**STRESS ECHO**

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Relevance of quantitative exercise Doppler echocardiography in asymptomatic valvular aortic stenosis versus bicycle exercise-stress-test

G. Leurent1; M. Laurent1; E. Donal1; C. Chabanne1; R. Gervais1; J.C. Daubert1; P. Mabo1; C. De Place1

1University Hospital, Cardiology Dept., Rennes, France

**Background:** In patients with asymptomatic valvular aortic stenosis, exercise testing may help at stratifying the clinical risk. However, data are still limited, and the role of quantitative exercise Doppler echocardiography has never been investigated.

**Methods and results:** Forty consecutive patients (68±12 years old) with critical asymptomatic aortic stenosis (aortic valve area <1 cm²) were assessed by a conventional standardized bicycle exercise stress test (EST) and quantitative Doppler echocardiographic measurements at rest and during semi-supine EST. EKG and blood pressure were monitored during the 2-exam. Gradients, effective orifice area, pulmonary pressure, or outputs were measured during exercise-echocardiography. No serious adverse event was observed during the study. No correlation was observed between baseline echocardiographic results and the EST results. Exercise increase in outputs and gradients were significantly greater in patients with a negative-EST, compared to patients having a positive-EST according to ESC-guidelines (maximal gradient +10±20 vs +15±20 mm Hg; aortic valve effective orifice area +0.12±0.23 vs -0.09±0.18 cm²). A correlation was observed between effective orifice area and cardiac output during exercise (figure 1) and interestingly the correlation was significantly higher in the negative - EST group (p=0.04).

**Conclusion:** Quantitative Doppler exercise echocardiography could be useful to identify a subset of patients with asymptomatic valvular aortic stenosis suspect of justifying a prompt valvular surgery. The delta of increase in outputs and gradients, during exercise, appears extremely useful. It might help for clinical decision making despite the lake of large series in the literature.

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**HEART VALVE DISEASE**

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Feasibility of real time three dimensional transthoracic echocardiography for planning mitral reconstructive surgery

R. Sharma1; J. Mann1; L. Drummond1; S. Livesey1; I.A. Simpson1

1Southampton University Hospital, Cardiology Dept., Southampton, United Kingdom

**Background:** Transoesophageal echocardiography (TOE) is considered the gold standard imaging technique for mitral valve assessment prior to surgery. We compared the accuracy of 2-Dimensional TOE with Real Time 3-Dimensional transthoracic echocardiography (RT-3DE) for the pre-operative functional assessment of patients with mitral valve prolapse.

**Methods.** In 44 patients with severe mitral regurgitation due to type 2 valve dysfunction, TOE and RT-3DE were performed 24 hours prior to surgery. We compared the accuracy of 2-Dimensional TOE with Real Time 3-Dimensional transthoracic echocardiography (RT-3DE) for the pre-operative functional assessment of patients with mitral valve prolapse.

**Conclusion:** Although M-mode and RT-3DE LVM measurements are moderately correlated in patients with aortic stenosis, M-mode echocardiography systematically overestimates LVM determined by RT-3DE, possibly due to a systematic bias. Moreover, previously published cutoff values for left ventricular hypertrophy may not apply to LVM determinations by RT-3DE.
analysed by 2 separate observers. TOE and RT-3DE images were acquired digitally on the Philips IE33 ultrasound machine and stored for off - line analysis. The RT-3DE datasets were retrospectively analysed with Philips Qlab software (version 4.0). Leaflet segments and commissures were displayed in short axis en - face and long axis views. Echocardiographic results were validated intraoperatively. Results: - Patients did not have image quality suitable for analysis with RT-3DE and were excluded from analysis. This left a sample size of 39 patients (mean age 52±11 years, 19 male). Twenty - five patients had mitral valve repair and 9 mitral valve replacement. In total, 54 out of 334 analysed mitral valve segments were diseased. Prolapse of a single mitral valve segment was present in 25 patients. 14 patients had complex disease involving 2 or more segments. Sensitivity, specificity and accuracy for TOE in identification of diseased segments were 94%, 100% and 96% respectively. The same value for RT-3DE was 91%, 100% and 94%. The difference was not statistically significant. Accuracies were not significantly different according to segment location. Ruptured chordae was confirmed at surgery in 20 patients. Sensitivity for the diagnosis of ruptured chordae was 90% for TOE and 72% for RT-3DE (p = 0.03). Specificity was comparable by both techniques (89% TOE vs 83% RT-3DE). Interobserver agreement was 92% (for TOE (k=0.85) and 86% for RT-3DE (k=0.83, p = non significant). The mean procedure time for TOE was 27±6 minutes. This was significantly longer than the procedure time for RT-3DE (7.3±3 minutes, p = 0.03). The mean 3D reconstruction time was 15±8 minutes.

Conclusions: RT-3DE is feasible with comparative accuracy to TOE for pre - operative anatomical localisation of prolapsing mitral valve segments. However, the technique is limited by poor image quality in a small proportion of patients. TOE remains superior for diagnosis and localisation of chordal rupture.

3 - D ECHO

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Volumetric Blood Flow Measurement by three-dimensional transoesophageal Doppler-echocardiography

T. Largier1 ; P. Rhomberg1 ; P. A. Kaufmann1 ; E. R. Schmidt1 ; R. Jenni1
1Zurich, Switzerland

Background: Currently available non-invasive methods for quantification of cardiac output (CO) do not account for the three-dimensional velocity profile and are angle-dependent, thus providing inaccurate results. In collaboration with TomTec Munich, we have developed a new software, which has the potential to overcome these limitations as it is angle-independent and allows assessment of velocity profiles by using three-dimensional colour-coded transoesophageal Doppler-echocardiography (3D-Doppler). We have validated CO as assessed by 3D-Doppler versus invasive measurements.

Methods: Twenty-one early postoperative cardiac surgical patients were included in the study. An ultrasound system (Sequoia, Acuson, CA) was used. To acquire 3D velocity distribution in the left ventricular inflow tract, the ultrasound probe rotated synchronous with the pulse in five degree steps by 180 degree around the axis of the ultrasound beam. The volume was reconstructed and displayed three-dimensionally from the obtained data (TomTec 4D Cardio scan) and the data were analysed offline (TomTec 4D Echo view). The results were compared with those obtained simultaneously by pulmonary artery thermodilution.

Results: Three patients could not be evaluated by echocardiography due to poor image quality because of postoperative air between the ultrasound probe and a pressure catheter. In the remaining 18 patients, 5 had only sufficient image quality for the same reason, and 13 had good image quality. Correlation with thermodilution CO was 0.84 (p < 0.0001), and Bland-Altman (BA) limits of agreement (1.96xSD) were 1.25 l/min (27% of the mean). When including only the 13 patients with good image quality, correlation improved (0.86, p<0.0001) and BA-limits decreased to 1.16 l/min (24% of the mean), indicating good agreement between the two methods.

Conclusion: Transoesophageal 3D-Doppler provides accurate CO measurements as compared to the invasive gold standard. However, good image quality is mandatory.

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Chronic ischaemic mitral regurgitation - the comparison between the symmetric and asymmetric type of tethering using three - dimensional transoesophageal echocardiography

A.M. Lesniak-Sobelga1 ; E. Wegner-Muniak1 ; M. Kostlewicz1 ; M. Olzowska1 ; M. Hlawaty2 ; P. Pieniazek2 ; W. Tracz2
1Institute Of Cardiology, Collegium Medicum, Cardiac And Vascular Diseases Dept, Krakow, Poland; 2John Paul II Hospital, Center for Diagnosis and Rehabilitation, Krakow, Poland; 3Institute Of Cardiology, Krakow, Poland

Background: The main mechanism of ischaemic mitral regurgitation (MR) is the systolic mitral valve tenting due to apical and posterior papillary muscle displacement.

The aim of this study was to compare the symmetric and asymmetric type of tethering causing ischaemic mitral regurgitation (MR).

Material and methods: 23 subjects (20 M, 3 F; mean age 61.3 years) with coronary artery disease and previous myocardial infarction, with chronic mild to moderate mitral regurgitation (MR) caused by restriction motion, underwent 2D and 3D transthoracic echocardiographic examination (VIVID 7 Diagnostics, GE). Depending on the actual way of tethering the subjects were split up into two groups: asymmetric (12 subjects) and symmetric ones (11 subjects). The following parameters were analysed: the mitral deformation indices (the end-systolic and end-diastolic mitral annular area, the coaptation height, the tenting area, mitral annulus diameter - anterior mitral leaflet length ratio); left ventricle remodeling parameters (left ventricular end-systolic diameter (LVESD), left ventricular end-diastolic volume (LVEDV), stroke volume (SV) and ejection fraction (EF), sphericity index (SI), the wall motion score index (WMSI) and the quantitative parameters of MR (regurgitant volume -RV and effective regurgitant orifice area -ERO obtained by the PISA method) and vena contracta width (VCW).

Results: There were no statistical differences of the mitral deformation indices between the asymmetric and symmetric type of tethering, except the coaptation height (1.92±0.25 vs 1.58±0.34, p=0.0451). The comparison between the two groups of subjects showed no differences in left ventricular remodeling and the quantitative parameters of MR.

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Determining mitral regurgitant jet area using three dimensional color-flow

T. Hergum1 ; G. Horne1 ; B. Haugen1 ; J. Sema2 ; S. Samstad3 ; H. Torp1
1NTNU, Circulation and Medical Imaging Dept, Trondheim, Norway; 2St. Olavs Hospital, Trondheim, Norway

The cross sectional area (CSA) of a regurgitant jet represents a quantitative measure of regurgitation severity. Although the PISA method may be used for this purpose, there are limitations regarding eccentric jets, multiple jets and jets with a complex geometry. Measuring the regurgitant CSA directly from 3D color-flow images represents an alternative to the PISA method. The CSA of the vena contracta region, the region with near-laminar flow just below orifice, has previously been shown to correlate well with the actual orifice area. Using a GE Vingmed Vivid 7 ultrasound scanner and a matrix array probe we measured the CSA of the vena contracta region in 2 patients with mitral regurgitation and in a patient with a circular orifice. The 4D colorflow data was acquired over 6 heart cycles, and stitched to gather to form a full volume based on ECG triggering. The phantom uses a steady-state flow of a blood-mimicking fluid and it uses orifices with arbitrary size and geometry. For this study we used three circular orifices with area 0.13, 0.28 and 0.36 cm² and a pressure -practed jet of a jet velocity of 4 m/s. The vena contracta region was found using high pulse repetition frequency (HPRF) PW doppler by manually searching for a region with maximum velocity and minimum bandwidth. A "banana - shaped" orifice with cross sectional area of 0.39 cm² was also used to evaluate the performance of the method for a more clinically realistic shape. The recorded data was processed offline using Matlab for high - pass filtering and calculation of power doppler images. The images were visualized using AVView, and the diameter of the vena contracta region below the orifice was measured. Preliminary results from the circular orifice with area 0.39 cm² was found to have a circular vena contracta with CSA of 0.36 cm². The vena contracta region is known to be more narrow than the opening orifice. Some examples of in -vivo 3D color - flow images of mitral regurgitation and corresponding cross sectional areas will be presented, as well as images obtained in vitro using the banana -shaped and circular orifices.

Measuring the cross sectional area of regurgitant jets directly using 3D ultrasound does not have the limitations of the PISA method when it comes to jet location and geometry. We have shown that using a recent ultrasound scanner with 4D color doppler capabilities the CSA of an in vitro severe regurgitation can be measured directly in the vena contracta region.

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Mechanism of residual regurgitation following a mitral valve repair. A three-dimensional echocardiographic study

R. Kerekes1
1Department of Medicine Klinikum, Internal Medicine Dept., Klinikum, Czech Republic

Background: 3D echocardiography extends the scope of 2D echocardiography and enables to evaluate anatomy of complex cardiac structures, i.e. congenital abnormalities, ventricular septal defects or native mitral valve. The aim of this work was determine the mechanism of late failure of mitral valve repair using transoesophageal 3D echocardiography.

Methods and results: Seventeen consecutive patients with significant residual mitral regurgitation on transthoracic echocardiography following a repair underwent multiple transthoracic echocardiography. The addition to Doppler and two-dimensional echocardiography, data for three-dimensional echocardiography reconstruction were obtained. Etiology of residual regurgitation comprised postoperative dehiscence of an annuloplasty ring (82%), isolated progression of the disease (12%) and malposition of annuloplasty ring with progression of the disease (6%). The most common dehiscence site was at the posterior part of mitral annulus (P3) and the rate was gradually decreasing to the anterolateral leaflet at ante-
HEART VALVE DISEASE

411 Echocardiographic parameters associated with high level of plasma brain natriuretic peptide after aortic valve replacement for calcific aortic stenosis in elderly

G. Badea 1; E. Apetrei 1; M. Obreja 1; G. Ursu 1; L. Marzan 1; M. Dumitrescu 1
1National Institute of Cardiovascular Diseases, Cardiology Dept., Bucharest, Romania

Background: BNP is an endogenous cardiac hormone synthesised and secreted predominantly from the left ventricle in response to increased wall stress. In valvular aortic stenosis BNP correlates with the severity of the outflow obstruction. After aortic valve replacement (AVR) BNP falls in some patients. The presence of systemic hypertension, a condition frequently associated with valvular aortic stenosis may influence the plasma BNP level after AVR.

Methods: To evaluate plasma BNP level in patients with AVR and calcific aortic valve stenosis in elderly and to examine the correlation between BNP and left ventricular mass index, ejection fraction and geometry preoperatively and two month post AVR in patients with and without systemic hypertension.

Results: 68 patients over 60 years (17 F/51 M) were included. Plasma BNP, clinical assessment and echocardiographic measurements were performed two month after AVR. BNP was elevated post AVR (200.3±131.7 pg/ml) and hypertensive patients had higher values of BNP compared to normotensives (251.47±151.47 vs 109.44±25.26 pg/ml, p<0.001). Postoperative left ventricular mass (308±116 g) and left ventricular mass index (171±6.4 g/m²) correlated with BNP (r=0.63 and r=0.65) irrespective of the presence of systemic hypertension. Regarding left ventricular geometry, both preoperative and postoperative eccentric remodelling is characterised by the highest plasma BNP values (280±166 pg/ml and 377±111 pg/ml) independent of left ventricular ejection fraction. No correlation was found between BNP and pre/postoperative transprosthetic gradients or ejection fraction.

Conclusion: BNP is increased in elderly patients post AVR for calcific aortic stenosis and hypertensive patients had elevated values compared to normotensives. Plasma BNP level is correlated with pre and postoperative left ventricular mass index and geometry. Associated systemic hypertension seems to contribute to a high BNP level in elderly post AVR for calcific aortic stenosis. Additional reduction of blood pressure in these patients could favorably influence the regression of BNP but this hypothesis needs further approach.

413 Evaluation of diastolic function during exercise in severe asymptomatic aortic stenosis

D. Karsera 1; P. Lancellotti 1; G. Tumminello 1; L. Pierard 1
1Hospital Universitario Virgen de la Victoria, Cardiology Dept., Malaga, Spain

Methods: We studied 21 patients post mitral valve repair and measured MVA by 2D planimetry, 3D planimetry and Doppler pressure half-time (PHT). 2D and 3D real-time transthoracic echocardiograms were performed using an E33 machine (Phillips Ultrasound, Bothell, USA). Analysis was performed offline. 3D datasets were manipulated to visualise the mitral orifice at the leaflet tips precisely (figure). We compared the difference in measured MVA offline with the difference in measured MVA by 3D planimetry and PHT.

Results: MVA measured by 3D echo gave better agreement to MVA by PHT than MVA by 2D planimetry (Average difference 0.4 cm² (SD 0.3) vs 0.8 cm² (SD 0.7)) respectively p=0.014 Student’s T test). There was good correlation between MVA by PHT and with a correlation coefficient of 0.89 for 3D vs 0.60 for 2D. Interobserver variability was good (p<NS).

Conclusion: Planimetry by 3D echocardiography permits accurate identification of the mitral orifice and is therefore an accurate method for assessing MVA post surgery and correlates well with PHT.

Table 1. Preoperative comparative analysis

<table>
<thead>
<tr>
<th></th>
<th>MR (n=67)</th>
<th>No MR (n=78)</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heart failure admission</td>
<td>34 (50.7%)</td>
<td>26 (33.3%)</td>
<td>0.01*</td>
</tr>
<tr>
<td>Sinus rhythm</td>
<td>40 (59.7%)</td>
<td>66 (84.6%)</td>
<td>0.002*</td>
</tr>
<tr>
<td>Maximal aortic gradient</td>
<td>74.8±25.3</td>
<td>78.4±19.5</td>
<td>0.347</td>
</tr>
<tr>
<td>Aortic regurgitation</td>
<td>56 (83.5%)</td>
<td>45 (67.6%)</td>
<td>0.001*</td>
</tr>
<tr>
<td>Left atrium dilatation</td>
<td>25 (35.3%)</td>
<td>10 (12.8%)</td>
<td>0.001*</td>
</tr>
<tr>
<td>LV ejection fraction &lt;40%</td>
<td>13 (19.4%)</td>
<td>5 (6.4%)</td>
<td>0.017*</td>
</tr>
<tr>
<td>LV hypertrophy</td>
<td>57 (85.0%)</td>
<td>72 (92.3%)</td>
<td>0.030*</td>
</tr>
<tr>
<td>Arterial pulmonary pressure (mm Hg)</td>
<td>52.3±13.3</td>
<td>40.2±9.3</td>
<td>0.006*</td>
</tr>
</tbody>
</table>

*p<0.05; LV=left ventricular; MR=mitral regurgitation.
ablable from patient to patient. In univariate analysis, patients who had an abnormal response had a higher increase in both peak (99±30 mm Hg) (p=0.0041) and mean (55±20 mm Hg) (p=0.043) transvalvular pressure gradients. At rest both E/A ratio (1.12±0.5) (p=0.0044) and E/Ea ratio (23±11) (p=0.027) were higher in the symptomatic group. During exercise E/Ea ratio and the variability of E/Ea were significantly higher in the symptomatic group. By multivariate logistic regression analysis, 2 independent predictors of an abnormal response to exercise were a higher increase of mean transaortic pressure gradient (p=0.0075) and of E/Ea ratio (p=0.0323) during exercise.

Conclusion: Impaired augmentation of both mean aortic pressure gradient and of the E/Ea ratio are predictive of an abnormal response to exercise in patients with severe asymptomatic aortic stenosis.

414 Impact of prosthesis-patient mismatch on long-term survival in patients with biological prostheses in the aortic position
E. Donal 1; H. Corbineau 1; J.P. Verhoey 1; B. Lelong 1; T. Langany 1; A. Leguerrier 1
1 Rennes, France; 2 University Hospital Pontchaillou, Cardiac Surgery Dept., Rennes, France; 3 University Hospital Pontchaillou, Cardiac Surgery Dept., Rennes, France

Background: The impact of aortic prosthesis-patient mismatch (P-PM) on long-term survival is unclear (P-PM has been defined as an indexed effective orifice area (IOEA) <0.8 or 0.85 cm²/m² in the literature).

Purpose: Cohort analysis of P-PM impact on mortality and functional status.

Method and results: Between 1984 and 2004, 1003 patients underwent aortic valve replacement (AVR) with Mosaic Medtronic biological prostheses and had transthoracic echocardiography within 1 year after AVR. Mean age of patients was 75±6.8 years; 18.3% were ≥80 years old. Mean body surface area was 1.8±0.2 cm². Prosthetic size was 19 in 4.7%, 21 in 28.3%, 23 in 44.1%, 25 in 19.1% and 27 in 3.8% of the 1003 patients. The mean follow-up was 3.7±2.6 years. Prosthesis-IEOA was derived from the continuity equation. P-PM was classified as severe (IOEA ≤0.60 cm²/m²), moderate (0.60 cm²/m² ≤IEOA <0.8 cm²/m²), or not significant (IEOA ≥0.8 cm²/m²). P-PM was severe in 1.6%, moderate in 60.4% of the 1003 patients.

