment, E and S wave velocities from tricuspid lateral annulus by tissue Doppler and systolic pulmonary artery pressure (SPAP) were measured.

Results: The values before and after treatment in both groups were shown in Table. There were no differences detected in E, S wave velocities, SPAP, age and gender between two groups before treatment (p>0.05). S and E wave velocities were increased in levosimendan group whereas they were unchanged in dobutamine group after the treatment. SPAP has shown significant reduction in both groups. However, these reduction is greater in levosimendan group (p<0.01). There was no significant relationship between S and E wave velocities and SPAP in both groups.

Conclusions: Levosimendan improves right ventricular systolic and diastolic functions independent of its reduction of SPAP due to direct vasodilator effect on the pulmonary vascular bed. These results elucidate the favorable effects of levosimendan on right ventricular dysfunction.

Table 1

<table>
<thead>
<tr>
<th></th>
<th>Before</th>
<th>After</th>
<th>p</th>
<th>Before</th>
<th>After</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>S (cm/s)</td>
<td>12.9±1.6</td>
<td>14.8±2.1</td>
<td>0.001</td>
<td>12.2±2.9</td>
<td>13.2±2.4</td>
<td>NS</td>
</tr>
<tr>
<td>E (cm/s)</td>
<td>12.2±1.4</td>
<td>13.2±2.0</td>
<td>0.01</td>
<td>11.7±2.6</td>
<td>10.4±2.3</td>
<td>NS</td>
</tr>
<tr>
<td>SPAP (mmHg)</td>
<td>49±7.0</td>
<td>40±6.0</td>
<td>0.001</td>
<td>52±7.0</td>
<td>48±6.0</td>
<td>0.03</td>
</tr>
</tbody>
</table>

1046

Diagnosis of right ventricular infarction in patients with proximal right coronary artery lesion - diagnostic significance of pulsed Doppler Tissue Imaging

B. Zaborska1; P. Maciejewski1; W. Wasek1; B. Bednarz1; E. Makowska1; E. Pilichowska1; A. Buda1
1Postgraduate Medical School, Grochowski Hosp, Cardiology Dept., Warsaw, Poland

Purpose: There is still lack of gold standard in diagnosis of right ventricular (RV) myocardial infarction (MI), occurring mainly in patients (pts) with inferior MI and proximal right coronary artery (RCA) lesion. Standard echocardiography has limited value in diagnosis of RV dysfunction. The data on usefulness of pulsed Doppler Tissue Imaging (TDI) in the diagnosis of RV MI in pts with inferior MI are sparse, especially in the group with ST segment elevation (STEMI) treated by primary percutaneous coronary intervention (pPCI). The aim of the study was to evaluate diagnostic significance of RV myocardial velocities in this group of pts and assessed correlations with angiographic findings.

Methods: 57 pts (34 males), mean age 63±10.3, with first acute inferior STEMI treated by pPCI were prospectively assessed. RV MI was determined angiographically if the RCA was proximally (1 or 2 segment) totally occluded - TIMI 0. ECHO with TDI was performed after pPCI within 24 hours from the onset of symptoms (mean±SD: 15±7.0). In TDI the peak systolic myocardial velocity (Sm) and peak early diastolic velocity (Em) for RV free wall were obtained. All ECHO and TDI data were compared between groups: with RV MI and without RV MI. Echocardiographers were blinded to clinical, ecg and angiographic parameters.

Results: Angiographically RV MI was found in 30 (53%) pts with inferior STEMI. Receiver operating characteristic (ROC) analysis revealed important diagnostic significance of SmRV for RV MI (ROC =0.75). SmRV <12.3 cm/s as a cut off for diagnosis of RV MI had 77% sensitivity and 74% specificity. In RV MI diagnosis ROC=0.77 was found for Em RV. Em RV<10.6 cm/s as a cut off for diagnosis of RV MI had 77% sensitivity and 71% specificity. Comparison of TDI data is shown in table. In the group with RV MI significantly lower Sm RV and Em RV were revealed, reflecting impaired RV systolic and diastolic function.