189 deaths were observed during the follow-up (5.1%). Operative mortality was higher in IEOA ≥0.8 cm²/m² (6.6% vs 3.5%, p=0.002). Mean IEOA was 1.87±5 vs 15.1±6 mm Hg and left ventricular ejection fraction was 60.4±12 vs 58±12% (p=0.01) in the P-PtM group. The functional class during follow-up was not different between the 2-group.

Conclusion: P-PM is not an independent predictor of short or mid-term mortality in our cohort of 103 patients implanted with the same Mosaic biological prosthetic valve.

415 Identifying valvaral & structural heart disease using brain natriuretic peptide: a three assay comparison
S. Modj 1; A. Clarke 1; C. Russell 1; K. Heathcote 1; S. Bowles 1; J.D. Sonomer 1
1 Chester, United Kingdom

Objective: BNP has a widely developing role in predicting cardiac disease other than just LV dysfunction. We evaluate the use of three separate serum Brain Natriuretic Peptide (BNP) assays combined with other demographic and clinical data to predict significant valvaral heart disease and other structural abnormalities in a cohort of patients with suspected heart failure.

Design: Prospective, single blinded cohort study of 95 patients referred by General Practitioners for open access Echocardiography. The echo cardiograms were interpreted using the three BNP levels. Setting: A UK District General Hospital. Variables: Age, sex, British society of echocardiography (BSE) standard adult echocardiogram, creatinine, chest x-ray (CXR), ECG, cardiovascular risk factors, symptoms and signs, medication, simultaneous
correlation of NT-170 NT proBNP (R-pBNP), Bayer® Centaur BNP (BC-BNP) &Biosite® Triage BNP (BT-BNP) levels.

Results: A total of 93 echocardiograms were of diagnostic quality. Including ventricular dilatation and dysfunction, or valve disease or ventricular hypertrophy classed as moderate or severe, a total of 19 patients had abnor-
mal echocardiograms (20%). The R-pBNP assay had the highest negative predictive value at 95%, but lacked specificity when compared with the other assays (R-pBNP: sensitivity 89%, specificity 55%, positive predictive value (PPV) 34%, negative predictive value (NPV) 95%; BC-BNP: sensitivity 63%, specificity 85%, PPV 52%, NPV 90%; BT-BNP: sensitivity 58%, specificity 48%, NPV 84%).

Conclusions: As well as predicting absence of LVSD, a negative BNP ap-
ppears to be a reliable predictor of a structurally normal heart. Used alone to predict a normal echocardiogram, BNP can offer a substantial reduction in departmental workload (R-pBNP 45.3%, BC-BNP &BT-BNP 73.7%).

416 Prevalence of echocardiographic valvaral regurgitation in healthy children
I. Germanakis 1; F. Panthenakis 1; R. Ferakakis 1; P.E. Vardas 1; M. Kalmanti 1
1 University Hospital, Pediatric Cardiology Unit, Pediatrics Dept., Heraklion Crete, Greece

Although clinically significant heart valvular insufficiency is rare in child-
hood, the use of sensitive modern echocardiographic systems could re-
sult in an increased prevalence of silent valvaral regurgitation among oth-
erwise healthy children.

Aim: To evaluate the prevalence of echocardiographic valvaral regurgita-
tion (VR) among healthy school age children of Mediterranean origin.

Methods: A group of 125 consecutive healthy children, (62 boys, 63 girls, median age 8.8 years, range 8.2 to 10.2 years) participating to the initial phase of Cretan Pediatric Cardiology Survey (CPCS), were enrolled to the study. CPCS is a large scale population based study of the cardiovascular health status of school age children of Cretan origin, approved by the Greek Ministry of Education. Participants undergo a detailed evaluation including cardiac auscultation, ECG and echocardiography (using a Vivid 3 Expert, GE System and age appropriate transducers). Echocardiographic valvaral incom-
petence, was considered as insignificant in the presence of trace (at the level of valve leaflets, detected by colour Doppler) or mild (beyond the level of valve leaflets, detected additionally by PW Doppler) regurgitation. Cases of more severe valvaral regurgitation, or prolapse (in cases of MVVR) and (or abnormal auscultatory findings, were considered as significant.

Results: Pulmonary VR was present in 88% (trace 85%, mild 3%), tricuspid VR in 72% (trace 66%, mild 6%), mitral VR in 45.6% (trace 44%, mild 1.6%) and aortic VR in 24% (trace 20%, mild 4%) of children. Valvaral regurgitation was either isolated (18%) or combined (70%) (involving two (28%), three (30%) or four valves (12%)). Mitral valve prolapse and bicuspid A0V were detected in 4.8% and 8% of children; their presence was associated with an increased likelihood for valvaral regurgitation (OR=5.6 and OR=23.6 for AVR and MVR respectively, p<0.005). Clinical auscultation alone failed to detect children with mild echocardiographic valvaral regurgitation.

Conclusions: Silent valvaral regurgitation, detected during routine echocardiographic evaluation, is very common among healthy children. In the presence of a morphological normal aortic and mitral valve it should be inter-
preted as a normal finding.

417 Valvaral heart disease in patients with Parkinson disease treated with pergolide
E. Laraudogitia Zakumbide 1; S. Velasco 1; J.J. Onaindia 1; J.R. Rumoroso 1; I. Rito 1; N. Foncea 1; S. Palomar 1; I. Lekuona 1
1 Hospital de Galdakao, Vizcaya, Spain

Restrictive valvaral heart disease has been reported in patients with Parkinson disease treated with pergolide. However, few data are available on actual frequency, severity and dose-dependency of pergolide-induced disease.

Aim: To evaluate in a double blind and prospective study, the presence of valvaral heart disease in patients treated with pergolide versus patients with Parkinson disease age-sex matched never treated with pergolide (control).

Patients and methods: 26 patients treated with pergolide and 26 never treated were evaluated by echocardiography. Systolic and diastolic func-
tion, valvaral heart disease and systolic pulmonary artery pressures (SPAP) were determined.

Results: Mean cumulative doses of pergolide was 4401 mg y daily doses was 2.19±1.24 mg/day. Mean time of treatment was 64±35 months. Some of the results are in the table. Mitral and aortic mild esclerodegenerative changes without any repercus-
sion were frequent in both groups as is expected in this older population. In the pergolide group, important restrictive valvaral heart disease was present in two patients (2/26) with significant mitral and tricuspid regurgitation and none in the control group (in this non pergolide group, significant regurgita-
tions were related to degenerative valvaral heart disease, no restrictive). No association was found between doses and time of treatment and the pres-
ence of restrictive valvaral disease.

Conclusion: In our patients with Parkinson´s disease treated with pergolide doses <5 mg/d, pergolide-induced restrictive valvaral heart disease is present in 8% of patients, a lower frequency than previously reported.
418 Clinically relevant valvular heart disease is rare in Parkinsons disease patients treated with pergolide

H. Linkova 1, H. Penicka 1, E. Ruzicka 1, J. Roth 1, O. Ulmanova 1, L. Novakova 1, M. Havlikova 1

Background: Therapy with pergolide, an ergot-derived dopamine receptor agonist, is associated with retroperitoneal, pleural and pericardial fibrosis. The aim of this study was to investigate the relationship between the long-term use of pergolide and the prevalence of restrictive valvular heart disease.

Methods: The study population consisted of 95 patients (age 61±9 years, 24% female) with Parkinson’s disease (PD) treated with pergolide and 35 healthy controls matched for age and gender. All subjects underwent transthoracic echo-Doppler examination. Valve morphology was graded as normal, restrictive or degenerative. Mitral valve tenting area and tenting distance were assessed from parasternal long-axis views.

Results: Average daily dose of pergolide, cumulative dose and median duration of treatment were 2.93±0.72 mg, 4543±1932 mg and 51.6±23 months, respectively. Severe valvular heart disease or pulmonary hypertension was not observed in any subject. Two PD patients (2.1%) and one control (2.9%) had moderate degenerative aortic regurgitation. Discrete fibrous thickening of the left-sided valves was noted in 16 PD patients (16.8 %) as compared to none of the controls (p<0.01). Mitral valve was affected in 10 patients and aortic valve in 6 patients. Regurgitation was not observed on any of the affected valves. Of note, in the PD patients, the mitral valve tenting area was significantly larger than in controls (1.44±0.03 cm² vs 1.05±0.05 cm², p<0.0001).

Conclusions: The present study demonstrated that long-term use of pergolide is not associated with clinically relevant valvular disease. Nevertheless, discrete fibrous changes with restrictive leaflet motion of left-sided valves were observed only in PD patients treated with pergolide.

419 Biological ring in mitral-valve repair: echocardiography evaluation of mitral annulus dynamics and left-ventricular function with pericardial annuloplasty

F. Roshanali 1, M.A. Yousefnia 1, M.H. Mandegar 1

1Federico II University of Naples, Clin. Medicine, Cardiovascular & Immun. Sciences Dept., Naples, Italy

Objective: Annular dynamics play an important role in the valvular and ventricular function. We evaluate the effects of pericardial annuloplasty rings on mitral annulus dynamics and left-ventricular (LV) function after mitral-valve repair.

Material and methods: 100 consecutive patients were prospectively enrolled. All patients had myxomatous mitral valve with severe regurgitation and underwent identical surgical mitral-valve reconstruction. All patients underwent mitral annuloplasty with an autologous pericardial ring and other method of repair depends on involved segments. Post-operative LV systolic indices have been assessed by two-dimensional echocardiography at rest and during exercise. Mitral annular motion has been examined by mitral annulus systolic excursion (MASE). Mean and peak trans-mitral flow velocities (TMFV) and mitral valve area (MVA) have been also evaluated by continuous-wave Doppler.

Results: The mean follow-up did not differ between the groups, those being 24±6 months in (range:12-35 months). Post-operative echocardiographic study did not show significant mitral regurgitation at rest or at peak exercise in any patient. There was significant increased in TMFV (from 1.14±0.20 to 1.68±0.22 m/s, t=−4, p<0.001). Recruitment of LVEF reserve during exercise was observed (from 55.5±7 to 65.4±5, t=−3.95, p<0.005). Significant increased MASE at all the studied longitudinal segments at rest and during exercise was observed in all patients. No calcifications have been observed on pericardial rings.

Conclusions: The autologous pericardium for annuloplasty in mitral valve has excellent mitral annulus dynamics and preserves LV function during stress conditions. Effective annular remodelling with the autologous pericardium is shown, with no echocardiographic sign of degeneration. Further studies are required to compare biological versus flexible prosthetic rings in mitral valve repair.

420 Echocardiographic densitometry in the evaluation of aortic valve calcification

J. Nelassov 1, E. Moothien Pillay 2, A. Kastanajan 2

1Rostov-On-Don, Russian Federation; 2Rostov State Medical University, Ultrasound Dept., Rostov-On-Don, Russian Federation

Aim: In this study we aimed to analyze if echocardiographic densitometry can be useful for assessment of aortic valve calcification.

Methods: 27 subjects were examined by röntgenoscopy for the purpose of detection of aortic valve calcification. In 8 patients (mean age 69.9±8.7 years) calcific aortic valve disease was detected and in 19 subjects (mean age 36.0±14.1 years) - was not. Echocardiographic densitometry was performed using ultrasound scanner Nemo 35 (TOSHIBA). Standard cardiac program (1HeartA) and fundamental imaging frequency of 2.5 MHz were selected. Level of gain 80 was common for all subjects. Aortic valve was visualized in parasternal short axis view. Measurements were made with 2D-Echo Histogram package and method of ellipse was applied for tracing of aortic valve. The distribution of intensity of 2D-mode echoes within the traced area (aortic valve including aortic annulus) was displayed graphically. Obtained values of Max and Mean intensity in the 2 groups were compared using t-criteria of Student. Max is the number of data corresponding to the graduation value with the maximum number of data as a percentage of the total number of data (%). Mean is a mean value of echo intensity within the traced area.

Results: Visualization of the aortic valve was performed in all cases easily. The Max value in subjects without calcification was 9.52±2.76 and in patients with aortic valve calcification - 6.13±0.83 (p=0.002) and the Mean value - 9.2±1.5 and 18.6±2.3 (p<0.0001), respectively.

Conclusion: Echocardiographic densitometry allows to differentiate between aortic valve calcification and normal valve and can give a quantitative evaluation of the degree of calcification.

421 Prevalence and determinants of aortic sclerosis in patients with atherosclerosis

M.A. Losi 1, G. Brevetti 1, G. Barbatelli 1, G. D'Alessandro 1, V. Schiano 1, A. Cacace 1, S. Betocchi 1, M. Chiariello 1

1Federico II University of Naples, Clin. Medicine, Cardiovascular & Immuns. Sciences Dept., Naples, Italy

Aortic sclerosis (AS) is a marker of increased risk for cardiovascular events. AS incidence increases with age and in specific clinical settings, and it is thought to represent a marker of atherosclerosis. Its prevalence and determinants, however, in patients with both coronary artery disease (CAD) and peripheral artery disease (PAD) are not known.

Aim: To assess the prevalence and the determinants of AS in patients with CAD and PAD.

Methods: Patients referred for echocardiography for suspected cardiac disease were prospectively enrolled in the study. Aortic sclerosis was defined by echocardiography as focal areas of increased echogenicity on aortic cusps not inducing stenosis, i.e. maximal aortic velocity < or =2.5 m/s. History of CAD, PAD, hypertension, dyslipidemia, diabetes, and smoke were assessed in each patient. 215 patients (age 69±9 years, 167 men) were divided into four age and sex matched groups: 63 had neither history of CAD nor PAD (normal), 71 had CAD, 24 had PAD, and in the remaining 57 there was history of both CAD and PAD.

Results: AS was found in 66 patients; patients with AS were older than patients without (71±7 vs 64±9 years, p<0.001). AS prevalence increased significantly in patients with both CAD and PAD (Figure). By logistic regression analysis, determinants of AS were found to be age and coexistence of CAD and PAD (p<0.001).
Methods and results: (ESE) in this population. 

The exercise test was abnormal in 67 patients. Symptoms developed in 48 patients: dyspnea in 38, angina in 9, dizziness in 5 and significant fatigue in 4. Abnormal blood pressure response to exercise was noted in 44 patients, and in 24 of them it was the only manifestation of test abnormality. ST segment depression > 2 mm was observed in 7 patients. There was no sustained ventricular arrhythmia. There were no cases of syncope or other major complications. The post-exercise peak and mean transaortic pressure gradients were 113±24 mm Hg and 70±16 mm Hg respectively. An abnormal contractile response was observed in 12 patients and in 7 of them it was the only parameter of test abnormality. Sixty-four patients were followed up for 20.6±13.7 months. Of these, 41 underwent aortic valve replacement and in 23 (56%) of them the indication for surgery was based on the test result. Three patients died during follow-up, one of them while waiting for surgery.

Conclusions: ESE under careful supervision is a safe and useful procedure for the evaluation of asymptomatic patients with severe AS. A large proportion of patients underwent aortic valve replacement based exclusively on the ESE results.

422 Asymptomatic severe aortic stenosis: is there a role of BNP in decision making? 

F. Mori 1; A. Oddo 1; F. Pieri 1; G. Galeota 1; A. Zuppilirro 1; G.F. Gensini 1

1Ospedale Careggi, Cardiologia Generale 2, Firenze, Italy; 2Cardiologia Ospedale SM Annunziata, Firenze, Italy; 3Istituto Clinica Medica e Cardiologia, Firenze, Italy

Background: The onset of symptoms is a critical point in the natural history of AS (AS) and the cardiac indication for valve replacement; however, particularly in elderly patients (p), the assessment of symptoms is not always easy and the evaluation of the optimal time for surgery is often difficult.

Aim: To evaluate natriuretic peptide (pro-BNP) levels in asymptomatic or mildly symptomatic p with severe AS and to define the possible role of pro-BNP in the decision making.

Methods: 22 p (mean age 73±8 yrs, 6 male) with severe isolated AS (mean aortic valve area [AVA] 0.4±0.05 cm²/m²), were examined; all p had a normal left ventricular function (mean ejection fraction 0.65±0.04%) and were in I-II NYHA functional class. At the first evaluation, pro-BNP levels were measured and a complete echocardiographic examination was performed in all p. Patients were then enrolled in a follow-up program with every six month complete clinical and echocardiographic evaluation.

Results: At the first examination pro-BNP mean value was 916±846 pg/mL; during follow-up period (13±5 months) 5 p showed clinical and functional worsening and underwent aortic valve replacement because of symptoms (Group A); 15 p had unchanged clinical conditions (Group B); 2 p were lost at follow-up. First evaluation pro-BNP levels were statistically higher in group A than in group B (1635±1432 vs 710±509 pg/mL, p<0.05), whereas Echocardiographic parameters usually used for AS quantification did not show significant differences between the two groups: AVA 0.44±0.13 vs 0.45±0.04 cm²/m², Peak velocity 4.87±0.88 vs 4.37±0.40 m/sec; mean gradient 62.23±23.47 vs 47±10 mm Hg; Doppler Velocity Index 0.23±0.08 vs 0.23±0.03; aortic valve resistance 323±170 vs 223±58 dyne.sec.cm⁻² (p<0.05); Percent Stroke Work Loss 29±10 vs 24±5%.

Conclusions: Our data show that in asymptomatic or mildly symptomatic p with severe AS, natriuretic peptides may predict the onset or worsening of symptoms and provide important prognostic information beyond echo-cardiographic parameters. Thus, they may be useful for timing of surgery in these p.

423 Exercise stress echocardiography: a useful and safe tool for the evaluation of asymptomatic patients with severe aortic stenosis D. Weisemberg 1; Y. Shapira 1; M. Vaturir 1; A. Battler 1; A. Sagie 1

1Rabin Medical Center, Cardiology Dept., Petah Tikva, Israel

Background: The timing of surgery in asymptomatic patients with severe aortic stenosis (AS) is controversial. Exercise testing may help in risk stratification and prognostication, but data are limited. Hence the aim of this study was to assess the safety and clinical utility of exercise stress echocardiography (ESE) in this population.

Methods and results: We evaluated 101 consecutive patients (mean age 69±10 years, range 35 to 85 years, 58% male) with asymptomatic severe AS (aortic valve area [AVA] <1 cm² and/or mean transvalvular pressure gradient >750 mm Hg ), with normal left ventricular function, who were referred for treadmill-ESE. The study was supervised by an on-site experienced cardiologist, and blood pressure was measured every 1 minute. The test was considered abnormal if it was stopped prematurely because of: limiting symptoms (dyspnea, angina, dizziness or significant fatigue), fall or small (<20 mm Hg) rise in systolic blood pressure, >2 mm ST segment depression, or the appearance of complex ventricular arrhythmia. The resting AVA averaged 0.74±0.13 cm², with peak and mean transvalvular gradients of 91±19 mm Hg and 57±13 mm Hg, respectively. Total exercise time was 5.2±2.6 minutes.

Conclusions: In patients with atherosclerosis, the prevalence of AS is increased. This increase is related to age and to the coexistence of CAD and PAD. Thus, AS represents a marker of a more generalized atherosclerotic process in aging patients.

424 Early and medium-term survival after aortic valve replacement in septogenarians with severe aortic stenosis W.H. Ding 1; A. Duncan 1; R. Chung 1; W. Li 1; J.R. Popper 1; M.Y. Herein 1

1Royal Brompton Hospital, Echocardiography Dept., London, United Kingdom

Background: Aortic valve replacement (AVR) for severe aortic stenosis (AS) is challenging in elderly patients.

Methods: We compared clinical, surgical, and echocardiographic data in 112 (70 years) and 72 (<70 years) p who underwent AVR for severe AS between 1998-2003. Mean age was 77±1 years and 60±1 years, respectively. One month prior to AVR we recorded fractional shortening (FS), peak AV pressure drop (AVPD), mitral E/A ratio, and peak systolic pulmonary artery pressure (PSPAP) by echocardiography. Median follow up was 46 months. Study endpoints were all-cause mortality.