Conclusions: Evaluation of RV peak systolic myocardial velocity and peak early diastolic velocity using TDI is a rapid, non-invasive method for diagnosis of RCA proximal lesions and angiographically determined RV MI in pts with inferior STEMI.

Table 1. Comparison of TDI data

<table>
<thead>
<tr>
<th></th>
<th>RV MI (+)</th>
<th>RV MI (-)</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sm RV (cm/s)</td>
<td>10.3±3.1</td>
<td>13.0±2.5</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Em RV (cm/s)</td>
<td>8.7±2.6</td>
<td>11.5±2.8</td>
<td>&lt;0.001</td>
</tr>
</tbody>
</table>

1047

Pacemaker lead infective endocarditis: diagnostic value of echocardiography

A. Lagouche1; F.T. Thury1; J.C.D. Dehary1; J.P.A. Avierinos1; J.P.C. Cosaalta1; F.F. Franceschi1; G.H. Habib1
1Marseille, France

Background: Pacemaker lead infective endocarditis (PMLIE) has been associated with difficult and delayed diagnosis as well as severe prognosis. However, predictors of bad outcome in these patients are not known. Particularly, the predictive value of echocardiography has not yet been studied in PMLIE.

Aim of the study: To assess the prognostic markers of bad outcome in PMLIE, including transthoracic (TTE) and transoesophageal (TOE) echocardiography.

Methods: Sixty-three patients (51 men, mean age >75 years) with definite PMLIE by Duke criteria were prospectively included between 1995 and 2005. Blood cultures were positive in 62% pts and a vegetation was identified in 62%. Six-month mortality and a combined criterion (death - pulmonary embolism - severe sepsis) were analysed. Clinical, biological, and echocardiographic variables were tested in a multivariable analysis.

Results: At six months, mortality was 21%, pulmonary embolism was observed in 40% pts, and severe sepsis in 16%. The combined criterion was observed in 56% of patients with PMLIE. Only age (p=0.04) and vegetation size (p=0.02) were independently associated with bad outcome. ROC curve identified a >15 mm vegetation size as the best predictor of occurrence of both the combined criterion (p=0.01) and death (p=0.02).

Conclusion: PMLIE is still associated with severe prognosis. The best predictors of bad outcome are age and large vegetations on the pacemaker lead. Echocardiography may be helpful for management and therapeutic decision in PMLIE.

1048

Correlation of RV echo parameters in patients before and after long-term permanent pacing

A Drezewicka1; R. Mlynski1; E. Pilat1; R. Gardas1; W. Kargul1
1Medical University of Silesia, Electrocardiology Dept., Katowice, Poland

The overall function of the right ventricle (RV) is an important part of circulatory efficiency. Echocardiography has some tools which can show us in an indirect way the function of the RV such as: the RV contractility dp/dt, RV fractional area change (RVFA) and Tricuspid Annular Plane Systolic Excur- sion (TAPSE). There is no research showing the role of these parameters and their correlation in a patient paced for many years. Purpose of the study was to evaluate RV function and find the most adequate and precise echo measurement in patients paced for many years.

Methods: 86 patients (age 72±8 years) with previously implanted ventricular types of cardiac pacemakers (types: DDD, VDD and VVI) were included in the study. All of them were hospitalized to exchange the pacemaker due to Elective Replacement Indicator (ERI) - they comprise the study group (SGroup). The control group (CGroup) consist of 20 patients of a similar population and without structural heart disease qualified for cardiac pacemaker implantation due to cardiac rhythm disorders. In each patient a full echo examination was performed including parameters evaluating the function of the right ventricle such as: RV dp/dt, RVFA, TAPSE and diameters of the RV. All echo measurements were performed using a Vivid 7 (GE).