Results: There were no significant differences in gender, QRS duration, severity of stenosis, incidence of angina, coronary artery disease, hypertension, or diabetes between the two groups, pre-operatively. FS and AVPD were similar (27±1 vs 29±1, p=0.27; 74±2 vs 74±3 mm Hg, p=1). AF incidence, left atrial size and E/A ratio were greater in the elderly (36% vs 19%, p=0.03; 44±1 vs 41±2 mm, 2.2±0.1 vs 1.9±0.2, respectively, p<0.001). There were no differences in surgical data (urgent AVR, cardiopulmonary bypass time [CPBP], or incidence of stented valve). Peri-operative mortality was 12% (elderly) vs 4% (young, p=0.14). In the elderly, mortality (non-survivors vs survivors) was associated with: worse renal function (creatinine 140±11 vs 111±3 mmol/L), increased E/A ratio (3.5±0.5 vs 2.1±0.2, raised PSPAP (44±5 vs 25±1 mm Hg), longer CPBP (146±15 vs 112±3 min, p<0.002), and increased incidence of stented valve (100% vs 72%, p=0.04). Compared with survivors, Medium-term mortality was 19% (elderly) vs 11% (young, p=0.23). Similarly, mortality in the elderly was associated with worse renal function: (creatinine 126±9 vs 112±3 mmol/L, p=0.03), increased E/A ratio (3.4±0.4 vs 2.0±0.1, raised PSPAP (36±3 vs 25±1 mm Hg, p=0.001), longer CPBP (132±11 vs 113±3 min, p=0.04), and increased incidence of urgent operation (76% vs 32%, p<0.001).

Conclusion: Peri-operative AVR mortality in septogenarians is acceptable, and together with medium term mortality is related to LV diastolic dysfunction. The beneficial role of stentless AVR in elderly patients needs further study.

425 Role of statins and ACE inhibitors in the progression of aortic valve sclerosis or stenosis F. Antonini-Cappelletti 1; E. Leibl 1; D. Chioco 1; T. Bescigoa 1; P. Faggiano 1; R. Piazza 1; D. Pavan 1; G.L. Nicolosi 1

1ARC, Ospedale Civile, Cardiology Dept., Pordenone, Italy; 2Spedali Civili, Cardiology Dept., Brescia, Italy; 3S. Vito al T., Cardiology Dept., Pordenone, Italy

Background: It has recently been hypothesized that statins could slow the progression of aortic sclerosis and stenosis, but this remains still controversial. Moreover, there is little and conflicting information about the additional role of ACE-inhibitors in these patients.

Methods: From our database we retrospectively identified 1136 consecutive patients with aortic valve sclerosis, defined as thickened aortic cusps and peak aortic velocity (Vmax)>1.5 and <2 m/s, or mild to moderate aortic stenosis (Vmax 2.0-3.9 m/s) and with at least 2 complete echocardiographic studies 6 months apart. During follow-up, 121 patients (11%) were treated with statins. As a control group, 121 age-gender matched patients not treated with statins, with similar initial aortic Vmax were randomly selected. In this case-control population, a therapy with ACE-inhibitors was present in 107 patients (53 statin-treated and 54 not statin-treated). Mean (±SD) follow-up duration was 52±34 months.

Results: There were no differences between statin-treated patients and not statin-treated regarding age, gender, follow-up duration and prevalence of

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426 Postystolic shortening in patients with symptomatic aortic stenosis

R. Jurkевичius 1; R. Arzanauskienė 1; G. Klaškauskaitė 1; R. Vereskaitė 1; R. Jonkaliene 1; J. Vaskeleyte 1; J. Janaiene 1; J. Marcinekivecienė 1

1 Institute of Cardiology, Kaunas, Lithuania; 2 Kaunas University of Medicine, Kaunas, Lithuania

Background: Myocardial postsystolic shortening (PSS) is considered a sensitive marker of myocardial ischaemia. In most patients with aortic stenosis (AS) left ventricular long axis excursion is reduced even in the presence of normal ejection fraction. Limited information exists regarding value of PSS in AS. Aim of the study was to investigate the presence and significance of PSS in patients with symptomatic AS.

Methods: Seventy two patients (aged 65±9 yrs.) with symptomatic AS were studied. Left ventricular long axis function was assessed echocardiographically using tissue Doppler and digitized M-mode echocardiography of mitral annulus motion.

Results: PSS was present in 32 (44.4%) patients with AS. No statistically significant difference between groups with and without PSS was found in clinical data, left ventricular function and grade of AS. Frequency of significant coronary stenosis did not differ significantly in groups with and without PSS (32% vs 16%, p=0.11). The only significant finding was correlation between duration of symptoms and amplitude of PSS (r=0.58, p<0.05). Multiple regression analysis revealed best predictors of PSS amplitude (R²=0.56): thickness of posterior wall of the left ventricle, left atrium dimension, and systolic lateral velocity of mitral annulus (p<0.05).

Conclusions: 1. Postsystolic shortening was present in 44.4 % of patients with symptomatic aortic stenosis and is associated with longer duration of symptoms. 2. In aortic stenosis postsystolic shortening amplitude is related to left ventricular hypertrophy and left atrial size.

427 Evaluation of left ventricular remodeling in patients with aortic stenosis

M. Fijalkowski 1; A. Rogowski 1; R. Galaska 2; W. Dubaniewicz 1; J. Rogowski 1; A. Rynkiewicz 1

1 Medical University of Gdansk, 1st Department of Cardiology, Gdansk, Poland
2 Institute of Cardiology, Kaunas University of Medicine, Kaunas, Lithuania

Background: Pressure overload in patients with aortic stenosis causes accumulation of fibrillar collagens leading to increase of left ventricular mass and myocardial stiffness.

Aim: The aim of study was to establish relation between type of left ventricular remodeling and echocardiographic parameters.

Methods: The study population consisted of 128 patients with isolated aortic stenosis (42 women; mean age 65±10 years). Types of left ventricular remodeling in patients with aortic stenosis were classified according to LVMI and relative wall thickness (RWT): normal LV (N), LV concentric remodeling (CR), LV concentric hypertrophy (CH) and LV excentric hypertrophy (EH).

Results: The mean echocardiographic parameters of patient with AS were: the aortic valve area (AVA) 0.8±0.3 cm², maximal pressure gradient (PG max) 68±29 mm Hg and mean pressure gradient (PG mean) 54±20 mm Hg, LVEF 71±14%, fractional shortening (FS) 35±10%, left LVMI 146±47 mg, circumferential end-systolic wall stress (cESS) 102±48 kdynes/cm², left ventricular chamber stiffness (KLV) 0.12±0.11 mm Hg/ml. Prevalence of types of left ventricle remodeling was N - 11pts (8%), CR - 38 pts (30%), CH –- 60 pts (46.9%), EH - 19 pts (15%). In group of patients with excentric remodeling significantly higher were cESS and KLV and significantly lower was LVEF (p<0.001) N v. EH, EH v. CR, CH

Conclusions: 1. Prevalence of excentric remodeling is the highest in group with excentric hypertrophy and associated with increase of left ventricle chamber stiffness and deterioration of systolic function indices. Response of left ventricle remodeling to pressure overload depends more to level of wall stress that to Doppler echocardiographic parameters of aortic stenosis severity.
Median follow-up was 46 months (inter-quartile range 19-73 months). Survival at 4 years was 83%. Univariate predictors of median-term mortality (hazard ratio [HR]) were low FS (HR: 0.68 per percentage increase, p<0.001) raised PSPAP (HR: 1.07, p<0.001), high mitral E/A ratio (HR: 3.52, p<0.001), low AVPD (HR: 0.97, p=0.015), and CAGB (HR: 4.93, p=0.037). 15/64 patients with stented valve died but no patient with a stentless valve died (chi² = 6.25, p<0.025). Independent predictors of median-term mortality were raised PSPAP >46 mm Hg (HR: 7.71, p<0.0015), low FS <20% (HR: 0.02, p=0.030), and restrictive LV filling pattern (high mitral E/A ratio, HR: 1.77, p<0.035). Using ROC analysis, FS <20% was 85% sensitive, 93% specific for predicting median-term mortality, and PSPAP >46 mm Hg was 80% sensitive, 94% specific.

Conclusion: The severity of pre-operative LV systolic and diastolic dysfunction is the major predictor of mortality after AVR in severe but low pressure-drop AS. The beneficial role of low-profile, stentless AVR in such patients appears suggestive.

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Impaired LV systolic longitudinal function by a new systolic index and LV diastolic dysfunction in patients with moderate aortic stenosis
K. Steine1; A. Rosseboe1; T.R. Pedersen1; M. Stugaard1
1Aker University Hospital HF, Cardiology Department Dept., Oslo, Norway; 2Ullevaal University Hospital, Cardiology Dept., Oslo, Norway

Background: Previous studies on severe aortic stenosis by standard echo have demonstrated normal LVEF and impaired LV diastolic function. Tissue Doppler imaging (TDI) techniques, however, have revealed impaired LV contractility in subsets of patients. In the present study we introduced a new systolic index to disclose impaired systolic function in moderate aortic stenosis (MAS). We also wanted to explore if these patients had diastolic dysfunction.

Methods: 49 patients, 65±12 (SD) years of age, from the multicenter Simvastatin + Ezetimibe in Aortic Stenosis study (SEAS), were included and compared to 26 healthy individuals, 64±12 years (p=ns). Asymptomatic patients with aortic peak velocities between 2.5 m/s and 4.0 m/s were included. LVEF was determined using Simpson’s rule. By tissue tracking, which is derived from tissue velocities, a new LV systolic index was determined using averaged atriovenous (AV) systolic displacement in four-chamber view, divided by the distance from apex to the AV plane in diastole. The diastolic function of the LV was assessed by peak velocities of pulsed Doppler transmural early and atrial A filling waves, the E/A ratio, E deceleration time and flow propagation velocity by color M-mode Doppler. LV filling pressure was estimated by the E/F flow propagation velocity index.

Conclusion: The easily derived new systolic index by tissue tracking reveals a reduced systolic longitudinal function in patients with MAS. Although the E/A ratio, E deceleration time and Flow propagation velocity between the MAS patients and the controls were similar, the MAS patients have diastolic dysfunction according to the increased filling pressure in these patients by the E/F flow propagation index.

Table 1

<table>
<thead>
<tr>
<th>MAS, n=49</th>
<th>Controls, n=26</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>LVEF</td>
<td>55±6</td>
<td>55±4</td>
</tr>
<tr>
<td>systolic index, %</td>
<td>10.3±2.7</td>
<td>12.±2.7</td>
</tr>
<tr>
<td>E cm/s</td>
<td>90±21</td>
<td>69±13</td>
</tr>
<tr>
<td>A cm/s</td>
<td>78±30</td>
<td>57±16</td>
</tr>
<tr>
<td>E/A</td>
<td>1.1±0.5</td>
<td>1.2±0.3</td>
</tr>
<tr>
<td>Flow propagation, cm/s</td>
<td>55±27</td>
<td>56±26</td>
</tr>
<tr>
<td>E/F flow propagation</td>
<td>1.7±0.7</td>
<td>1.3±0.5</td>
</tr>
</tbody>
</table>

432
Usefulness of the proximal isovelocity surface area method for quantification of the severity of aortic regurgitation in patients with eccentric jets: Comparison with cardiac magnetic resonance
A. Poulet1; J.B. Le Polain De Waroux1; A. Pasquet1; B. Gerber1; J.L. Vanoverschelde1
1Cliniques Universitaires Saint Luc, Cardiology Dept., Brussels, Belgium

Background: In pts with aortic regurgitation (AR), Doppler-echocardiographic assessment of the proximal isovelocity surface area (PISA) permits quantification of AR severity. Since this assessment is usually performed on color flow images obtained from apical windows, it may underestimate AR severity in pts with eccentric as opposed to central AR jets.

Aim: The aim of this study was 1- to test if the accuracy of the PISA method in order to operate early enough to prevent heart failure. Ultrasonic strain rate (SR) imaging could provide a new technique for detecting early changes in radial and longitudinal deformation in patients with severe AR. It could be a useful tool in predicting LV dysfunction.

Table 1

<table>
<thead>
<tr>
<th>E/Flow propagation index</th>
<th>E/Flow propagation index</th>
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<tbody>
<tr>
<td>p&lt;0.001</td>
<td>p=0.001</td>
</tr>
<tr>
<td>R=0.7</td>
<td>R=0.57</td>
</tr>
</tbody>
</table>

Results: Results of the study population consisted of 49 individuals: 26 consecutively matched subjects. All patients underwent a standard echo examination extended with a tissue Doppler imaging study. For LV radial deformation, the posterior wall (LVPW) was examined. To assess LV longitudinal deformation, SR data were acquired from the septum and LV lateral walls.

Results: Radial peak systolic SR in the LVPW was significantly decreased in patients with severe AR compared to healthy subjects (1.6±0.6 s⁻¹ vs 3.0±0.5 s⁻¹, p<0.001), in addition SR was inversely correlated with LV end systolic diameter (ESD) (figure 1 left). Longitudinal SR was significantly reduced for mid segment of septum in the severe AR group compared to control subjects (1.5±0.3 s⁻¹ vs 1.5±0.3 s⁻¹, p<0.001) as well as for LV lateral wall compared to controls (1.5±0.4 s⁻¹ vs 1.6±0.2 s⁻¹, p<0.001). Longitudinal SR was inversely correlated with ESD (figure 1 right).

Conclusions: SR imaging is a sensitive tool in detecting subclinical changes in radial and longitudinal deformation in patients with severe AR. It could be a useful tool in predicting LV dysfunction.

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Left ventricular abnormalities in asymptomatic patients with isolated severe aortic regurgitation detected by strain rate imaging
A. Marcinik1; G.R. Sutherland1; M. Marcinik1; T. Karu1; A. Baltabaeva1; E. Merli1; B. Bjøns1; M. Jahangiri1
1St. George’s Hospital, Echo Dept., London, United Kingdom

It is a challenge to identify patients with subclinical myocardial dysfunction in order to operate early enough to prevent heart failure. Ultrasonic strain rate (SR) imaging could provide a new technique for detecting early changes in regional left ventricular (LV) systolic deformation.

Aim: To assess the changes in regional LV systolic function by SR imaging in predicting LV dysfunction in patients with isolated severe aortic regurgitation (AR).

Methods: The study population consisted of 49 individuals: 26 consecutively matched subjects. All patients underwent a standard echo examination extended with a tissue Doppler imaging study. For LV radial deformation, the posterior wall (LVPW) was examined. To assess LV longitudinal deformation, SR data were acquired from the septum and LV lateral walls.

Results: Radial peak systolic SR in the LVPW was significantly decreased in patients with severe AR compared to healthy subjects (1.6±0.6 s⁻¹ vs 3.0±0.5 s⁻¹, p<0.001), in addition SR was inversely correlated with LV end systolic diameter (ESD) (figure 1 left). Longitudinal SR was significantly reduced for mid segment of septum in the severe AR group compared to control subjects (1.5±0.3 s⁻¹ vs 1.5±0.3 s⁻¹, p<0.001) as well as for LV lateral wall compared to controls (1.5±0.4 s⁻¹ vs 1.6±0.2 s⁻¹, p<0.001). Longitudinal SR was inversely correlated with ESD (figure 1 right).

Conclusions: SR imaging is a sensitive tool in detecting subclinical changes in radial and longitudinal deformation in patients with severe AR. It could be a useful tool in predicting LV dysfunction.
433 Preoperative systolic strain rate predicts postoperative left ventricular systolic function in patients with chronic aortic regurgitation
T. Onishi ; H. Kawai ; M. Furuki ; K. Tatsumi ; T. Kataoka ; H. Tanaka ; M. Yokoyama ; Y. Okita
1Kobe University Graduate School of Medicine, Cardiovascular and Respiratory Medicine Dept., Kobe, Japan
Background: Postoperative left ventricular (LV) systolic function is an important prognostic factor in patients with chronic aortic regurgitation (AR). However, before surgical correction, it is difficult to estimate postoperative LV systolic function. Recently myocardial strain rate (SR) obtained from transesophageal echocardiography has been reported to provide reliable information regarding regional myocardial function. The purpose of this study was to investigate the value of preoperative regional myocardial peak systolic SR as a predictor of postoperative LV systolic function.

Methods: We studied 33 patients with chronic AR who underwent aortic valve replacement or valve repair. We performed standard and tissue Doppler echocardiography before and 17±7 days after surgical correction, and obtained left ventricular (LV) dimensions, LV EF, end systolic wall stress (WS), and peak systolic radial SR at the mid-ventricular level in the posterior wall.

Results: Surgical correction caused significant decrease in LV dimensions and WS and significant increase in peak systolic SR but no significant change in LV EF. Preoperative LV EF, systolic SR, end-systolic LV dimension and WS were significantly correlated with postoperative LVEF and multivariate analysis identified preoperative SR as the only independent predictor of postoperative LV EF. In Receiver Operating Characteristic curve analysis, preoperative SR >1.82 (μ/s) was the best predictor of postoperative LV dysfunction (LV EF<55%) with a sensitivity of 87% and a specificity of 90% (AUC 0.96 p<0.0001).

Conclusion: Lower preoperative systolic SR is significantly associated with postoperative LV systolic dysfunction and assessment of preoperative regional systolic function is useful to optimize the timing of surgery.

PERIOPERATIVE/INTENSIVE CARE

434 Incremental accuracy of transoesophageal echocardiography over transthoracic approach for description of functional anatomy of aortic regurgitation
P. Gallego Garcia De Vinuesa ; A. Castro ; G. Brunstein ; F. Trujillo ; I. Mendez ; B. Prado ; J.M. Cruz Fernandez
1Virgen Macarena University Hospital, Seville, Spain
2Cliniques Universitaires Saint Luc, Cardiology Dept., Brussels, Belgium
Background: Preoperative systolic strain rate predicts postoperative left ventricular systolic function in patients with chronic aortic regurgitation.

Methods: We studied 33 patients with chronic AR who underwent aortic valve replacement or valve repair. We performed standard and tissue Doppler echocardiography before and 17±7 days after surgical correction, and obtained left ventricular (LV) dimensions, LV EF, end systolic wall stress (WS), and peak systolic radial SR at the mid-ventricular level in the posterior wall.

Results: Surgical correction caused significant decrease in LV dimensions and WS and significant increase in peak systolic SR but no significant change in LV EF. Preoperative LV EF, systolic SR, end-systolic LV dimension and WS were significantly correlated with postoperative LV EF and multivariate analysis identified preoperative SR as the only independent predictor of postoperative LV EF. In Receiver Operating Characteristic curve analysis, preoperative SR >1.82 (μ/s) was the best predictor of postoperative LV dysfunction (LV EF<55%) with a sensitivity of 87% and a specificity of 90% (AUC 0.96 p<0.0001).

Conclusion: Lower preoperative systolic SR is significantly associated with postoperative LV systolic dysfunction and assessment of preoperative regional systolic function is useful to optimize the timing of surgery.

435 Functional assessment of the mechanisms of aortic regurgitation by transoesophageal echocardiography: Diagnostic accuracy and prediction of surgical reparability.
J.-S. Le Polain De Waroux ; A.C. Pouleur ; D. Vancraeynest ; A. Pasquet ; B.L. Gerber ; M. Van Dyck ; G. El Khoury ; J.L. Vlaeroverschelde
1Cliniques Universitaires Saint Luc, Cardiology Dept., Brussels, Belgium

Background: For patients with aortic regurgitation (AR), aortic valve repair is an attractive, albeit technically demanding, surgical alternative to aortic valve replacement. In this setting, accurate pre-operative delineation of aortic valve pathology and potential reparability is of paramount importance. Aim: To assess the diagnostic value of pre-operative transoesophageal echocardiography (TEE) in defining the mechanisms of AR, as identified by surgical inspection, and in predicting reparability, by using the final surgical approach as reference.