Results: All analyses were done in each group independently and then correlated to each other. Values were expressed as mean±SD. In the SGroup median length of time presence of the lead in the RV was 8.2 (SD=3.4) years. A good correlation between RV dp/dt and TAPSE was found (r=0.75, regression slope 1.02). This correlation was strongly dependent on the age.
Comparison of the right ventricle function before and directly after implantation of a cardiac pacemaker

A. Drzewiecka 1; R. Mlynarski 1; E. Pilat 1; R. Gardas 1; W. Kargul 1
1Medical University of Silesia, Electrocardiology Dept., Katowice, Poland

The aim of our study was to examine echocardiographic (ECHO) parameters reflecting pulmonary artery systolic pressure (PASP), right ventricular diastolic function (RV-DF) and right ventricular global (systolic and diastolic) function, expressed by the myocardial performance index (MPI) in persons with morbid obesity.

Material and methods: The study group (G) consisted of 30 non-smoking, otherwise-healthy, non-obstructive persons (24 women; 6 men; mean age 32.3±5.5) with morbid obesity (BMI > 40 kg/m²; mean 48). The control group (C) completed 30 non-smoking healthy persons (22 women; 8 men; mean age 35±3.6) with BMI ≤ 25. In ECHO the parameters of RV-DF and RV global function were assessed.

Results: Heart rate, blood pressure, ECHO RV diameter, M-Mode ECHO tricuspid annulus movement (TAPSE) were normal and did not differ significantly between both groups. PASP was elevated in both groups (P < 0.05 vs BMI ≤ 25). Comparing patients with normal and abnormal RV function, there were no differences in parameters of OSA gravity like apnea-hypopnea index (50.2 33.2-62.2); 33.7 29.5-63.2; P=0.47), Ewth score (14-9.17; 12-11.18; P=0.58) or desaturation index (56.2 23.8-67.1; 42.4 16.0-54.9; P=0.56).

Conclusions: The assessment of myocardial performance index is especially useful to reflect the impairment of RV function in systemic and diastolic function in non-symptomatic persons with morbid obesity. 2. In persons with morbid obesity ECHO parameters suggest slight PASP elevation and RV diastolic dysfunction, but remain within the normal range.

HEART VOLUME DISTANCE

Mitrail leaflet separation index: a new method for the evaluation of the severity of mitral stenosis in the setting of percutaneous mitral commissurotomy

B. Holmin 1; D. Messika-Zeitoun 1; E. Brochet 1; B. Iung 1; A. Vahanian 1
1Bichat Hospital, Paris, France

Background: Planimetry (MV2AD) is considered as the reference method for evaluation of the severity of mitral stenosis (MS). A mitral leaflet separation index (distance between tips of the mitral leaflets) has recently been presented as a reliable measure of MS severity. This method has the advantage of simplicity and therefore, in contrast to planimetry, do not require an experienced operator. However it has never been evaluated in the setting of percutaneous mitral commissurotomy (PMC).

Methods: Forty-three patients, (29 women and 14 men, mean age 52±16 years, 30% atrial fibrillation) referred for PMC were examined by two-dimensional echocardiography. Fifty-nine examinations were performed, 24 before (BM) and 35 after PMC. The mitral leaflet separation index was obtained by averaging the maximal diastolic leaflet separation at the tips of the leaflets in parasternal long-axis and apical 4-chamber views. Planimetry was used as reference. A good value a a formal ward was defined as a difference between values ≤ 2 mm.

Results: Overall, MV2AD was 1.53±0.53 cm², mean mitral leaflet separation index 1.03±0.24 cm. Correlation was good (r=0.74, r<0.0001). Before PMC correlation was poor (r=0.36, p=0.08). After PMC, correlation was good (0.66, p<0.001).
leaflet separation index to predict a good valve opening was 0.87. Using a threshold value of 0.98 cm, sensitivity, specificity, positive predicted value and negative predicted value were 85%, 77%, 82% and 80% respectively.