Method: 100 consecutive patients (71 males, mean age: 57±17 years) undergoing surgical correction of a significant AR were included. Mechanisms of AR were categorized by TEE and surgical inspection as follows: type 1A-C: aortic dilatation, type 1D: cusp prolapse, type 2: cusp prolapse, type 3: restrictive cusp motion. Aortic dissection and endocarditis were also considered as specific diagnoses.

Results: At surgery, mechanisms of AR were type 1 A-C in 25 pts, type 1D in 8 pts, type 2 in 31 pts, type 3 in 22 pts, aortic dissection in 3 pts and aortic valve endocarditis in 11 pts. Agreement between TEE and surgical inspection was 92% (Kappa: 0.90). Misdiagnoses concerned cusp prolapses which were confused with free edge fenestration on TEE. Aortic valve repair was performed in 75 pts and valve replacement in 25 pts. TEE correctly predicted the final surgical approach in 66/75 pts undergoing successful repair (sensitivity: 86%) and in 24/25 pts undergoing replacement (specificity: 96%).

Conclusions: In pts with AR, TEE allows for the accurate delineation of both the underlying mechanisms and possible reparability.

Table 1. Incremental diagnostic value of TEE

<table>
<thead>
<tr>
<th>Lesion correction</th>
<th>TEE</th>
<th>TTE</th>
<th>p</th>
<th>Incremental Value</th>
<th>Error</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gross anatomic classification</td>
<td>86%</td>
<td>82%</td>
<td>0.2</td>
<td>2.3%</td>
<td>42%</td>
</tr>
<tr>
<td>Mechanism</td>
<td>85%</td>
<td>63%</td>
<td>0.05</td>
<td>20.5%</td>
<td>77%</td>
</tr>
<tr>
<td>Rheumatic/Degenerative</td>
<td>91%</td>
<td>82%</td>
<td>0.05</td>
<td>9%</td>
<td>100%</td>
</tr>
<tr>
<td>Bicuspid Valve</td>
<td>100%</td>
<td>93%</td>
<td>0.5</td>
<td>4.8%</td>
<td>100%</td>
</tr>
<tr>
<td>Vegetation/Perforation</td>
<td>100%</td>
<td>96%</td>
<td>0.5</td>
<td>2.2%</td>
<td>100%</td>
</tr>
<tr>
<td>Prolapse</td>
<td>94%</td>
<td>72%</td>
<td>0.008</td>
<td>1.8%</td>
<td>50%</td>
</tr>
<tr>
<td>Geometry of Aortic Root</td>
<td>90%</td>
<td>90%</td>
<td>0.95</td>
<td>0%</td>
<td>37.5%</td>
</tr>
</tbody>
</table>

HEART VALVE DISEASE

436 Left atrial size predicts outcome in asymptomatic severe mitral regurgitation
R. Rosenhek ; F. Rader ; M. Krejci ; D. Kalbeck ; G. Maurer ; H. Baumgartner
1Medical University Of Vienna, Cardiology Dept., Wien, Austria; 2Vienna, Austria

Background: Left atrial (LA) size is affected by left ventricular (LV) diastolic pressure, ventricular remodeling, atrial fibrillation and mitral regurgitation (MR) itself. LA size has been proposed to be a predictor of outcome after mitral valve replacement with preserved LV function. However, the predictive value of LA size for development of symptoms or LV dysfunction among pts with severe MR has not been studied.

Methods: 132 consecutive asymptomatic pts (age 55±15 yrs, 49 female) with severe degenerative MR and normal LV function were prospectively followed for a median of 69 months. Pts underwent serial clinical and echocardiographic exams. The following potential predictors of outcome were studied: LA size, enddiastolic LV diameter, pulmonary artery pressure and clinical risk factors.

Results: Kaplan-Meier event-free survival for the entire pt. group, with end-points defined as development of symptoms or LV dysfunction (n=58) and death related to MR (n=0) was 92.2% at 2 yrs, 78±4% at 4 yrs, 65±5% at 6 yrs and 55±6% at 8 yrs. LA size was the strongest independent predictor of outcome: No events were observed in the group with a LA <50 mm. Event-free survival for patients with a LA A 50 to 69 mm was 94±3% at 2 yrs, 82±5% at 4 and 51±8% at 8 yrs versus 85±8% at 2 yrs, 47±12% at 4 yrs and 40±12% at 8 yrs for patients with a LA >70 mm (p=0.0001). None of the other studied parameters reached significance as predictors of outcome in multivariate analysis.

Conclusion: LA size is a strong and independent predictor of outcome in patients with asymptomatic severe MR. LA size allows stratification of patients into groups at low, intermediate and high risk for subsequent development of symptoms or LV dysfunction requiring surgery.

Table 1. Surgical Diagnosis Total

<table>
<thead>
<tr>
<th>TEE Diagnosis</th>
<th>Type 1A-C</th>
<th>Type 1D</th>
<th>Type 2</th>
<th>Type 3</th>
<th>Dissect.</th>
<th>Endoc.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type 1A-C</td>
<td>21</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>22</td>
</tr>
<tr>
<td>Type 1D</td>
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<td>7</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>10</td>
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<td>Type 2</td>
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<td>29</td>
<td>0</td>
<td>1</td>
<td>32</td>
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<tr>
<td>Type 3</td>
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<td>0</td>
<td>0</td>
<td>22</td>
<td>0</td>
<td>23</td>
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<tr>
<td>Dissection</td>
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<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>Endocarditis</td>
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<td>0</td>
<td>0</td>
<td>0</td>
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<tr>
<td>Total</td>
<td>25</td>
<td>8</td>
<td>31</td>
<td>22</td>
<td>3</td>
<td>110</td>
</tr>
</tbody>
</table>
437 Ultrasonic myocardial tissue characterization by cyclic variation of integrated backscatter in patients with aortic stenosis

M. Fląkowski 1, A. Kropowski 1, R. Galaska 1, W. Dubiniawicz 1, J. Rogowski 1, A. Rynkiewicz 1
1 Medical University Of Gdansk, 1st Department Of Cardiology, Gdansk, Poland

Background: Ultrasonic myocardial tissue characterization by cyclic variation of integrated backscatter (CVIBS) has been successfully used for the differentiation of various myopathies from normal myocardium. Aim: The aim of the study was ultrasonic myocardial tissue characterization in patients with aortic stenosis (AS) by cyclic variation of integrated backscatter.

Methods: The study population consisted of 128 patients (42 women; mean age 65±10 years). In the parasternal long-axis view two regions of interest were chosen to estimate CVIBS: the mid-septum and the mid-posterior wall. Types of left ventricular remodeling in our group were classified according to left ventricular mass index (LVMI) and relative wall thickness (RWT): normal LVMI (LVMI<1.4), LVH (LVMI>1.5), concentric remodeling (RWT<0.45), and eccentric remodeling (RWT>0.45). Left ventricular systolic function and diastolic function indices were estimated. Results: The mean echocardiographic parameters were: the aortic valve area (AVA) 0.8±0.3 cm², maximal pressure gradient (PG max) 86±29 mm Hg and mean pressure gradient (PG mean) 54±20 mm Hg, LVEF 71±14%, fractional shortening (FS) 35±10%, and LVEF 146±47 mm Hg. Correlation between end-systolic wall stress (cESS) 102±48 kdynes/cm², CVIBS septum 5.6±2.3 db, CVIBS posterior wall 5.4±2.0 db. We found inverse correlation between mean CVIBS and LVMi (r=-0.29, r=0.24, p<0.05; for septum and posterior wall respectively) and cESS (r=-0.28, r=-0.32, p<0.05; for septum and posterior wall respectively) and direct correlation between mean CVIBS and LVEF (r=0.28, r=-0.25, p<0.05; for septum and posterior wall respectively) and FS (r=0.26, r=-0.22, p<0.05; for septum and posterior wall respectively). In addition mean CVIBS for both septum and posterior wall was significantly lower in group with LV eccentric hypertrophy compared to patients with LV concentric remodeling and LV eccentric hypertrophy. The aim of this study was to determine the occurrence of toxic valvulopathy in young adults using Ecstasy. Methods: 29 subjects using or having used Ecstasy and 29 sex and age-matched controls were blindly evaluated with echocardiography. Results: Sixteen (55%) subjects who took Ecstasy had a pathological echocardiography using the Food and Drug Administration criteria for ap-petite suppressant-induced valve disease, whereas none in the control group (p<0.0001). Six (21%) subjects had a mitral regurgitation (MR) of 1/4 and 4 (14%) had a MR2/4, while none in the control group (p=0.0024). The mitral area regurgitant jets were 12% (range 3-40) and 5% (2-8) respectively (p=0.007). Tricuspid regurgitation ≥2/4 was present in 13 (45%) Ecstasy subjects and absent in controls (p<0.0001). The tricuspid area regurgitant jets were 19% (5-39) and 9% (0-27) respectively (p<0.0001). Four (14%) Ecstasy subjects had a mild pathological aortic regurgitation (p=0.11). Valvular struts were present in 6 (21%) Ecstasy subjects and in none of controls (p=0.024). One of them developed a transient ischemic cerebro-vascular attack. Conclusion: Ecstasy leads to mild to moderate RVHD and valvular struts. People using Ecstasy and clinicians should be aware of this potential toxic effect.
Conclusions: In DCMP the longitudinal contraction velocity $S_L$ is the lowest when the LV dilatation is extremely large and functional MR is severe. In comparison to organic MR in DCMP the LV volume overloading does not lead to the longitudinal contraction activation. The dynamics of $S_L$ velocity during the disease progression should be carefully monitored in organic MR to perform surgical correction in time avoiding the LV irreversible changes.

441 Mitral regurgitation - predictor of left ventricle dysfunction in patients with disease of aortic valve
A. Kostic-Mirkovic 1; I. Oslasevic 1; B. Vujicic-Tasic 1
1Clinical Center of Montenegro, Cardiac Surgery Dept., Podgorica, Serbia and Montenegro; 2Clinical Center of Serbia, Cardiology Dept., Belgrade, Serbia and Montenegro

Background: The function of left ventricle (LV) after replacement of aortic valve depends of interaction of numerous preoperative factors like: contractility of LV, amount of irreversible interstitial fibrosis, afterload and architecture of LV. The aim of this study was to determine if there were changes in LV function in patients with mitral regurgitation as well. In aortic stenosis any augmentation of afterload lead to hypertrophy and dilatation of left ventricle. The hypertrophy of cardiac muscle, change in left ventricular architecture and dilatation or disease of mitral valve cause mitral regurgitation (MR). The goal of this paper is to establish if MR is prognostic factor of dysfunction of LV in patients with disease of aortic valve.

Methods: This investigation has enrolled 86 patients who had the aortic valve replacement done in clinical centre of Serbia. The entire transthoracic echocardiography examination was made to all patients preoperatively and in early postoperative course - one week after operation. In 22 patients the long term follow up was 6-84 months and 64 months was made.

Results: We examined the systolic function of LV (ejection fraction) in patients who had aortic valve disease with MR of different grade of severity (1 +, 2 +, 3 +) and second group of patients who had aortic valve disease without MR. Our results suggest that there is a significant correlation between MR and ejection fraction so we could draw a conclusion that MR is a referent predictor of LV dysfunction (correlation coefficient 0.489, p < 0.000). We have calculated with logistic regression the predictor value of three times higher relative risk in patients with MR to have a LV dysfunction (RR 9.253 p < 0.0001; 95%CI-1.009-5.875).

442 Non-myxomatous flail mitral valve: prevalence, clinical and echocardiographic characteristics and 5-year outcome
S. Adawi 1; D.A. Halon 1; A. Meddle 2; S. Avram 3; B.S. Lewis 1; A. Shriam 1
1Lady Davis Carmel Medical Center, Cardiology Dept., Haifa, Israel

Background: Ruptured chordae leading to flail mitral valve (FMV) and mitral regurgitation (MR) is considered to be caused primarily by myxomatous MV disease. The aim of this study was to determine the prevalence and characteristics of non-myxomatous FMV and compare outcome pts to pts with FMV due to myxomatous etiology.

Methods: We identified 107 pts (71 (66%) males) with FMV in the echo data base and classified them as myxomatous or non-myxomatous based on MV anatomy (leaflet redundancy) using transthoracic (78 pts) or transesophageal (28 pts) echocardiography. We compared their clinical and echocardiographic characteristics and outcome at 5 years.

Results: Myxomatous MV was present in 36 pts (34%), 60 pts (56%) had a non-myxomatous MV, and in 11 pts (10%) etiology was indeterminate. Compared to pts with myxomatous MV, pts with non-myxomatous FMV were older, had more mitral annulus calcification (MAC) and aortic sclerosis and recent symptom onset was more likely (Table). There was no difference in MR severity but they had higher pulmonary artery pressure (52±16 vs 42±13, p = 0.008). During 5y follow-up non-myxomatous pts had worse survival and survival free of re-hospitalization for heart failure (HF), and were less likely to have MV surgery. Survival was not significantly different after age-adjustment.

Conclusions: In the study population a non-myxomatous etiology of FMV was predominant (66% wear and tear). Non-myxomatous etiology was associated with older age, degenerative changes such as MAC and aortic sclerosis and recent symptom onset. It had a worse prognosis than the myxomatous type, both before and after surgery. The poor clinical outcome appeared to be related to older age and worse baseline characteristics.

Table 1. Five year clinical outcome

<table>
<thead>
<tr>
<th>Myxomatous MV (n=36)</th>
<th>Non-myxomatous p value</th>
<th>Non-myxomatous MV (n=60)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (y)</td>
<td>61±12</td>
<td>76±9</td>
</tr>
<tr>
<td>MAC (17%)</td>
<td>36 (90%)</td>
<td>0.001</td>
</tr>
<tr>
<td>Aortic sclerosis (2%)</td>
<td>25 (42%)</td>
<td>0.004</td>
</tr>
<tr>
<td>Symptoms?1month</td>
<td>19%</td>
<td>47%</td>
</tr>
<tr>
<td>Survival (5y)</td>
<td>91%</td>
<td>65%</td>
</tr>
<tr>
<td>Survival free of re-hospitalization for HF (5y)</td>
<td>85%</td>
<td>53%</td>
</tr>
<tr>
<td>MV surgery (22%)</td>
<td>20 (33%)</td>
<td>0.03</td>
</tr>
<tr>
<td>Survival post MV surgery (5y)</td>
<td>96%</td>
<td>51%</td>
</tr>
</tbody>
</table>

HEART VALVE DISEASE

444 Mitral regurgitation after a first Non-ST segment elevation acute coronary syndrome and its long-term prognostic implications
L. Perez de Isla 1; J. Zamorano 2; M. Quezada 3; L. Mataza 4; A. Aubele 4; D. Herrera 1; C. Almeida 1; J.L. Rodrigo 1
1Hospital Clinico San Carlos, Instituto Cardiovasc., Unidad De Imagen Cardiovascular, Madrid, Spain; 2Hospital Clinico San Carlos, Madrid, Spain

The development of mitral regurgitation (MR) early after an acute myocardial infarction (AMI) is a frequent complication. Its negative impact on survival has been extensively studied after Q wave AMI. The aim of this study was to determine the long-term prognostic implications of MR and the independent predictors of poor long-term outcome in the setting of Non-ST segment elevation coronary acute syndrome (NISTSEACS).

Methods: 300 consecutive patients (71.7% men, mean age 66.9±13.9 y) who suffered a first NISTSEACS comprised our study group. MR was detected in 126 patients (42%, 88 men, mean age 71.3±11y). Cardiovascular mortality was the predefined end-point.

Results: Mean follow up was 42.6±19.4 8 days. Survival was greater in patients without MR. Log Rank test showed a significant difference in survival depending on the severity of the MR after the index NISTSEACS (Log Rank p<0.001). Cox regression univariate analysis showed age, left atrium diameter, renal failure, the systolic pressure in the pulmonary artery and the presence and degree of MR as variables related to long-term prognosis. Nevertheless, only MR was found as an independent predictor in the multivariate analysis.

Conclusions: The presence and degree of MR confers a worse prognosis after a first NISTSEACS. Thus, the presence of this complication should be specifically assessed in every patient after a NISTSEACS and a close follow-up should be done.

Table 1. Multivariate analysis results

<table>
<thead>
<tr>
<th>RR</th>
<th>95% CI</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mitril regurgitation</td>
<td>5.02</td>
<td>0.045</td>
</tr>
</tbody>
</table>

RR: relative risk; 95% CI: 95% confidence interval
3-D ECHO

445 Systolic enlargement of the mitral annulus according to the lv systolic function and its impact on the left atrial filling

J. Kwan 1; G.C. Kim 1; I.S. Ahn 1; M.J. Jeon 1; D.H. Kim 1; K.S. Park 1; W.H. Lee 1

1Cardiology Dept., Incheon, Republic of Korea

Background and purpose: The mitral annulus (MA) is an integral part of the mitral apparatus giving attachment to the left ventricle (LV) and the atrium (LA). The MA motion during systole has been reported to be proportional to the LV systolic function. This study was conducted to investigate if systolic MA motion that is related to LV systolic function has an impact on LA filling using real-time 3D echocardiography (RT3DE).

Methods: RT3DE was performed in 11 normal controls with normal LV systolic function (EF 57±4%) and 12 patients with global LV systolic dysfunction (EF 24±5%). LV volumetric data were segmented into 16 rotational apical planes (angle increment =11.25°) around the rotational axis from the apex through the center of the MA, using newly developed 3D computer software (TomTec, Co. Germany). Two hinge points of leaflets were traced in each plane during early and late systole. The MA was then automatically reconstructed with those 32 traced points. 3D surface (3DMAA) and 2D projected areas (2DMAA) of the annulus during early and late systole were automatically calculated. LA volume (LAV) measurement was identified by the planimetry on the 8 rotational apical planes using 3D computer software (4D Cardio View, TomTec, Co.). All measurements were corrected by BSA (c) for the comparison between two groups. Systolic changes of all geometrical MA parameters and LAV were estimated by their fractional changes (%).

Results: c3DMAA, c2DMAA and cLAV were significantly (p<0.01) increased in patient group but their fractional increases during systole were significantly (p<0.01) reduced comparing with controls. Fractional increases of c3DMAA (r=0.83, p<0.01) and c2DMAA (r=0.88, p<0.01) showed close correlations with LV EF. Fractional increases of both c3DMAA (r=0.89, p<0.01) and cLAV (r=0.90, p<0.01) also showed close relationships with that of cLAV.

Conclusion: Systolic enlargement of the mitral annulus was closely related to the LV systolic function and the fractional change of the annulus may significantly affect left atrial filling during systole.

HEART VALVE DISEASE

447 Usefulness of non-invasive coronary imaging by computed tomography prior to valvular surgery

J.F. Rodriguez Palomares 1; H. Cuellar Calabria 1; P. Mahia Casado 1; S. Cordova Alvestegui 1; R. Rois 1; M.T. Gonzalez Alujas 1; R. Aguilar Torres 1; A. Evangelista Masip 1

1Hospital Universitari Vall d’Hebron, Cardiology Dept., Barcelona, Spain

Purpose: Different studies have demonstrated the usefulness of Computed Tomography (CT) to diagnose coronary artery disease, but there is no data available in the context of valvular heart disease. The aim of this study is to assess whether non-invasive coronary imaging (IC) before valvular surgery.

Materials and methods: 38 consecutive patients (mean age: 68.9 years) were studied before valvular surgery: 74.7% aortic valvular disease (73.7% aortic stenosis, 21.1% aortic regurgitation) and 5.3% mitral valvular disease (all of them mitral stenosis). Main risk factors were: systemic hypertension 76.3%, diabetes 34.2%, dyslipidemia 57.9% and arterial peripheral disease 21.1%. Non-invasive studies were performed by helical CT (Siemens Sensation 16). 84.2% patients were in sinus rhythm, with a mean heart rate of <60.9 bpm (50% using b-blockers).