**Conclusion:** In this large study group of patients with a wide range of MS severity, mitral leaflet separation index was well correlated to the planimetry and a threshold value of 0.98 cm could predict a good PMR result with high sensitivity and specificity. Thus the leaflet separation index, as a semi-quantitative method, seems to be a useful and complimentary method for MS severity assessment in the setting of PMR.

**1053**

**Long-term prognostic value of right ventricular contractile reserve by dobutamine stress echocardiography in patients with mitral stenosis:**

**A tissue Doppler study**

L.E. Sade 1; B. Ozin 1; T. Ulu 1; S. Ackel 1; M. Bligi 1; B. Piri 1; M. Ulucam 1; H. Muderrisoglu 1

1University of Baskent, Cardiology Dept., Ankara, Turkey

**Purpose:** Isovolumic acceleration (IVA) is a measure of right ventricular (RV) contractile function that is unaffected by loading conditions. The objective of this study was to test the hypothesis that RV contractile reserve assessed by tissue Doppler (TD) derived IVA may be associated with long-term outcome in patients with mitral stenosis (MS).

**Methods:** We prospectively studied 43 subjects (mean age 44±16). Twenty-four with MS and nineteen controls. RV contractile reserve was evaluated under dobutamine challenge at a maximum dose of 20 mcg/kg/min. Conventional 2D and Doppler measurements, pulsed wave TD velocity measurements of the tricuspid annulus at the RV free wall were performed at baseline and during dobutamine infusion. All patients underwent cardiac catheterization. Follow-up duration was 14.5 months.

**Results:** Patients with major cardiac adverse events (MACE +): Two patients died, two were hospitalized for acute pulmonary edema, and one deteriorated from NYHA II to III. Mean mitral valve area was 0.7±0.1 cm²/m² in MACE + patients and 0.7±0.2 cm²/m² in MACE - MS patients (p NS). Baseline TD 2D and TD measures did not differ between patients and controls and were not associated with patient outcome. Under dobutamine challenge IVA, isovolumic contraction, A, and RV fractional area change were significantly larger in patients than in controls (all p<0.05) However only reduced IVA was associated with unfavorable clinical outcome (p<0.01) (Figure).

**Conclusion:** Inability to increase RV IVA during dobutamine challenge is associated with an unfavorable long-term outcome and may be of prognostic value in patients with MS.

**ISCHAEMIC HEART DISEASE**

**1054**

**Transthoracic echocardiographic prediction in the ischemic prediction of mitral valve repair failure**

J. Biernat 1; J.S. Golba 1; M.A. Deja 1; K. Widenka 1; W. Domaradzki 1; L.E. Sade 1; B. Ozin 1; T. Ulus 1; S. Acikel 1; M. Bilgi 1; B. Pirat 1; M. Ulucam 1; H. Muderrisoglu 1

1University of Baskent, Cardiology Dept., Ankara, Turkey

**Background:** In the spectrum of the patients with ischemic mitral regurgitation (MR) it is possible to distinguish at least two different subgroups on the basis of some echocardiographic characteristics: 1. patients symmetric tethering (prevalent apical tethering of both leaflets) and 2. patients with asymmetric tethering (prevalent posterior tethering of both leaflets). These two groups differ for clinical features, degree of local and global left ventricular remodelling and dysfunction, and characteristics of the regurgitant jet.

**Aim:** To evaluate if these two groups have different long-term prognosis.

**Methods:** The cohort consisted of patients with ischemic MR who were recorded in our echocardiographic database from January 2000 to January 2006. All patients with a effective regurgitant area >10 mm² or vena contracta >0.2 cm were included in the study. Thus, 219 patients (mean age 67±16 years) were enrolled, 104 (47%) patients in the symmetric and 115 (53%) patients in the asymmetric group. The mean ejection fraction (EF) was 31.3±7%. The end point was cardiac mortality. Survival and event-free survival of patients with symmetric and asymmetric tethering were determined by the Kaplan-Meier method and compared by the log-rank test. Patients were censored at the time of last follow-up. To detect the independent predictors of death, a multivariate Cox regression procedure was performed including the end-diastolic and end systolic volumes, the deceleration time of E wave, the degree of MR and the EF as potential variables.