Results: The incidence of coronary artery disease in those patients was 34% (37 segments). By CT 94% of segments could be evaluated. 8% were not assessable owing to: stent (2), artifact (5), small vessel (6) and calcification (23). 90% of distal vessels could be assessed. Calcium score ranged from 0 to 5532 (median: 360). In 28 segments CT showed significant coronary lesions (>50%) confirmed by IC (there was disagreement between both techniques in 9 segments). CT showed a 70% sensitivity, 99% specificity, 86% positive predictive value and 97% negative predictive value. Sensitivity and specificity were in proximal segments: 86.6% and 98%, in median: 70% and 99% and in distal segments: 70% and 98%.

Conclusion: CT appears to be an excellent technique for ruling out coronary lesions prior to valvular surgery making an invasive study unnecessary.

ISCHAEMIC HEART DISEASE

448 Mitral annular calcification and functional mitral regurgitation: frequent duo in patients referred to myocardial revascularization

B. Obrenovic-Kircanski 1; D. Trifunovic-Zamaklar 2; D. Panic 2; B. Vujisic-Tesic 1; N. Milic 1; P. Djukic 1

1Belgrade, Serbia and Montenegro; 2Institute for Cardiovascular Diseases, Cardiology Dept., Belgrade, Serbia and Montenegro

Background: Functional mitral regurgitation (MR) and mitral annular calcification (MAC) are common in coronary heart disease (CHD). MR is caused by modifications of subvalvar apparatus geometry as a consequence of local myocardial contraction abnormalities. MAC is manifestation of generalized atherosclerosis affecting mitral annulus. MR and MAC each per se portends adverse clinical outcome in CHD patients. Aim: In this study we evaluated clinical predictors of MR, MAC and association of these changes of mitral valve in CHD pts referred to myocardial revascularization.

Methods: Transthoracic echocardiography was performed in 112 consecutive pts (mean age 59.1±8.3 yrs, 75.6% male) with significant CHD referred to ACBG or PCI. The severity of MR was graded qualitative. Age, gender, BMI, hypertension, DM, cholesterol, triglycerides, severity of CHD and previous myocardial infarction (MI), were analyzed. According to the presence of mitral changes the patients were divided into four groups: Group A (without MR and/or MAC), Group B (only MAC), Group C (only MR) and Group D (MR and MAC).
HEART VALVE DISEASE

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Prognosis of carcinoid heart disease: value of tissue Doppler imaging
N. Mansencal 1 ; E. Mitry 1 ; P. Lacombe 1 ; P. Rougier 1 ; O. Dubourg 1
1AP-Hp, Hospital Ambroise Pare, Service De Cardiologie, Boulogne-Billancourt, France

Background: Carcinoid heart disease (CHD) may occur in patients with digestive endocrine tumor and carcinoid syndrome. No previous studies have assessed the use of tissue Doppler imaging (TDI) in CHD. The aim of this prospective study was to evaluate the prognostic value of TDI in CHD.

Methods: We prospectively studied 56 consecutive patients (1998-2005) with proved digestive endocrine tumor and carcinoid syndrome. Patients with previous history of heart disease were excluded. All patients underwent several echocardiographic studies for the assessment of CHD and the CHD progression (echocardiographic scoring system). Furthermore, we systematically calculated the mitral inflow to annulus ratio (E/E' ratio) using PW Doppler (mitral inflow) and TDI (lateral mitral annulus). Survival rate was collected at the end of the study.

Results: Mean age was 59±9 years. Mean follow-up was 27±16 months. A right-CHD was found in 30 patients (54%) and a left-CHD in 13 patients (23%). The prevalence of right- and left-CHD significantly increased during follow-up (p = 0.002). Right- and left-CHD were not associated with a significant increase of death (p = NS). The only independent marker of death (multivariate analysis) was an E/E' > 8 (odds ratio = 6.2; 95% CI 1.95-19.7; p = 0.002) (See Kaplan Meier curves).

Conclusions: This prospective study demonstrates that tissue Doppler imaging allows to detect high-risk patients with carcinoid syndrome. Patients with E/E' ratio > 8 should be cautiously monitored during follow-up.

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Transcatheter and transesophageal echocardiographic evaluation of the ischemic mitral regurgitation: heart team approach
A. Labecka 1 ; B. Firek 1 ; P. Szymanski 1 ; I. Kowalik 1 ; H. Szwed 1 ; T. Pasierski 2
1An-Hp, Hospital Ambroise Pare, Service De Cardiologie, Boulogne-Billancourt, France

Aims: The aim of the study was to evaluate the factors determining the mitral regurgitation in patients with left ventricular remodelling after myocardial infarction.

Methods: 52 consecutive patients (mean age 62 ± 9 years) with mild to moderate ischemic mitral regurgitation due to prior myocardial infarction underwent transesophageal echocardiographic examination. By means of Doppler echocardiography we evaluated the mitral regurgitant volume (RV), the regurgitation fraction (RF) and the effective regurgitant orifice area (EROA). 35 patients also underwent transesophageal echocardiographic examination in order to evaluate the geometry of the subvalvular mitral apparatus. In the transgastric 2-chamber view (90°e) we measured the length of the shortest chordae tendineae from the head of the papillary muscles (PM) to their anchoring point on the valve between the segments P3 and A2 of the mitral leaflets (Z2) and, respectively, from the head of the anterior papillary muscle (AL) to the anchoring point on the valve between the segments P1 and A2 (Z1). The displacement of the papillary muscles was evaluated by the measurement of the distance from PM and AL to the respective opposite point on the mitral annulus (PMA and, respectively, ALA). We also determined the distance between PM and Z1 (PMR) and, respectively, between AL and Z2 (ALR).

Results: There was a significant correlation of the mitral annulus area (MA) with RV (r = 0.462; p = 0.0006) and EROA (r = 0.350; p = 0.0453). The correlation between EROA was more significant for ERDA < 0.3 cm² (r = 0.613, p = 0.0019). MA significantly correlated with RF only for RF from 30% to 60% (r = 0.478, p = 0.0075). EROA showed no dependence on the length of the chordae tendineae and the parameters of the papillary muscles displacement. The PMA/PMR ratio, a marker of the leaflets restriction at the level of the point Z1, correlated very well with EROA (r = 0.99, p < 0.001) only for EROA > 0.4 cm² (5 patients).

Conclusions: In patients with ischemic mitral regurgitation after myocardial infarction, the mitral annulus enlargement is one of the determinants of the regurgitant volume and of the effective regurgitant orifice area. It seems that in the case of the mitral regurgitation with smaller regurgitant orifice area (< 0.3 cm²), the importance of the regurgitation depends mainly on the enlargement of the annulus, on the other hand, in the case of the mitral regurgitation with larger regurgitant orifice area (> 0.4 cm²) the leaflets restriction determined by the posterior papillary muscle displacement plays a very significant role.
p < 0.005). And the decrease in tenting area with dobutamine had a good correlation with increase in Srs in the inferior segment (r = 0.62, p < 0.01), but neither increase in Srs in the anterior, posteroseptal, posterior nor lateral segment. Furthermore, the decrease in MR volume fraction was correlated with increase in Srs in the inferior segment (r = 0.63, p < 0.01).

Conclusions: The results of this study suggest that inferior myocardiocystolic function may affect the configuration of mitral apparatus and may be one of the determinants of functional MR severity.

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P Wave duration and dispersion in mitral valve prolapse
F. Akgul1, E. Seyfeli1, F. Yalcin1, T. Seydaliyeva1
1Mustafa Kemal University, Cardiology Dept., Antalya/Hatay, Turkey

Aims: P wave dispersion (PWD) is an electrocardiographic measurement, which reflects a disparity in atrial conduction and vulnerability to atrial fibrillation. In this study, we compared P wave duration and PWD of mitral valve prolapse (MVP) patients with healthy control subjects. We also investigate the echocardiographic determinants of PWD in MVP patients.

Methods and results: Sixty-nine MVP patients (mean age 36.1 ± 12.4 years) and 32 healthy control subjects (mean age 35.2 ± 10.9 years) were included in the study. Twelve-lead surface electrocardiography recording was obtained from all participants. The change in maximum and minimum P wave duration was measured manually and the difference between the two values was defined as PWD. There was no difference between the two groups in terms of baseline demographic characteristics. Maximum P wave duration was higher in MVP patients than controls (123.8 ± 7.2 vs 115.3 ± 6.1 ms, p = 0.007). Minimum P wave duration was found to be similar in MVP patients and healthy controls. Mean PWD value of MVP patients was found to be higher than those of controls (52.6 ± 12.7 vs 46.2 ± 9.1 ms, p < 0.01). In patients with MVP, multiple regression analysis revealed that among the echocardiographic parameters that were tested, the echocardiographic degree of the prolapse, anterior mitral leaflet thickness, left atrial diameter and detection of mitral regurgitation were independently associated with PWD.

Conclusion: P wave duration and PWD are increased in patients with MVP. PWD is related to the echocardiographic degree of the prolapse, anterior mitral leaflet thickness, left atrial diameter and detection of mitral regurgitation were independently associated with PWD.

Key words: Mitral valve prolapse, P wave dispersion, echocardiography

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Outcome of mitral valve repair in population with high incidence of rheumatic heart disease
S. AlAhmari1, A. Sahah1, M. Al Faghi2
1PSOSC, Riyadh, Saudi Arabia; 2PSSC, Riyadh, Saudi Arabia

Background: Preserving the mitral valve (MV) apparatus by repair has widely become the preferred method of treating mitral valve regurgitation (MR). The outcome has been consistently good in mainly degenerative mitral valve disease.

Aims: We aimed to evaluate the result of MV repair using echocardiography in a population with mainly rheumatic valve diseases.

Methods: Patients were enrolled prospectively, and have been evaluated pre and postoperatively by serial echocardiographic studies.

Results: One hundred patients with MR were enrolled prospectively in the study. The mean age was 48.5 ± 15.6 years, 56% males and 44% females. Etiology was rheumatic in 38.9%, ischemic in 23.3%, leaflet prolapse in 28%, degenerative in 4%, and endocarditis in 1%. At baseline, 80% of pat had severe MR, and 20% had moderate MR. At 12 months follow up, 88% had no or mild MR, and 9% had moderate MR, and 3% had moderately severe to sever MR. The left ventricle end systolic volume decreased from 59 ± 38.7 to 52.3 ± 32.1 ml, p < 0.001, and the end diastolic volume has decreased from 112.3 ± 57.2 to 88.4 ± 38.5 ml, p < 0.001. The pulmonary systolic pressure decreased from 48.9 ±17.5 to 37.7 ± 8.9 mm Hg, p < 0.0001.

Conclusion: MV repair can be performed successfully in different MV pathologies, including rheumatic valve disease. Left ventricular remodeling indices, and pulmonary artery pressure have improved after MV repair.

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Left ventricular function in mitral valve stenosis assessed by TDI
I. Dincer1, S. Turhan1, T. Altin1, A. Ongun1, C. Tulunay1, C. Enol1,2
1Ankara University Faculty of Medicine, Cardiology Dept., Ankara, Turkey

Aim: Left ventricular global systolic function is accepted to be well preserved in patients with mitral stenosis (MS). There are few studies evaluating the left ventricular (LV) longitudinal function by tissue Doppler imaging (TDI) in patients with MS. Furthermore recently, isovolumic acceleration (IVA) during the contraction phase has been proposed to be useful index of myocardial contractility independent of loading conditions. Aim of our study was to assess the LV longitudinal function and LV contractility using TDI in patients with MS.

Methods: Seventy-two patients (57 females with mean age of 43 ± 11) with mitral stenosis and 34 healthy controls (27 female with mean age of 47 ± 12) were evaluated by echocardiography. From the tissue Doppler recordings of mitral valve septal and lateral annulus, peak systolic ejection velocity and isovolumetric acceleration (IVA) were measured. IVA was defined as the mean slope of the isovolumic contraction velocity wave (VIVA/acceleration time, m/sec).

Results: There were no statistically significant difference in left ventricular diameters between two groups. Left atrial diameter and pulmonary artery pressure were significantly higher in patients with mitral stenosis as expected. Mitral valve septal and lateral annulus S wave and IVA were also significantly lower in patients with MS.

Conclusion: LV longitudinal function assessed by S wave and contractile function assessed by IVA are impaired in patients with MS.

Table 1

<table>
<thead>
<tr>
<th></th>
<th>Mitral stenosis</th>
<th>Control</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>LVESD (cm)</td>
<td>4.9 ± 0.5</td>
<td>4.5 ± 0.4</td>
<td>0.183</td>
</tr>
<tr>
<td>LVEDS (cm)</td>
<td>3.1 ± 0.6</td>
<td>2.9 ± 0.3</td>
<td>0.63</td>
</tr>
<tr>
<td>LA (cm)</td>
<td>5.2 ± 0.9</td>
<td>5.4 ± 0.3</td>
<td>&lt;0.001</td>
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<tr>
<td>PAP (mm Hg)</td>
<td>40 ± 12</td>
<td>25 ± 9</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>S (lateral annulus) (m/sec)</td>
<td>5.4 ± 1.4</td>
<td>8 ± 2.7</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>IVA (lateral annulus) (m/sec)</td>
<td>2 ± 0.7</td>
<td>3 ± 1.7</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>S (septal annulus) (m/sec)</td>
<td>4.9 ± 0.8</td>
<td>6.8 ± 1.8</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>IVA (septal annulus) (m/sec)</td>
<td>1.6 ± 0.6</td>
<td>2.6 ± 0.9</td>
<td>&lt;0.001</td>
</tr>
</tbody>
</table>

Echocardiographic findings in patients with mitral stenosis and control group

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Asymmetric commissural fusion and rheumatic mitral stenosis; Immediate results after percutaneous mitral commissurotomy
M. Jabaren1, K. Suleiman1, L. Bushani1, N. Freedberg1, B. Blokh1, Y. Turgeman1
1Hae'mek Medical Center, Afula, Israel

Background: Normal mitral valve is characterized by equi-coval bilateral commissural length. Since the main factor for success of percutaneous balloon mitral commissurotomy (PTMC) is valvular morphology and the main mechanism of balloon valvular dilatation is commissural splitting, however the issue of asymmetric commissural pathology was not completely evaluated.

Objective: To determine the relation between asymmetric commissural length and immediate PTMC results in patients with rheumatic pliable mitral stenosis.

Material and methods: Twenty five patients (22 F, 3 M), mean age 44 ± 11 year (range: 23-76) with a mean mitral valve area (MVA) of 1.0 ± 0.1 cm² were included in this echocardiographic study. All patients were characterized by asymmetric commissural pathology in the presence of 7.9 ± 0.7 mean echocardiographic Wilkin’s score. We excluded patients after previous surgical commissurotomy, or bilateral commissural calcification. Commissural length was measured in early diastole using parasternal short axis view from the mitral annulus towards the mitral valve orifice whereas planimetric MVA calculation was undertaken. Off line measurements were collected using the Midescon functional analysis system. Commissural asymmetric index (ASI) was defined as the length of the longest fused commissure divided by the shortest one. The relation between ASI and post PTMC MVA is presented in Figure 1.

Results: All PTMC procedures terminated successfully. Immediate post procedure MVA of 1.7 ± 0.9 cm² had MVA of >1.5 cm² whereas only 0.4 MVA of 1.4 cm².

Conclusion: PTMC is feasible in the presence of asymmetric commissural fusion in patients with pliable rheumatic MS. Furthermore there is no negative impact upon immediate results after this procedure.

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Validity of the right ventricular isovolumic myocardial acceleration to assess the severity of rheumatic mitral stenosis
Y. Tayareci1, Z. Bugra1, B. Unman1, I. Altun1, S. Yurdakul1, Y. Nisanci1, M. Meric1
1Istanbul University, Istanbul Faculty of Med, Cardiology Dept., Istanbul, Turkey

Objectives: To demonstrate whether the myocardial acceleration during isovolumic contraction (IVA) is a sensitive indicator of right ventricular (RV)
Atrial myocardial deformation properties in patients with mitral stenosis: a strain and strain rate imaging study

R. Ancona1; P. Caso1; G. Di Salvo1; A. D’andrea 1; S. Comenale Pinto1; R. Ancona1; P. Caso 1; G. Di Salvo 1; A. D’andrea 1; S. Comenale Pinto1; A. D’andrea 1; S. Comenale Pinto1; R. Ancona1; P. Caso 1; G. Di Salvo 1; A. D’andrea 1; S. Comenale Pinto1; A. D’andrea 1; S. Comenale Pinto1; R. Ancona1; P. Caso 1; G. Di Salvo 1; A. D’andrea 1; S. Comenale Pinto1

Background: Mitral stenosis (MS) causes left atrium (LA) enlargement and dysfunction, resulting in reduced LA flow velocity. Tissue Doppler imaging (TDI) assesses regional myocardial function noninvasively; particularly Strain Rate (SR) imaging enables quantitative measurement of atrial reservoir function.

Aim of the study: To evaluate the effect of MS on right and left atrial (LA/RA) reservoir function using Strain(S) and SR and to compare atrial myocardial deformation properties in MS patients with sinus rhythm and in those with atrial fibrillation (AF).

Methods: We studied 85 subjects: 33 (28 F, 5 M) healthy subjects (52 years) and 52 patients with isolated mitral stenosis: 16 with chronic AF and atrial fibrillation (AF), without CAD, hypertension, diabetes mellitus, left ventricular (LV) dysfunction (EF≤50%), LV dilatation, LV hypertrophy or other valvular disease. By Echocardiography System Seven GE equipped with TFI function were measured: mitral valve area in 2D and with Doppler flow; mitral valve velocity gradient, Wilkins’ scores, LA/RA volume (maximum and minimal), LA/RA EF (%), right ventricular systolic pressure, LA diameters. Peak systolic tissue atrial S and SR were evaluated in apical 4 and 2 chambers view at the level of the mid segment of the septal, lateral, anterior and inferior atrial walls, and at the mid segment of the RA free wall.

Results: MS patients had significantly larger LA dimension and significantly lower LA ejection fraction than controls. LA EF in patients with MS (media 28.32%) was lower than LA EF in controls (44.35%) and LA maximal volume was greater in patients with MS (97.63 mL) in comparison with controls (24.51 mL). The myocardial atrial S and SR were found to be significantly (p<0.01) lower for each atrial wall in patients with pure MS compared to controls (r=0.15 vs 75±18%). Patients with AF + MS showed significant (p<0.01) more compromised atrial myocardial deformation properties than MS patients in sinus rhythm (25±10 vs 55±18%). A significant correlation was found between left atrial S and atrial valve area (p=0.03; R=-0.51) and between atrial S and mean gradient (p=0.005; R=-0.63) across the mitral valve.

Conclusion: Strain Imaging is an echocardiography technique useful to study the assessment of LA function in patients with MS noninvasively. Atrial myocardial deformation properties are compromised in patients with MS; this impairment is more pronounced in patients with MS + AF.
tion of masses with modern technology is effective and localization provides additional strong clues. Novel technologies (3D, texture analysis) may improve clinical accuracy.

Methods: We have enrolled 156 patients (71 female, 85 male; aged between 23-73; mean 43.71 ± 11.65 years) in the study, who were admitted to our echocardiography laboratory for TEE examination due to various indications. All patients were anesthetized topically in the oropharynx with 10% aerosol solution of lidocaine until the gag reflex was suppressed. Afterwards, we have separated patients into three groups: Group A (n=52) received 4 mg of ondansetron as antiemetic (a selective serotonin [5-HT3] receptor antagonist), Group B (n=52) received 10 mg metoclopramide as antiemetic (a centrally acting dopamine receptor antagonist) and Group C (n=52) received saline as placebo intravenously, five to ten minutes before the procedure. All patients received 2 mg midazolam intravenously. Usage of additional doses of midazolam was let liberally to the two qualified performing operators who were blind to the antiemetic agent used, after the introduction of the TEE probe into the esophagus. Data concerning additional doses of midazolam, procedural time, recovery time in the outpatient ward, blood pressure values, percutaneous arterial oxygen saturation values, tolerability via the transgastric window, side affects of the medications used and patient discomfort via a visual analogue scale were collected and analyzed.

Results: There wasn’t any demographic difference between Group A, B and C. Group A received less additional midazolam than Group B and C (Group A: 0.62 mg±0.72; Group B: 1.92 mg±0.93; Group C: 2.12 mg±0.81; p<0.001). Visual analogue scale regarding patient discomfort was significantly lower in Group A than in Group B and C (4.0±1.58, 6.12±1.75, 6.62±1.55 respectively; p<0.001). Recovery time in the outpatient ward was lower in Group A than in Group B and C (22.5±4.8, 30.96±6.57, 30.38±5.03 minutes respectively; p=0.001). No adverse reaction to ondansetron was observed, whereas one patient developed mild spontaneously resuming dystonia due to metoclopramide.

Conclusions: Ondansetron reduces the need for sedation during TEE and improves patient comfort. It can be safely used during TEE in favor of patients.

HEART VALVE DISEASE

461 Early experience with percutaneous closure of perivalvular leaks with Amplatzer VSD or PDA occluders

Y. Shapira 1; R. Hirsch 1; R. Kornowski 1; A. Assali 1; M. Vaturi 1; H. Sievert 2; A. Battler 1; A. Sagie 1

1Rabin Medical Center, Cardiology Dept., Petah Tikva, Israel; 2CardioVascular Center, Cardiology Dept., Frankfurt, Germany

Purpose: Perivalvular leak may cause significant hemodynamic consequences and/or hemolysis. Re-do surgery is associated with considerable mortality and morbidity, and recurrence is not uncommon. We review our short-term results of percutaneous closure of perivalvular leaks by Amplatzer® occluders.

Methods: Eight patients (4 male, mean age 60.1±8.7, range 46-67 years) were referred for percutaneous closure of perivalvular leak because of congestive heart failure (2), hemolysis (1) or both (5). The average number of previous heart operations was 2±1.4 (2±5 patients). The procedure was done under general anesthesia, with fluoroscopic and transesophageal echocardiographic (TEE) guidance. The per-mltal leaks were generally accessed via antegrade, trans-septal approach, whereas the peri-aortic leaks were accessed via retrograde approach. In most patients contrast was injected to the recipient chamber to delineate the leak contour and determine the device size and shape. The leaks were sealed with Amplatzer VSD or PDA occluders.

Results: The perivalvular leaks were around the mitral valve (5), aortic valve (1) or both (2). All valves but one were mechanical. All procedures were uneventful. Device deployment was successful in 8 (80%) of valves (7 patients). All procedures were performed under general anesthesia, with fluoroscopic and transesophageal echocardiographic (TEE) guidance. The per-mltal leaks were generally accessed via antegrade, trans-septal approach, whereas the peri-aortic leaks were accessed via retrograde approach. In most patients contrast was injected to the recipient chamber to delineate the leak contour and determine the device size and shape. The leaks were sealed with Amplatzer VSD or PDA occluders.

Conclusions: Perivalvular leaks are a critical complication of valve surgery. Percutaneous closure with Amplatzer® VSD or PDA occluder is feasible, and may be offered to poor surgical candidates.

462 Ondansetron administration before transoesophageal echocardiography reduces the need for sedation and improves patient comfort during the procedure

M.S. Yilmazer 1; A. Aydin 1; S. Altırmakas 1; B. Dagdeviren 1; H. Tezel 1

1Deutsches Krankenhaus (German Hospital), Cardiology Dept., Istanbul, Turkey

Purpose: Transoesophageal Echocardiography (TEE) is a semi-invasive and an uncomfortable procedure for the most of patients. We tested out, if usage of emetics during TEE could reduce patients discomfort.

Methods: We have enrolled 156 patients (71 female, 85 male; aged between 23-73; mean 43.71 ± 11.65 years) in the study, who were admitted to our echocardiography laboratory for TEE examination due to various indications. All patients were anesthetized topically in the oropharynx with 10% aerosol solution of lidocaine until the gag reflex was suppressed. Afterwards, we have separated patients into three groups: Group A (n=52) received 4 mg of ondansetron as antiemetic (a selective serotonin [5-HT3] receptor antagonist), Group B (n=52) received 10 mg metoclopramide as antiemetic (a centrally acting dopamine receptor antagonist) and Group C (n=52) received saline as placebo intravenously, five to ten minutes before the procedure. All patients received 2 mg midazolam intravenously. Usage of additional doses of midazolam was let liberally to the two qualified performing operators who were blind to the antiemetic agent used, after the introduction of the TEE probe into the esophagus. Data concerning additional doses of midazolam, procedural time, recovery time in the outpatient ward, blood pressure values, percutaneous arterial oxygen saturation values, tolerability via the transgastric window, side affects of the medications used and patient discomfort via a visual analogue scale were collected and analyzed.

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Conclusions: Ondansetron reduces the need for sedation during TEE and improves patient comfort. It can be safely used during TEE in favor of patients.

463 Left atrial thrombi and thrombus-like artifacts in patients with atrial fibrillation candidate to cardioversion: prevalence and response to prolonged anticoagulation therapy

E. Antonelli 1; E.L. Antonelli 1; A. Seccarno 1; A. Bassignana 1; E. Avogadri 1; S. Dogliani 1; A. Coppolino 1; B. Doronzo 1

1SS. Annunziata Hospital, Cardiology Dept., Savigliano, Italy

Transoesophageal echocardiography (TEE) is the method of choice for the detection of thrombi in the left atrium, allowing earlier cardioversion (CV) of atrial fibrillation (AF). However, the examination of the left atrial appendage (LAA) is often difficult because of variability in the number of lobes, thickness and length of pectinate muscles, reverberations from anatomical structures.

Aim: To investigate the prevalence of thrombi and the prevalence of other images in the left atrium that may mimic thrombi, and to evaluate their response to prolonged warfarin therapy.

Methods: We studied 487 consecutive pts undergoing multplane TEE before CV of AF lasting >2 days (mean duration 37.9±6.49 days). All pts followed a brief (mean 6.6±3.3 days) at home oral anticoagulation with warfarin in order to achieve an INR value >2. Particular attention was paid trying to differentiate thrombi from artifacts on the basis of echogenicity, texture, spontaneous echo contrast and the absence of variations after prolonged anticoagulation therapy.

Results: Thrombi were found in 19 pts (3.9%), all in the LAA. Artifacts mimicking a thrombus were considered to be present in 46 pts (9.4%), most of them (78%) ascribed to reverberations from the membranous band. Pts with artifacts had significantly higher LAA Doppler outflow velocity (28.1±18.0 vs 13.1±7.5 cm/sec, p<0.01) and significantly lower prevalence of left atrial spontaneous echo contrast (51% vs 89%, p<0.05) compared to pts with LAA thrombi. No differences in echocardiographic parameters were found in pts with artifacts compared to pts without artifacts nor thrombi. After a median of 9 weeks of warfarin therapy LAA thrombi completely resolved on follow up TEE in 17 patients (89%); in the remaining 2 pts residual thrombi were found to be smaller. In pts considered to have artifacts mimicking LAA thrombi no differences were found on follow up TEE. CV was successful in 74% of pts with thrombus resolution or with artifacts, without complications.

Conclusions: In pts with AF candidate to CV we found a 3.9% prevalence of left atrial thrombi, a low percentage if compared to other previous studies. We also detected a high prevalence of artifacts which can mimic the presence of thrombi. The association with a good LAA outflow, a low degree of spontaneous echo contrast and the absence of variations after prolonged anticoagulation can facilitate the recognition of artifacts.

464 Measurement of aortic intima-media thickness with transesophageal echocardiography using a parametric quantification software

L. Mendes 1; F.C. Caetano 1; J.F. Santos 1; F. Seixo 1; P. Cardoso 1; F. Martins 1; M. Mendes 1

1Setubal, Portugal

Abstracts S69

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Background: The prevalence and clinical significance of atherosclerotic aortic disease has now been documented in a variety of patient populations by using transthoracic echocardiography. The use of standardized and automatic software for measurement of intima-media thickness (IMT) could be useful in daily practice.

Aim: To evaluate a new parametric quantification software used in digitalized TEE images for the assessment of IMT.

Methods: The QLA 2.0® (Philips) allows detection of the borders from different structures and selecting a region of interest (ROI) is able to determine the anatomic interface between intima and media. The study population comprised 31 consecutive patients (62±16 years) referred for TEE. The images of the aortic arch (Aa) (0•) and the descending aorta (da) (90•) were digitalized and saved. The off-line analyses were made with the QLAB software version 2.0®. We used two ROI (10 and 20 mm) to automatically determine the IMT. When the optimal image definition was less than 80% (value determined by the software), we proceeded with visual determination of the IMT.

Results: The medium IMT determined in the Aa with a 10 mm ROI was 1.76±1.04 mm, with a medium optimal image definition of 85%; (17 determined automatically, 14 determined visually). At the same level the medium IMT with a 20 mm ROI was 1.81±0.88 mm, with a medium optimal image definition of 86% (12 determined automatically, 16 determined visually). The medium IMT determined in the da with a 10 mm ROI was 1.88±1.23 mm, with a medium optimal image definition of 92% (19 determined automatically, 11 determined visually). At the same level the medium IMT with a 20 mm ROI was 1.84±1.19 mm, with a medium optimal image definition of 89% (18 determined automatically, 11 determined visually). We were not able to measure four IMT (one with 20 mm ROI at aortic arch level and one with 10 mm ROI and two with 20 mm ROI at the descending aorta level) because of deficient intima-media interface definition.

Conclusion: The QLAB version 2.0® software can be used in TEE images to determine the IMT of the Aa and the da. The automatic IMT assessment was more feasible at the descendent aorta.

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Relationship between inflammatory status and markers of thromboembolic risk on transeosophagal echocardiography in patients with atrial fibrillation

G. Cianfrocca 1 ; M.L. L 2 ; A. Auriti 1 ; V. Pasceri 1 ; L. Bianconi 1 ; S. Ficili 1

Background: Previous studies have suggested a relationship between inflammation and thrombus in several clinical conditions. However there are limited data on the possible association between inflammatory status and markers of thromboembolic risk on transeosophagal echocardiography (TEE) in patients with atrial fibrillation (AF).

Methods and results: A total of 159 consecutive patients (age 66±11 years, 98 men) with non-valvular AF lasting >48 hours underwent TEE. High-sensitivity C-reactive protein (CRP), fibrinogen, D-dimer, hematocrit were dosed at the time of TEE. Patients were divided into two groups according to presence (n=60) or absence (n=99) of dense spontaneous echo contrast (SEC) in left atrium or left atrial appendage. Patients with dense SEC had high levels of CRP (14.2±2.3 vs 6.9± 14 mg/L, p<0.0001). Presence or absence of SEC were not related to age, sex, main risk factors, fibrinogen, hematocrit, D-dimer, CRP levels, however peak left atrial appendage velocity at TEE was significantly lower in patients with dense SEC (0.37±0.21 vs 0.56±0.21, p<0.0001). CRP>3 mg/L was related to SEC with a sensitivity of 71% and specificity of 62%. In multivariate analysis both CRP and peak left atrial appendage velocity were significantly associated with dense SEC with an odd ratio of 4.1 (95% confidence interval 1.3-13) for CRP and odds ratio of 3.9 (95% confidence interval 1.3-12) for peak left atrial appendage velocity. Interestingly, there was no correlation between CRP and peak left atrial appendage velocity suggesting that these two markers may identify different components of thromboembolic risk (inflammation vs stasis).

Conclusions: Our results suggest that both stasis and inflammation play a role in the pathogenesis of thromboembolism in atrial fibrillation.

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Relation of Elevated C reactive protein to transeosophagal echocardiographic findings in non valvular atrial fibrillation

D. Bocca 1 , A. De Angelantonio 1 ; S. Ederhy 1 ; G. Dufaitre 1 ; S. Janower 1 ; C. Meuleman 1

Methods: The study group consisted of 146 non valvular atrial fibrillation patients (mean age 65±14.7, 70 male (47.8%). Patients with a recent history of surgery (<3 months) or sepsis at the time of the admission were excluded. AF was considered to be secondary to a precipitating condition in 39 patients: acute coronary syndrome (n=10), and congestive heart failure (n=29). Transthoracic and TEE parameters included left atrial (LA) area, LA appendage (LAA) emptying and filling velocities and presence of LAA/LAA spontaneous echo contrast (SEC) and thrombus. Thromboembolic risk was defined as the presence of SEC. Results: The table depicts the prevalence of LAA abnormalities according to CRP levels expressed in terciles. At multivariable analysis, adjusting for all variable associated with CRP levels, age (beta coefficient: 0,2; p=0,03), acute coronary syndrome patient (3.8; p=0,005) and presence of LA thrombogenic milieu (beta: 0,83; p=0,002) were found independent predictors of CRP levels.

Conclusion: Our results suggest a link between LA thrombogenic milieu and inflammation

Table 1. CRP level and TEE findings

<table>
<thead>
<tr>
<th>CRP Level</th>
<th>1st Tertile (n=42)</th>
<th>2nd Tertile (n=47)</th>
<th>3rd Tertile (n=55)</th>
<th>p Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
<td>49</td>
<td>49</td>
<td>48</td>
<td></td>
</tr>
<tr>
<td>LA area mm²</td>
<td>2.05±0.5</td>
<td>2.18±0.6</td>
<td>2.04±0.6</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>LAA area cm²</td>
<td>1.76±1.1</td>
<td>1.76±1.1</td>
<td>1.80±1.2</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>CRP (mg/L)</td>
<td>&lt;1.64 mg/l</td>
<td>1.64-8.6 mg/l</td>
<td>&gt;8.6 mg/l</td>
<td></td>
</tr>
<tr>
<td>LASEC or LAA thrombus</td>
<td>1 (2.1)</td>
<td>3 (6.4)</td>
<td>7 (12.7)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>LAA/atrial thrombus</td>
<td>1 (2.1)</td>
<td>3 (6.4)</td>
<td>7 (12.7)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>LAA thrombogenic milieu</td>
<td>1 (2.1)</td>
<td>3 (6.4)</td>
<td>7 (12.7)</td>
<td>&lt;0.001</td>
</tr>
</tbody>
</table>

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Interventricular fibrosis involvement in endocarditis-a transeosophagal echocardiographic approach

D. C. Bedeleanu 1 ; A. M. Serban 1 ; M. Pului 1 ; C. Sarmulescu 1

Background: Mitral-aortic interventricular fibrous (MAVF), represents the left half of the non-coronary cusp and the adjacent third of the left coronary cusp of the aortic valve and the anterior mitral valve, which offers little resistance to infection.

Aim: To evaluate MAVF involvement in infective endocarditis (IE), using TEE.

Material and methods: 128 consecutive cases of definite IE, mean age 49.15y (range between 17-69), 113 on native aortic valve and 15 on aortic prosthetic valves, examined by TEE echocardiography were revisited.

Results: IE complications detected by TEE were found in 51/113 pts (45.13%), 41 (36.28%) in aortic native valve IE pts and 10/15 (66.6%) in aortic prosthetic valves IE (6 mechanical, 4 biological). Associated anterior mitral valve vegetations were found in 11/51 (21.56%) pts, anterior mitral valve with rupture in 2/51 (3.92%) pts, subvalvular mitral on MAVF vegetations in 3/51 (5.88%) pts. Aortic abscesses were found in 12 (23.32) pts, 7 pts with aortic native valve IE and in 5 pts with prosthetic valves (3 mechanical and 2 biological). Pseudoaneurysms (PSA) and/or fistulas were found in 18/51 (35.29) pts, 10 on aortic valve IE and 8 on aortic prostheses. PSA fistulised into LA in 12 pts (23.32%), in 10/12 pts resulting severe acute mitral regurgitation, into the RA in 2 pts (3.92%) resulting filling and emptying valve failure and in the IVS in 3 pts (5.88%). In 3 (5.88%) pts fistulas from LV to ascending aorta were found. MAVF was implicated directly in fistulas formation and had „dissection -like aspects “ in 4 pts (7.84%). In 3 cases an „infiltrated MAVF“ was described. Considering all these complications of IE, MAVF was implicated in aortic complicated IE, directly through fistulas or indirectly, by „kissing“ vegetation on AML in 22/51 pts (43.13%) In 2 pts,1 with aortic minor regurgitation and 1 biologic prostheses after treatment of IE, fistula determined a moderate mitral regurgitation. A number of 38 pts were deferred to surgery, 5 pts died. All the complications were confirmed on surgery and /or necropsy. In 2 pts MAVF healed with small fistulae into the LA.

Conclusion: Secondary involvement of the mitral-aortic interventricular fibrous occurring as the result of direct extension of the infection from the aortic valve or a result of an infected jet of aortic regurgitation striking the ventricular surface of the interventricular fibrous or anterior mitral valve is a rare frequent complication of IE in aortic valve diseases or in aortic prosthetic valve IE, which can be assessed by TEE.
Transesophageal echocardiographic assessment of left atrial appendage function in untreated systemic hypertensive patients in sinus rhythm and its relation with NT-proBNP levels

**Objective:** The aim is to assess Left_Atrial_Appendage (LAA) function as indicated by LAA flow velocities by pulsed wave (PW) flow by transesophageal echocardiography (TEE) and wall contraction velocities by Tissue_Doppler_Imaging (TDI) and its relation with NT-proBNP in hypertensive patients.

**Methods:** TEE was performed in 48 hypertensives in sinus rhythm, aged 40 to 55 years with normal systolic and in 20 control subjects without cardiovascular disease, aged 43 to 54 years. PW and TDI velocities of LAA were recorded. PW sample was obtained at the proximal third of the appendage with the optimum parallel Doppler alignment to LAA blood flow.

**Results:** In hypertensives the PW late emptying and filling velocities were significantly reduced compared with control group. The LAA emptying (p<0.05) and TDI velocities of both medial and lateral walls (p<0.05) were significantly reduced compared with control group. The LAA emptying (p<0.01) and TDI velocities of both medial and lateral walls (p<0.01) were significantly reduced compared with control group.

**Conclusions:** TEE is an accurate and reliable tool to assess mechanisms of AR in pts with eccentric AR.

### Table 1

<table>
<thead>
<tr>
<th>PW-D1 (cm/s)</th>
<th>PW-D2 (cm/s)</th>
<th>PW-D3 (cm/s)</th>
<th>TDI-M D1 (cm/s)</th>
<th>TDI-M D2 (cm/s)</th>
<th>NT-proBNP (pg/ml)</th>
</tr>
</thead>
<tbody>
<tr>
<td>HTN</td>
<td>Control</td>
<td>HTN</td>
<td>Control</td>
<td></td>
<td></td>
</tr>
<tr>
<td>13±7</td>
<td>18±4</td>
<td>32±5</td>
<td>59±21</td>
<td>32±5</td>
<td>20±4</td>
</tr>
<tr>
<td>26±23</td>
<td>51±0,01</td>
<td>40±0,16</td>
<td>7±12.3</td>
<td>13.87±0,4</td>
<td>9.52±2.1</td>
</tr>
<tr>
<td>P</td>
<td>&lt;0,05</td>
<td>&lt;0,001</td>
<td>&lt;0,001</td>
<td>&lt;0,05</td>
<td>&lt;0,001</td>
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### Table 1 continuation

<table>
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<tr>
<th>TDI-M D3 (cm/s)</th>
<th>TDI-L D1 (cm/s)</th>
<th>TDI-L D2 (cm/s)</th>
<th>TDI-L D3 (cm/s)</th>
<th>NT-proBNP (pg/ml)</th>
</tr>
</thead>
<tbody>
<tr>
<td>HTN 6.89±3.7</td>
<td>Control 10.43±5</td>
<td>9.6±2</td>
<td>15.6±5.1</td>
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<td>P</td>
<td>&lt;0,05</td>
<td>&lt;0.06</td>
<td>&lt;0.05</td>
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### 470

Transesophageal echocardiographic evaluation of pulmonary vein stenosis 9 months after circumferential RF catheter ablation of refractory atrial fibrillation

Aim: Iatrogenic pulmonary veins (PVs) stenosis is a known complication of catheter ablation procedure for the treatment of atrial fibrillation (AF). We investigated whether transesophageal echocardiographic examination (TEE) is a sensitive method for the evaluation of the incidence of PV stenosis after RF circumferential pulmonary veins isolation (CPV) by 9 months follow-up.