**Results:** The overall survival at 32 months was 72%. At 32 months the survival in the symmetric group was 79% and in the asymmetric group was 69%, but this difference was not statistically significant (p=0.2). The univariate predictors of death were the EF (p=0.013) and the degree of MR (p=0.019), whereas at multivariate analysis the only independent predictors of death was the degree of MR (p=0.009).

**Conclusion:** The preliminary results of this observational study show that the prognosis of patients with ischemic MR was independent on echocardiographic pattern but was mainly affected by the degree of MR.

**HEART VALVE DISEASE**

**1055**

**Long-term outcome of patients with ischemic mitral regurgitation according to the tethering pattern, preliminary results of an observational study**

E. Agricola 1; S. Ceruti 1; M. Oppizzi 2; M. Pisanì 3; A. Margonato 4

1San Raffaele Hospital, IRCCS, Division of Non-Invasive Cardiology, Milan, Italy

**Background:** In the spectrum of the patients with ischemic mitral regurgitation (MR) it is possible to distinguish at least two different subgroups on the basis of some echocardiographic characteristics: 1. patients symmetric tethering (prevalent apical tethering of both leaflets) and 2. patients with asymmetric tethering (prevalent posterior tethering of both leaflets). These two groups differ for clinical features, degree of local and global left ventricular remodelling and dysfunction, and characteristics of the regurgitant jet.

**Aim:** To evaluate if these two groups have different long-term prognosis.

**Methods:** The cohort consisted of patients with ischemic MR who were recorded in our echocardiographic database from January 2000 to January 2006. All patients with an effective regurgitant area >10 mm² or vena contracta >0.2 cm were included in the study. Thus, 219 patients (mean age 67±16 years) were enrolled, 104 (47%) patients in the symmetric and 115 (53%) patients in the asymmetric group. The mean ejection fraction (EF) was 31.3±7%. The end point was cardiac mortality. Survival and event-free survival of patients with symmetric and asymmetric tethering were determined by the Kaplan-Meier method and compared by the log-rank test. Patients were censored at the time of last follow-up. To detect the independent predictors of death, a multivariate Cox regression procedure was performed including the end-diastolic and end systolic volumes, the deceleration time of E wave, the degree of MR and the EF as potential variables.

**Results:** The overall survival at 32 months was 72%. At 32 months the survival in the symmetric group was 79% and in the asymmetric group was 69%, but this difference was not statistically significant (p=0.2). The univariate predictors of death were the EF (p=0.013) and the degree of MR (p=0.019), whereas at multivariate analysis the only independent predictors of death was the degree of MR (p=0.009).

**Conclusion:** The preliminary results of this observational study show that the prognosis of patients with ischemic MR was independent on echocardiographic pattern but was mainly affected by the degree of MR.

**ISCHAEMIC HEART DISEASE**

**1056**

**The comparison of mitral deformation indices and left ventricle geometry with quantitative assessment of ischaemic mitral regurgitation: echocardiographic and cardiovascular magnetic resonance study**

A.M. Lesnirak-Sobelga 1; E. Wicher-Muniak 2; M. Olszowska 1; M. Kostkiewicz 2; P. Pieniazek 2; P. Klimeczek 1; P. Pasowicz 1; W. Tracz 2

1Institute Of Cardiology, Collegium Medicum, Cardiac And Vascular Diseases Dept., Krakow, Poland; 2John Paul II Hospital, Center for Diagnosis and Rehabilitation, Cracow, Poland

**Background:** The pathophysiology of ischemic mitral regurgitation (MR) is related to local and global left ventricular remodeling and the papillary muscle dysfunction. Aim of this study was to compare mitral deformation indices and left ventricle remodeling with quantitative assessment of mitral regurgitation using transthoracic echocardiography (TTE) and cardiovascular magnetic resonance (CMR) methods.