**Methods and results:** 78 patients, with refractory to antiarrhythmic drugs and highly symptomatic episodes of paroxysmal and persistent AF underwent CPVI according to Pappone technique. 3-dimensional electroanatomic CARTO system was used. In all TEE was performed 8.8±3.3 months after procedure, with PV doppler flow velocities assessment (m/s), regarding left and right superior and inferior PVs. LVSP, RSPV, LIPV, RIPV. PV stenosis was defined in TEE examination if following criteria were met: a maximum Doppler flow velocity of ≥110 cm/s with corresponding deformity of systolic to diastolic flow amplitude (difference between systolic and diastolic wave amplitude >80%) and the presence of turbulence in color flow doppler. Patients who were found to have PV stenosis in TEE were performed MRI for the confirmation of diagnosis. A decrease in pulmonary vein diameter by more than 50% was considered significant. 21 pts (26%) reported symptoms of arrhythmia by the time of follow-up, whereas 57 pts (74%) were AF free. Although 9 pts (11.8%) were diagnosed for PVs stenosis by TEE, MRI confirmed critical stenosis of PVs ostia only in 4 patients (5.1%), from whom only two (2.5%) presented clinical symptoms of mild dyspnea and hemoptysis. Comparing maximal Doppler flow velocity in TEE examination with MRI images, we found out that only velocity values above 130 cm/s in PVs ostia corresponded significantly with MRI results.

**Conclusions:** A 9 months follow-up of patients treated with RF ablation by Pappone method for resistant AF shows a minimal risk of PVs stenosis. TEE seems to be a sensitive method for PV stenosis evaluation, nevertheless, echocardiographic criteria for stenosis assessment seem to be too strict, especially when not accompanied by clinical symptoms.

### 471

Transesophageal echocardiography in evaluation of pulmonary veins anatomy variations. A comparison with magnetic resonance angiography

**Objective:** The role of transesophageal echocardiography (TEE) in defining the exact PVs anatomy by comparing it with magnetic resonance angiography (MRA) for atrial fibrillation (AF) because it can help electrophysiologist in choosing the best ablative technique for each patient. The role of transesophageal echocardiography (TEE) is still debated.

**Background:** It’s now clear that variations in the number and anatomy of the pulmonary vein (PV) ostia are more frequent than thought. A detailed definition of PVs anatomy is of great importance in patients undergoing radiofrequency catheter ablation (RFCA) for atrial fibrillation (AF) because it helps electrophysiologist in choosing the best ablative technique for each patient.

**Methods and results:** 78 patients, with refractory to antiarrhythmic drugs and highly symptomatic episodes of paroxysmal and persistent AF were included. 48 patients were studied with MRA and then with TEE in order to exclude intra-atrial structures that might affect efficacy of RFCA. They went CPVI according to Pappone technique. 3-dimensional electroanatomic CARTO system was used. In all TEE was performed 8.8±3.3 months after procedure, with PV doppler flow velocities assessment (m/s), regarding left and right superior and inferior PVs. LVSP, RSPV, LIPV, RIPV. PV stenosis was defined in TEE examination if following criteria were met: a maximum Doppler flow velocity of ≥110 cm/s with corresponding deformity of systolic to diastolic flow amplitude (difference between systolic and diastolic wave amplitude >80%) and the presence of turbulence in color flow doppler. Patients who were found to have PV stenosis in TEE were performed MRI for the confirmation of diagnosis. A decrease in pulmonary vein diameter by more than 50% was considered significant. 21 pts (26%) reported symptoms of arrhythmia by the time of follow-up, whereas 57 pts (74%) were AF free. Although 9 pts (11.8%) were diagnosed for PVs stenosis by TEE, MRI confirmed critical stenosis of PVs ostia only in 4 patients (5.1%), from whom only two (2.5%) presented clinical symptoms of mild dyspnea and hemoptysis. Comparing maximal Doppler flow velocity in TEE examination with MRI images, we found out that only velocity values above 130 cm/s in PVs ostia corresponded significantly with MRI results.

**Conclusions:** A 9 months follow-up of patients treated with RF ablation by Pappone method for resistant AF shows a minimal risk of PVs stenosis. TEE seems to be a sensitive method for PV stenosis evaluation, nevertheless, echocardiographic criteria for stenosis assessment seem to be too strict, especially when not accompanied by clinical symptoms.
Diagnosis of patent foramen ovale: femoral vein contrast administration is better
U.M. Velupandian 1; R. Khiani 1; R. Calderwood 1; J. Morris 1; S.G. Ray 1; A.M. Heagerty 1; C.N. Mccollum 1
1University of Manchester, Academic Medicine and Surgery Dept., Manchester, United Kingdom; 2South Manchester University Hospital, Medical Statistics Dept., Manchester, United Kingdom

Purpose: Paradoxical embolism, may cause ischaemic stroke in young adults and decompression sickness. Venous to Arterial Circulation shunting (vACS) usually through a Patent Foramen Ovale (PFO) is dynamic and flow from the inferior vena cava is more readily directed towards the foramen ovale than flow from the superior vena cava. We assessed vACS through a PFO with transcranial Doppler (TCD) using antecubital and femoral veins for contrast administration.

Methods: Young adults (n=84) with possible paradoxical embolism were studied and (39/46) were detected to have a PFO using TCD of the middle cerebral artery. A standard injection protocol was used with ultrasound contrast (agitated saline-air-blood) administered via both antecubital and femoral veins i) at rest ii) with coughing and iii) a standardized Valsalva manoeuvre (VM). All studies were analyzed post test and the total number of microbubbles that appeared after each injection.

Results: The median number of microbubbles detected on TCD at rest, during cough and following release of a VM were 10 (0-558), 20 (0-515) and 67.5 (0-500) respectively with antecubital injection and 56 (0-795), 72 (0-594) and 100 (0-801) respectively with femoral injection. The difference in microbubble numbers between antecubital and femoral injections were highly significant (Wilcoxon signed ranks test) with p<0.001 for injections at rest and during cough and p=0.001 for injections with VM.

Conclusion: Femoral venous contrast administration provides a better estimate of vACS through a PFO particularly at rest. Antecubital contrast injections may underestimate a vACS through a PFO, unless a standardized VM is performed.

SOURCE OF EMBOLISM

Patent foramen ovale - an evaluation of diagnostic techniques and routes of contrast administration
U.M. Velupandian 1; R. Khiani 1; R. Calderwood 1; J. Morris 1; S.G. Ray 1; A.M. Heagerty 1; C.N. Mccollum 1
1University of Manchester, Academic Medicine and Surgery Dept., Manchester, United Kingdom; 2South Manchester University Hospital, Medical Statistics Dept., Manchester, United Kingdom

Purpose: Paradoxical embolism through a patent foramen ovale (PFO) may cause ischaemic stroke in young adults and decompression sickness. Detecting shunts through a PFO is therefore important. Transoesophageal echocardiogram (TOE) was compared with transcranial Doppler (TCD) and transthoracic echocardiogram (TTE) using antecubital (ACV) and femoral (VF) veins for contrast administration.

Methods: Young adults (n=59) referred for evaluation of a cardiac source of embolus, underwent TCD of the middle cerebral artery, TTE with second harmonic imaging and TOE with contrast(ing agitated saline-air-blood) administered via ACV and VF using a standardized protocol i) at rest ii) with coughing and iii) a Valsalva manoeuvre(VM) or modified VM on TOE.

Results: When compared with TOE, the sensitivity and specificity for TCD was 100% and 81.8% with ACV and 100% and 87.1% with VF. The sensitivity and specificity for TTE was 86.4% and 90.6% with ACV and 93.8% and 88.2% with VF (Table). Out of the six studies positive on TCD but negative on TOE with ACV, three were positive on TOE with VF (false negative on TOE with ACV), one was also significantly positive on TTE with VM and two have been false negative on TOE, one patient with a large shunt on TCD with VM did not have TTE imaging(no echo window) and one patient with minor shunt on TCD with VM was negative on both TTE and TOE (false positive on TCD).

Centralisers and routs of contrast administration


table 1

<table>
<thead>
<tr>
<th>Provocation</th>
<th>Inj 1</th>
<th>Inj 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Foot inj. late VM</td>
<td>29</td>
<td>64</td>
</tr>
<tr>
<td>Arm inj. rest</td>
<td>43</td>
<td>43</td>
</tr>
<tr>
<td>Arm inj. early VM</td>
<td>71</td>
<td>62</td>
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<tr>
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<td>33</td>
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<tr>
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<td>25</td>
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<tr>
<td>Arm inj. bed tilt</td>
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<td>64</td>
</tr>
<tr>
<td>Arm inj. cough</td>
<td>36</td>
<td>50</td>
</tr>
<tr>
<td>Arm inj. nitrospray</td>
<td>40</td>
<td>40</td>
</tr>
<tr>
<td>Sensitivity for PFO (%)</td>
<td>44</td>
<td>57</td>
</tr>
</tbody>
</table>

575
Conclusion: TCD with antecubital contrast administration was a reliable alternative to TOE for detection of PFO. Conventional TOE with antecubital injections may not be the 'gold standard' for PFO detection.

<table>
<thead>
<tr>
<th>Table 1. PFO Detection Techniques Compared</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>TOE vs TCD</strong></td>
</tr>
<tr>
<td><strong>TCD Negative (N)</strong></td>
</tr>
<tr>
<td>TOE Negative (N)</td>
</tr>
<tr>
<td>TOE Positive (N)</td>
</tr>
<tr>
<td>Sensitivity = 100%</td>
</tr>
</tbody>
</table>

| **TTE vs TCD** | **Antecubital Contr. Injection** (N=54) | **Femoral Contrast Injection** (N=45) |
| **TCD Negative (N)** | **TCD Positive (N)** |
| TTE Negative (N) | 29 | 3 | 19 | 15 |
| TTE Positive (N) | 3 | 25 | 4 | |
| Sensitivity = 86.4% | Sensitivity = 93.8% | Specificity = 90.6% | Specificity = 86.2% |

N=Number of cases

476 Presence of concomitant atrial septal aneurysm is associated with multiple acute cerebral ischemic lesions in cryptogenic stroke due to patent foramen ovale

A. Kessel-Schaefer1; L. Bonali; S. Engelter1; P. Lyver1; D. Tobler1; H.P. Brunner-La Rocca1; P. Buser1; A. Linka1
1University Hospital, Cardiology, Neurology Dept., Basel, Switzerland

Background: Patent foramen ovale (PFO) is often found in young patients (pts) with stroke without other determined etiologies. However, there is conflicting evidence whether the concomitant presence of an atrial septum aneurysm (ASA) is associated with an increased risk for recurrent stroke. Cerebral diffusion weighted magnetic resonance imaging (DWI) enables accurate identification of ischemic lesions and may give insight into mechanisms and risk of cerebral embolism associated with PFO and ASA.

Purpose: To compare DWI findings between pts with cryptogenic stroke (acute ischemic stroke, i.e. single episode of focal neurological deficit lasting >24 hours, with exclusion of intracerebral hemorrhage or other structural brain disease on CT or MRI) with PFO plus ASA and those with PFO alone.

Methods: All consecutive pts with first acute ischemic stroke between 1999-2005, age <60 years, DWI, and a PFO detected by TEE were included. Localization, number and size of ischemic brain lesions were correlated with PFO size (small/large: <<or=2 mm), degree of interatrial right-to-left shunt (RLS) (small/large: <or>30 microbubbles crossing the PFO), and the presence of ASA (septum deviation <15 mm).

Results: 48 pts were included. Mean age was 48 years (interquartile range 41-54), 66% were male. PFO was large in 32 pts (66%) and small in 33%. ASA was present in 30 pts (82.5%); 32 pts (66%) had large RLS and one third had small RLS; DWI lesions were present in 47 pts (98%). Single cerebral lesions were present in 28 pts (58%) and multiple lesions were present in 47 pts (98%). Localization, number and size of ischemic brain lesions were correlated with ASA size (ASA base: 24.2±6 mm; ASA excursion: 14.9±4 mm) and the presence of ASA (ASA base thickness: 5.2±1 mm; ASA excursion: 4.6±1.5 mm).

Conclusions: Significant differences in several PFO anatomic parameters were observed in the 25 patients (25%) presenting with a residual shunt as compared with those without residual shunt (table): No patient experienced recurrent neurologic symptoms.

Conclusion: Large PFO and ASA, and/or highly mobile ASA, are associated with the presence of a residual shunt at follow-up. Whether these findings impact on the risk of recurrent stroke deserve further study.

Material and methods: We retrospectively reviewed the transesophageal echocardiographic (TEE) atrial septum characteristics obtained in 49 consecutive patients (mean age 47±12 yrs) with cryptogenic stroke and PFO who underwent PDC at our institution over a 2 year period. Morphologic parameters: diameter of the base and maximal phasic excursion of atrial septum aneurysm (ASA), PFO diameter, tunnel length, and septum secundum thickness. The presence of a residual shunt was assessed by saline contrast study during transthoracic echocardiography (TTE) and TEE 6 months after PDC.

Results: Significant differences in several PFO anatomic parameters were observed in the 25 patients (25%) presenting with a residual shunt as compared with those without residual shunt (table).

Conclusion: Large PFO and ASA, and/or highly mobile ASA, are associated with the presence of a residual shunt at follow-up. Whether these findings impact on the risk of recurrent stroke deserve further study.

Method: Permission from the local Health Trust was sought and granted for the specialist technician-directed PFO screening service. A protocol was agreed upon. Transthoracic echocardiography with second harmonic imaging was employed as a sensitive yet readily applicable method of detecting clinically relevant intra-cardiac shunts when used with a contrast agent and in association with Valsalva. We selected agitated-saline bubble contrast (ASBC) for our protocol as it avoids the risk of anaphylaxis associated with plasma expanders and the hazards of exposure associated with blood/saline mixtures. Four echocardiographers possessing full British Society of Echocardiography accreditation were identified as being eligible to undergo specialist training, two of whom declined. Two technicians went forward to the local Trust-run intravenous (iv) cannulation course (one half day). Instruction was given in the 2 syringe plus 3-way tap method of generating ASBC and in eliciting the Valsalva manoeuvre from patients. All staff were competent in immediate life support. A physician supervised the first 10 studies for each technician. The first 30 PFO screening studies and reports were checked by a cardiologist.

Results: There was 100% concordance between reports from specialist technicians and the reviewing cardiologist for the first 30 studies in the technician-led service. Over 2 years, 2004-2006, 161 PFO screening studies were performed, physician-assisted in 29 (18%) (cf. 2002-2004, 96 studies, physician-assisted in 98 (100%). Of these 161 studies, 136 (86%) were performed by specialist technicians and were physician-assisted in 6 cases (4%). 23 (14%) studies were performed by non-specialist technicians and all of these were physician-assisted (100%). There was failure to obtain iv access in 2 of 161 cases (0.6%). Overall, in our selected population, 82 (51%) scans were positive for PFO.

Conclusion: Echocardiographers can, with clear protocols, structured training and support provide an independent, efficient and reliable PFO screening service. This service has streamlined PFO detection and contributed to technician education and personal development.

477 A technician-led service for detection of patent foramen ovale using transthoracic echocardiography

C. Labinjoh1; J. Mitchell1; D. Northridge1
1Western General Hospital, Cardiology Dept., Edinburgh, United Kingdom

Purpose: The association of patent foramen ovale (PFO) with cryptogenic stroke and decompression illness in SCUBA divers led to an increase in requests for echocardiographic detection of PFO in our department. The need for medically-qualified personnel in performing these studies became a limiting factor. We describe the development of a technician-led screening service for PFO detection.

479 Usefulness of a new transthoracic echocardiography protocol for identification of patent foramen ovale

C. Cabeza Lainez1; A.E. Gomez Menchero1; A. Carrillo Ruiz1; R. Garcia De La Borbolla1; D. Barolome Mateos1; N. Hernandez Vicente1; J.M. Llacas Pena1; M. Sancho Jaldon1
1Hospital Universitario Puerta Del Mar, Cardiology Dept., Cadiz, Spain

Introduction: The study of patent foramen ovale (PFO) has become one of the main activities of echocardiographers. All we know that transesophageal echocardiography (TEE) is the gold standard for diagnosis but this technique is time consuming and causes discomfort to the pa-
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Transthoracic echocardiography with harmonic imaging - a new method in diagnosing patent foramen ovale

A.-M. Dalecka 1 ; J.K. Biernat 1 ; K.S. Golba 1 ; G. Smolka 1 ; P. Janas 1 ; P. Ammann 1

1University Hospital Zurich, Cardiology Dept., Zurich, Switzerland; 2St. Gallen, Switzerland

Abstracts

Methods: We have studied 32 patients with a suspicion of PFO, 53% female. The study protocol begins with a TTE with agitated saline contrast (ASC) and a small amount of blood (0.3cc) in basal situation and with Valsalva maneuver followed by TEE with ASC to confirm the previous finding. The predominant cardiovascular risk factor was smoking (33%) and Hypertension (15%). Only 9% of patients presented moderate structural heart disease. Clinical condition that led to the study was non-severe stroke in 40% patients, transient ischemic attack in 28%, atrial septal aneurism (ASA) in 21%, migraine in 6% and peripheral embolism in 3%. 53% of patients were taking aspirine at the moment of the study. RESULTS: The total incidence of ASA was 62%. We found PFO in 62% of patients. TEE showed right to left shunt in 18 patients (16 patients confirmed by TEE) 11 patients showed no bubble apariation in the left sided of the heart by TEE (the same result was seen in 9 patients by TEE and the other two showed mild shunt). There was 3 hesitant results by TTE-ASC due to difficult accoustic window but TEE was only slightly positive in 1 patient.

Results: Summarized in table 1. In our study TTE with agitated saline contrast showed a predictive positive value (PPV) of 86% and a negative predictive value of 81.8%. Until now we have performed percutaneous closure of PFO in 15 patients with no complications and all the patients are free of events during the follow up of 15±3 months.

Conclusion: TTE is an effective technique to study patients with a high PPV (after a small learning curve), easy to use and with the advantage of so many repetitions as necessary with no disturbances for the patient.so, TEE can be (after a short learning curve), easy to use and with the advantage of so many repetitions as necessary with no disturbances for the patient.so, TEE can be

481

Should routine echocardiography be performed in all patients with stroke?

T. Wolber 1 ; M. Maeder 1 ; R. Aleky 1 ; I. Bluzzaite 1 ; R. Blank 1 ; H. Rickli 1 ; P. Ammann 1

1University Hospital Zurich, Cardiology Dept., Zurich, Switzerland; 2St. Gallen, Switzerland

Background and purpose: Cardiogenic embolism accounts for 15% to 30% of ischemic strokes. The value of routine use of echocardiography (echo) among patients with stroke remains controversial. We evaluated the diagnostic yield of routine echo in unselected patients with acute ischemic stroke.

Methods: Consecutive patients with ischemic stroke or a transient ischemic attack were included. Transthoracic echo (TTE) was performed in all patients, complemented by transesophageal echo (TEE) in selected patients.