**Material and methods:** 21 subjects (18 M, 3 F; mean age: 61-3 years) with coronary artery disease, ≥6 months after myocardial infarction, with functional mitral regurgitation (MR I-IV grade) underwent CMR and TTE within the period ≤5 days. There were only 4 subjects with MR III-IV grade, the remaining 17 with I-II grade. The following parameters, assessed by both methods, were analysed: mitral deformation indices as end- systolic and end-diastolic mitral annular area, the coaptation height, the tenting area, mitral annulus diameter - anterior mitral leaflet length ratio; left ventricle remodelling parameters: left ventricular end-systolic diameter (LVESD), left ventricular end-systolic volume (LVESV), left ventricular end-diatostolic diameter (LVEDD), stroke volume (SV),
HEART VALVE DISEASE

1057 Changes in deformation in asymptomatic patients with isolated severe mitral regurgitation detected by strain rate imaging
A. Marciniak1; M. Marciniak1; T. Karu1; A. Baltabaeva1; E. Merli1; B. Bijerne1; M. Jahangiri1; G.R. Sutherland1
1St. George’s Hospital, Echo Dept., London, United Kingdom
Early left ventricular (LV) dysfunction in patients with mitral regurgitation (MR) is difficult to detect due to the lack of a sensitive diagnostic tool to monitor systolic function. To date, there is no specific and widely used diagnostic method to detect subclinical changes in systolic function before irreversible LV dysfunction occurs in MR.

Methods: 53 individuals were studied: 30 asymptomatic patients with isolated severe MR (age 55±11 y) and 23 age matched controls. All patients underwent a standard echo examination with a tissue Doppler study. SR and strain (S) data were acquired from the posterior wall (LVPW) - radial deformation and from LV lateral wall and septum (longitudinal deformation).

Results: Radial peak systolic SR in the LVPW was significantly decreased in patients with severe MR compared to controls (2.20±0.8 vs 3.00±0.57, p<0.005). Radial SR and S were inversely correlated with LV end systolic diameter (ESD) (Fig. 1). Longitudinal SR was significantly reduced in LV lateral wall compared to controls (1.27±0.56 vs 1.60±0.24, p<0.005) as well as in septum 1.15±0.51 vs controls 1.50±0.32 (p<0.008).

Conclusions: SR imaging, could be a sensitive clinical tool in detecting sub-clinical deterioration in LV function in asymptomatic patients with severe MR.

1058 Evaluation of ventricular long axis contraction in patients with asymptomatic non-ischemic mitral valve regurgitation and normal systolic function
I.A. Paraskevaidis1; S. Kyrozopoulos1; D. Tsaiapras1; E.K. Iliodromiti1; J. Parissis1; D. Farmakis1; D.T. Kremastinos1
1Attiko University Hospital, 2nd University Cardiology Dept., Athens, Greece; 2Onassis Cardiac Surgery Center, Second Department of Cardiology, Athens, Greece
Purpose: Several indices have been proposed in order to evaluate left ventricular (LV) function in chronic mitral regurgitation (MR); however, none of them is unique. We investigated the role of ventricular long axis contraction in patients with non-ischemic asymptomatic MR.

Methods: Eighty-nine patients, aged 59.9±13.5 years, with non-ischemic asymptomatic MR were studied by echocardiography, exercise radionuclide cineangiography and cardiac catheterization.

Results: Fifty of 89 patients (56.2%) had a normal LV response to exercise, defined as a >5% increase in ejection fraction. LV end diastolic diameter (59.5±5 vs 57±4 mm) and volume (214±53 vs 190±43 mL) were significantly higher in patients with an impaired LV response (p<0.05). Peak systolic wave velocity and systolic wave slope both at the lateral wall and at the inter-ventricular septum were significantly lower in patients with an impaired LV response (p<0.001). Peak systolic wave velocity at the lateral wall (LaWS) was the index that best predicted LV response to exercise; a cutoff value of 9.5 cm/sec predicted an impaired LV response with a sensitivity of 96% and a specificity of 100%. As defined by the width of vena contracta, MR was mild/moderate in 78% of patients with a LaWS >9.5 cm/sec and severe in 22% of patients with a LaWS ≤9.5 cm/sec.

Conclusion: The evaluation of LV long axis contraction at rest can unmask a subnormal LV functional status in patients with asymptomatic non-ischemic MR.

1059 TEE guided thrombolytic therapy with or without surgery in prosthetic valve thrombosis
A. Nagy1; M. Lengyel1
1Gottsegen Hungarian Institute of Cardiology, Cardiology Dept., Budapest, Hungary
In the management of prosthetic valve thrombosis (PVT) therapy and surgery are treatment alternatives. The aim of the study was to assess the outcome of thrombolytic therapy with or without surgery in critically ill patients. Transesophageal echocardiography (TEE) was used for the diagnosis of PVT, assessment of thrombus (THR) size, location and motility, leaflet motion and treatment monitoring. Nonobstructive PVT was defined as normal leaflet motion with thrombus. Obstructive PVT (OPVT) included all cases with restricted leaflet motion, even in the absence of THR. Between 1993 and April 2006 109 episodes of PVT were found in 80 patients (24 males, 56 females; mean age 56 years; range 28-80 years). T was given in 56 episodes. In 44 cases T was completely successful (75% success rate), partially successful in 10 cases and failed in 4 cases. 4 patients died in this group (7% mortality) and complications of T included 4 episodes of sternal wound infection, 2 peripheral embolic events, 2 transient ischemic events. 8 critically ill patients of the 10 partially successful OPVT cases underwent surgery. 6 patients had mitral valve prosthesis, one patient aortic valve prosthesis, and one patient tricuspid valve prosthesis, out of which the mitral and the tricuspid valves were involved. In all these patients the valvular gradient decreased after thrombolysis, and the hemodynamic parameters improved. In all patients TEOE showed partial resolution of the obstruction, the disappearance of thrombus in 7 cases while in one patient the left atrial thrombus was unchanged. Surgery was successful in all these cases and proved pannus in 5 patients and valve thrombosis in 3 patients. In comparison 7 patients died out of the 26 patients who underwent surgery for other reasons (mortality rate 27%).

Conclusions: Thrombolysis can be performed in critically ill patients with PVT with high success rate, however severe complications can occur. In some patients the residual obstruction has to be resolved surgically due to pannus, or inveterated thrombus. In these cases, due to improved hemodynamics surgery can be performed safely.

1060 Factors associated with pulmonary artery pressure rise in mitral regurgitation related to valve prolapse
T. Le Tourneau1; A.S. Polge1; C. Vanesson1; S. Pouwels1; J. Darchies1; A. Yameogo1; C. Bauters1; G. Deklunder1
1Hospital Cardiologique, Service Expl Fonct Du Dr Deklunder, Lille Cedex, France; 2Cardiologic University Hospital, Lille, France
Purpose: Mitral valve surgery is recommended in patients with organic mitral regurgitation (MR) and severe pulmonary artery pressure (PAP)≥50 mm Hg at rest. However little is known about the determinants of PAP in this setting. Therefore, we sought to evaluate the predictive factors of systolic PAP in MR due to mitral valve prolapse.

Methods: One hundred forty-two patients (61±12 years, 102 males) with moderate to severe MR related to valve prolapse underwent a complete echocardiographic examination with pulmonary artery pressure measurement (using tricuspid regurgitation) and mitral tissue Doppler imaging (TDI).

Results: Mean systolic PAP was 44±13 mm Hg, ranging from 25 to 105 mm Hg. Patients with a systolic PAP≥50 mm Hg (n=33) were older and more symptomatic, had a more severe MR and a higher heart rate, a greater left atrium, a higher mitral E wave and E/A ratio, a shorter mitral deceleration time, a higher septal mitral E/eA ratio and a lower aortic stroke volume. In univariate analysis, predictive factors of systolic PAP were age (r=0.29, p=0.005), MR grade (r=0.29, p=0.0005), left atrial volume/m^2 (r=0.39, p=0.0002), mitral E velocity (r=0.42, p=0.001), mitral E/A ratio (r=0.46, p=0.001), mitral deceleration time (r=-0.22, p=0.034), septal mitral E/eA ratio (r=0.57, p=0.001), and aortic stroke volume (r=-0.31, p=0.006).

In multivariate analysis, the strongest independent factor associated with systolic PAP was septal mitral E/eA ratio (p<0.001); other independent factors were left atrial volume/m^2 (p=0.017) and mitral E/A ratio (p=0.017). Left ventricular size or ejection fraction, as well as effective regurgitant orifice or regurgitant volume were not predictive of systolic pulmonary artery pressure.

Conclusion: In moderate to severe organic mitral regurgitation related to mitral valve prolapse, systolic PAP is not associated with left ventricular size or function, but it is strongly associated with a parameter of diastolic function (septal mitral E/eA ratio); systolic PAP is also associated with a parameter of diastolic function.
Atorvastatin inhibits mitral regurgitation in an experimental hypercholesterolemia rabbit model

N. Rajamannan 1; K. Maganti 1; F. Caira 1; A. Flores 1; T. Spelsberg 2
1Northwestern University, Chicago, United States of America; 2Mayo Clinic College of Medicine, Biochemistry Dept., Rochester, United States of America

Degenerative mitral regurgitation is the most common cause of mitral regurgitation in the United States. Recent epidemiologic studies have linked degenerative mitral valve disease and risk factors for atherosclerosis. In the current study, we studied a hypercholesterolemic rabbit model with and without atorvastatin to determine the cellular mechanisms of mitral leaflet abnormalities.

Methods: 48 Watanabe rabbits were assigned to one of 3 groups: cholesterol (1%) diet, cholesterol (1%) plus atorvastatin (2.5 mg/kg), and normal diet for six months. The rabbits underwent transesophageal echocardiograms and then the mitral valves were harvested. Electron microscopy, immunohistologic staining, and Real-time PCR was performed. Immunohistologic staining of the mitral valves was performed using atherosclerotic markers macrophage (RAM11), alpha-actin smooth muscle, and Proliferating Cell Nuclear Antigen (PCNA). Bone matrix expression was determined by staining for osteopontin, osteocalcin, alizarin Red and measuring alkaline phosphatase gene expression. A 4-point grading system was used to visually describe the staining on each of the slides (0=no staining, 4=high staining). Real-time PCR was performed to measure alkaline phosphatase gene expression.

Results: Mitral regurgitation (3+), Macrophage (3.5+/-0.7), alpha-actin (4+/0), osteopontin (4+/0), osteocalcin (2.5+/0.7), PCNA (4+/0) and alkaline phosphatase (0.479+/0.286) were increased the mitral valves from the cholesterol treated rabbits (p<0.05 as compared to control mitral valves). Alkaline phosphatase was unchanged in the control versus cholesterol treatment groups. Atorvastatin decreased the amount of mitral regurgitation (1+), atherosclerotic proliferative changes including macrophage (2.5+/0.7), osteopontin (1.5+/0.7), osteocalcin (2.5+/0.7), PCNA (2+/0) and alkaline phosphatase expression (0.479+/0.286) in these treated valves.

Conclusion: Experimental hypercholesterolemia induces proliferation and osteopontin expression in the mitral valve that may potentially be modified with the use of a lipid-lowering agent.