Results: 807 echocardiographic examinations (743 TTE and 64 TEE) were performed in 775 consecutive patients. A potential cardiac source of embolism (CSE) was found in 144 (18%) of the patients. The most frequent potential CSE included atrial fibillation (7%) and patent foramen ovale (6%). Results were more likely to have an impact on therapeutic decisions in younger patients. Numbers needed to test (NNT) for detection of CSE increased ten-fold from 6 in patients <50 years to 62 in aged patients >70 years.

Conclusion: Echo may provide important information on the etiology of ischemic stroke. However, echocardiographic screening for a cardiac source of embolism is not warranted in all patients. In stroke patients younger than 50 years, echo has a higher diagnostic yield and should thus be performed. In older patients, routine echo results in a high rate of unimportant findings, and echo should be applied selectively.
483 Surgical or medical treatment for impending paradoxical embolism — report of a clinical cases and literature review

E. Fauveau;1 A. Cohen;2 N. Bonnet;3 K. Gacem;1 H. Lardoux;1 on behalf of Centre Hospitalier Sud Francilien
1Service De Cardiologie, Corbeil Essonnes, France; 2Paris, France; 3Cholet, France

Endpoint: Thrombus straddling a patient foramen ovale (TSFO) is rare. It occurs in presence of pulmonary embolism, and it can be responsible of paradoxical embolism. The treatment is discussed, even if surgical treatment by thrombectomy is more often chosen. We aimed to precision better TSFO treatment depending on clinical context.

Material and methods: First TSFO case was reported by Nelissen in 1985. A bibliographic research in Pubmed from 1985 to 2005, found 75 cases of TSFO diagnosed by echocardiography. We analysed the 79 patients including 4 patients of our personal experience.

Results: Median age was 57.8 year old, with a majority of men (M/F ratio: 0.6). Pulmonary embolism was present in 97% of cases, and was severe in 42% of cases. Paradoxical Embolism was found in 47% of cases, with cerebral site in half of cases. The diagnosis was confirmed by transesophageal echography in 1/3 of cases and by transoesophageal echography in 2/3 of cases. It shows more frequently a long mobile serpentine thrombus. Treatment was described in 70 of 79 cases. Heparin treatment group was older (66 years), had more stroke (7/10) than surgery group (median age 55 year, 8 stroke/46). Among 25 patients with hemodynamic compromise, surgery was the first therapeutic option (13/25). Proportionally, more patient received thrombolysis in its subgroup (8/25). Heparin or venous cave filter was more rarely chosen (4/25). In these subgroup, mortality was hight (>30 %) independantly of treatment.

Conclusion: Medical treatment by heparin is chosen as a second intention in an older population with more frequent comorbidities and strokes. However, mortality is not reduce in surgery group treatment compared to heparin in this review. Surgery seems to be justified in prevention of paradoxical embolism. Thrombolysis is more frequently chosen in the high risk population that cannot wait for surgical treatment, and is associated with the highest mortality.

Table 1. Immediate mortality (N=70)

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Mortality</th>
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<tbody>
<tr>
<td>surgery</td>
<td>7/46 (15%)</td>
</tr>
<tr>
<td>heparin</td>
<td>1/13 (8%)</td>
</tr>
<tr>
<td>thrombolysis</td>
<td>4/10 (40%)</td>
</tr>
<tr>
<td>cave filter</td>
<td></td>
</tr>
</tbody>
</table>

484 Is the diagnostic capacity of transesophageal echocardiography and cardiac disease found in peripheral embolism different from cerebral embolism?

A.T. Timoteo;1 L.M. Branco;1 A. Galirno;1 A. Leal;1 A. Santanta;1 J. Abreu;1 J. Feliciano;1 R. Ferreira
1Lisboa, Portugal; 2Santa Marta Hospital, Cardiology Dept., Lisbon, Portugal

Background: The search for a cardiac source of embolism by transesophageal echocardiography (TEE) is a very important tool in the evaluation of patients with embolic events.

Objectives: We sought to evaluate if the diagnostic capacity of TEE and the cerebral disease found is different in cerebral and peripheral embolism.

Methods: Study of 1110 consecutive patients studied since 1994 by TEE, after a normal transthoracic echocardiogram (TTE), for search of a cardiac source of embolism, due to an acute ischemic event, either cerebral or peripheral. We found 52 cases of peripheral embolism, and the remaining were acute cerebral ischemic events (confirmed by CT-scan).

Results: Male gender was more frequent in patients with cerebral events (53% vs 37%, p<0.035), with the same age (53±14 vs 57±18 years). There was a slight trend for a higher incidence of thromboembolic events in patients with cerebral embolism, and the remaining were acute cerebral ischemic events (confirmed by CT-scan).

Conclusions: In peripheral embolism, we found the same cardiac diseases as in cerebral embolism, but with a higher incidence in thromboembolism. It was also more often diagnostic of a cardiac source of embolism. However, the diagnostic rate was only 48%, less than what we expected to see in peripheral embolism, maybe due to the fact that large vegetations, thrombi or cardiac tumors, so often found in these cases, can be seen by TEE. The patients that underwent TTE were only the ones with normal TTE, outlining the importance of TEE after a normal TTE.

Table 1

<table>
<thead>
<tr>
<th>(%)</th>
<th>Peripherial embolism</th>
<th>Cerebral embolism</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Atrial septal defect</td>
<td>0</td>
<td>1</td>
<td>NS</td>
</tr>
<tr>
<td>Patent foramen ovale</td>
<td>4</td>
<td>9</td>
<td>NS</td>
</tr>
<tr>
<td>Atrial septum aneurysm</td>
<td>2</td>
<td>7</td>
<td>NS</td>
</tr>
<tr>
<td>Vegetation</td>
<td>2</td>
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<td>NS</td>
</tr>
<tr>
<td>Tumour</td>
<td>0</td>
<td>0.4</td>
<td>NS</td>
</tr>
<tr>
<td>Thrombo</td>
<td>13</td>
<td>6</td>
<td>0.08</td>
</tr>
<tr>
<td>Aortic plaques&gt;4 mm</td>
<td>15</td>
<td>1</td>
<td>NS</td>
</tr>
</tbody>
</table>

485 Patients with transient ischemic attack under oral anticoagulation: atrial thrombus resolution follow-up guided by transesophageal echocardiography

D.N. Chrissos;1 E.N. Taparlis;1 A.A. Katsaros;2 P.N. Stougianios;1 A.N. Kartalis;1 N.C. Korovessis;1 I.E. Kallikazaros;1 1Hippokration Hospital, Cardiology Dept., Athens, Greece; 2Athens, Greece

Introduction: Transesophageal echocardiography (TEE) has been proven an exceedingly reliable imaging technique for detection of atrial thrombi, specifically in patients (P) who have undergone a transient ischemic attack (TIA) -far surpassing transthoracic echocardiography. The purpose of this study is to determine the usefulness of TEE as a means of recording the outcomes of anticoagulation therapy in P with TIA.

Methods: We studied 169 P (88 males and 81 females of mean age 70±10 years) who had recently sustained a TIA, the diagnosis of which was made clinically and by brain computerized tomography. All P underwent TEE, well tolerated and uncomplicated. P<0.05 was considered statistically significant.

Results: 47 P (27.81%) were found by TEE to have atrial thrombus: 5 P (10.64%) in left atrium cavity and 42 P (88.36%) in left atrium appendage. 15 P were followed for a period of one month to 2.5 years. TEE was repeated 4 and 8 weeks after beginning oral anticoagulation. Atrial thrombus was completely dissolved in 12 P (80%), while it was still present in 3 P (p=0.004).

No thromboembolic events were manifested during the follow-up period.

Conclusions: It seems that administration of oral anticoagulation therapy results in elimination of thrombi in the majority of patients who have sustained a transient ischemic attack. Furthermore, the incidence of thromboembolic events seems to be related mainly to the resolution rather than organization of the atrial thrombus.

ATRIAL FUNCTION AND DISEASE

486 Atrial strain and strain rate analysis in patients with hypertrophic cardiomyopathy: functional findings and clinical significance

G. Pacileo;1 G. Limongelli;1 G. Salvo;1 M. Verrengia;1 A. Rea;1 T. Miele;1 S. Gala;1 R. Calabro1 1AO Monaldi, Dept., Napoli, Italy

Background: In patients with hypertrophic cardiomyopathy (HCM) atrial deformation significantly correlates with the risk of atrial fibrillation. However its clinical impact in patients with HCM has never been investigated.

Aim: To evaluate the atrial deformation by Strain (S) and Strain Rate (SR) analysis in pts with HCM and to correlate it with the onset of arrhythmias.

Methods: Our study population includes 53 subjects: 23 patients with HCM (mean age at study 30±12 years) (HCM group) and 20 age-matched healthy children (Control Group). Among patients with HCM 1/2 showed arrhythmias.

Results of SR analysis was performed from the apical views for the mid segments of interatrial septum (AS), left atrium (LA) lateral wall (LW), right atrial (RA) free wall (from the apical 4-chamber view), and LA inferior wall (IW) and LA anterior wall (AW) from the apical 2-chamber view.

Results: Compared to control group, in HCM pts S/SR analysis showed a significant reduction of both LA and RA deformation (S: 49.6±20.9% vs 80.8±3.15%, p<0.001; SR 4.2±1.7 s-1 vs 4.7±1.9 s-1, p<0.007; RA: S 65.5±33.4% vs 139.1±33.1%, p=0.01; SR 4.6±1.6 s-1 vs 5.8±1.8 s-1; LA: S 40.7±21.8% vs 77.5±15%, p<0.001; SR 4.2±1.8 s-1 vs 4.4±1.7 s-1, p=0.009). Patients with arrhythmias showed significantly lower values of peak systolic S and SR (S: 5±0.0; SR 0.02; LA: S 5±0.0; SR 0.02; RA: S 5±0.0; SR 0.02; LA: S 5±0.0; SR 0.02).

Conclusions: HCM patients show significant reduction of atrial deformation, probably due to involvement also of the atrial myocardium and for abnormal loading conditions. In addition, compared to HCM patients without arrhythmias, those with arrhythmias have the lowest values of systolic peak S/SR, confirming the potential clinical impact of these new functional indexes.

487 Left atrial strain/strain rate analysis in patients with dilated cardiomyopathy: correlation with clinical, electrocardiographic and echocardiographic findings

G. Limongelli;1 G. Pacileo;2 G. Di Salvo;3 R. Ancona;1 C. Maiello;1 G.E. Gepippa Eusebio;1 R. Calabro;1 P. Calabro1 1AO Monaldi, Dept., Napoli, Italy

Aim: We analysed strain/strain rate (S/SSR) parameters of the left atrium (LA) in patients with non-ischemic dilated cardiomyopathy, seeking potential correlation between S/SSR and clinical, electrocardiographic (ECC) and echocardiographic (Echo) findings of the patients.

Patients and methods: Twenty-four patients (mean age 23±16 years) with clinical diagnosis of dilated cardiomyopathy (DCM) were selected for the study. Coronary artery disease and left secondary causes of heart fail
were excluded by full clinical and diagnostic investigation. Patients under-
went a full clinical examination, including physical examination, NYHA func-
tional class assessment, 12-lead ECG, conventional echocardiography, ex-
ercise test, metabolic exercise test, and 24-hour Holter ECG. Echocar-
diography was performed by System Seven (GE), equipped with TFI view.
Left atrial S/HR were evaluated in 4 and 2 chambers view at the apical level of
different wall (septal, lateral, anterior, inferior). Twenty-four age-BSA matched
healthy individuals were studied as controls.

Results: Compared to normal in individuals, LA strain and strain rate were
significantly reduced (p=0.01, p=0.03). We found a correlation between LA strai
and strain rate with age at correction, surgical correction, and device di-
arrhythmias has significant lower values of atrial myocardial deformation prop-
erties in patients with an atrial substrate vulnerable for AF.

Conclusion: Regional LA function assessment using transthoracic echo-
cardiography and the strain capabilities is feasible and might be a predictive
parameter of atrial fibrillation or/and arterial thrombo-embolic event.

490 Total atrial activation time: New echocardiographic tool for identifying patients with an atrial substrate vulnerable for AF
F. Roshanali12; F. Roshanali12; S. Orali2; M. Eftekharzadeh12; A. Mohammadi12; K. Khatibi1
1Tehran, Iran (Islamic Republic of); 2Day General Hospital, Tehran, Iran (Islamic Republic of)

Background: We evaluate value of tissue Doppler echocardiography by trans-
 thoracic for measure total atrial activation time to identify with an atrial sub-
strate vulnerable for AF.
Methods: We studied 84 patients in sinus rhythm (40 patients with history of AF)
 undergoing trans-thoracic echocardiography. We measured PA-tid interval
as the time from initiation of the electrocardiographic P-wave to the lateral
 Left atrial tissue Doppler signal.
Results: AF history patients differed from sinus rhythm patients by a lower
activation time (43±1.5 versus 50±1.2), a reduced maximal A-wave trans-
mitral Doppler flow velocity (45±20 versus 55±17 cm/s), an increased total
pacing (55±10 versus 45±8 mL), and a prolonged PA-tid interval (163±32
versus 135±23 ms, respectively; p<0.01 for all). Also AF history patients
were older than SR group (58±10 versus 60±12 years). Pa tid interval was only inde-
pendent discriminator of history of AF. (1.1 for every 1 mos increment; p<0.001).
Conclusion: Total atrial activation time assessed by trans-thoracic tissue Doppler echo-
cardiography could be valuable to identifying patients vulnerable for AF.

491 LA volumes, global left atrial strain and strain rate in normal hearts
determined by 2-D echocardiography
R. Vianna1; K.S. Lee1; C.A. Moreno1; R.J. Buono1; V.P. Keating1; C.M. Bader1; C.P. Appleton1
1Mayo Clinic College of Medicine, Div. of CV Diseases, Scottsdale, Arizona (United States of America)

Introduction: Left atrial (LA) maximal volume by 2-D echocardiography is
associated with multiple adverse cardiovascular (CV) outcomes. Techniques
that detect early LA volume abnormalities and LA contracture dysfunction
may help with early prevention of adverse CV events.
Objectives: To determine normal LA maximal volume, LA ejection
fraction (LAEF) and global LA strain and strain rate during LA contraction
using 2D echo and 2D speckle tracking (2D-ST) techniques.
Methods: Forty seven healthy volunteers with no cardiac or diabetic history,
and normal exercise capacity, systolic BP <125 mm Hg), ECG, and
echocardiographic findings were included in this study. Apical 4-chamber
view images were analyzed using an EchoPac workstation (GE, Milwau-
kee, WI). LA volumes including maximum, minimum and volume prior to
atrial contraction (Pre-A) were calculated by the method of disks. Global LA
strain and strain rate were measured using 2D Strain analysis software.
Results: All values are expressed as mean±SD. Mean age was 39±8.5 years.
53% were female. Average HR was 63±9.7 BPM and average PR interval 138±
172 ms. Global strain at atrial contraction was 10±3.3% and strain rate 1.8±0.5
1/s. Volumes and changes during the atrial cycle are shown in the table below.
Conclusion: Average normal LA volume minimum is 8 ml/m² with an LAEF
of 0.34. With a decrease of global LA strain rate at atrial contraction of-10%. Our
study begins to establish the relation of LA volumes and contracture performance.
Increased LA minimum volume and a reduction in strain may be an early
index of LA dysfunction that deserves further study.
Table 1

<table>
<thead>
<tr>
<th>Volume (ml/m²)</th>
<th>% Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maximum</td>
<td>24±4.9</td>
</tr>
<tr>
<td>Pre-A</td>
<td>14±3.4</td>
</tr>
<tr>
<td>Minimum</td>
<td>8±4.9</td>
</tr>
<tr>
<td>LA Max to pre-A</td>
<td>9.9±2.6</td>
</tr>
<tr>
<td>Pre-A to Min</td>
<td>5.5±1.7</td>
</tr>
<tr>
<td>LAEF (ml/m²)</td>
<td>86±7.8</td>
</tr>
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</table>

S76 Abstracts

Eur J Echocardiography Abstracts Supplement, December 2006
LA mechanical function and LV systolic/diastolic parameters change in patients treated with ablation procedure for atrial fibrillation with no or minimal structural heart disease. A prospective 7 month A. Drzewiecka-Gerber1; A.M. Wnuk-Wojnar2; I. Wozniak-Skowierska3; J. Krauze1; A. Rybicka-Musialik1; S. Nowak1; C. Czerwinski1; M. Trusz-Grzula1; K. Katowice, Poland; 2Klinika Kawitologi, SPKS nr 7, Zislova 47, Katowice, Poland

Background: Hemodynamics of isolated atrial fibrillation (AF) is believed to be associated with slight enlargement of left atrial (LA) size and minor degree of left ventricular (LV) diastolic dysfunction, that is presumably rather to be a result than a cause of so called “ Lone AF”. Positive impact of sinus rhythm restoration by catheter ablation on LA size and LV function remains unclear.

Methods and results: A group of 29 consecutive patients with no or minimal structural heart disease (mean LVEF 64±5%) was treated with catheter ablation according to Pappone technique were included into prospective follow-up study. Mean age was 47±11 yrs. 17 patients had paroxysmal and 12 persistent AF. 11 patients (37%) had mild mitral stenosis (7 hypertension, 4 coronary artery disease). TTE was performed at baseline and after mean time of 208±73 days follow-up.

Conventional parameters, such as: LVEF, left atrium end systolic area/LAs and left atrium emptying fraction (LAEF%), left atrium filling fraction (LAIFF); E/A mitral flow ratio; as well as “new” diastolic/systolic indexes such as tissue Doppler imaging peak velocity of mitral annulus motion (TDI), Tei index, tissue tracking of anterior and posterior mitral leaflet, color M-mode propagation velocity were derived at baseline and follow-up examination. 20 patients (69%) demonstrated no arrhythmia recurrences at follow-up (AF negative group), whereas 9 patients (32%) had AF episodes confirmed in ECG Holter monitoring. Echo baseline parameters did not differ between the groups.

At follow-up examination, however, a significant LVEF improvement was observed in AF negative group versus AF positive group (68±5 versus 65±5; p=0.02); as well as significant growth in TDI peak velocity in AF negative versus AF positive group (12±2 versus 9±1 cm/s, respectively, p=0.01). Analyzing AF positive and negative group, a significant positive trend in LVEF improvement in AF negative group was observed at follow-up comparing to baseline (68±5 versus 65±5, respectively, p=0.06). LAEF improved significantly in AF negative group at follow-up comparing to baseline (64±14% versus 59±10%, respectively, p=0.003) as did TDI early peak velocity (12.2±2 cm/s versus 10.1±1 cm/s, respectively, p=0.002).

Propagation velocity also increased in AF negative patients (54±11 cm/s versus 46±10 cm/s, respectively, p=0.008).

Conclusions: This study demonstrates that successful restoration of sinus rhythm in patients with lone AF treated with ablation procedure results in significant improvement of LA and LV functional parameters, that can be easily measured by echocardiography.

493 The mechanism of mitral regurgitation complicated by non-valvular atrial fibrillation investigated using a two-dimensional tissue imaging technique

Y. Nakamura1; A. Mori1; H. Saeli2; T. Matsunaka3; M. Suzuki1; Y. Kazazari4; 1Ehime Prefectural Central Hospital, Cardiology Dept., Matsuyama, Japan; 2Hitachi Medical Co, Tokyo, Japan

Background: Mitral regurgitation associated with non-valvular atrial fibrillation usually presents without left ventricular (LV) dysfunction. Here we discuss the mechanism of mitral regurgitation despite normal LV function in NVAF patients. Two-dimensional tissue tracking is a new technology indipendent analysis to assess atrial function that may eliminate the inherent limitations of Doppler Tissue Imaging (DTI). Aim of this study: To assess the value of regional compliance of the LA wall in the prediction of improvement of NYHA class in ischemic (ICH) and non-ischemic (NI) inferior wall ischemia and infarction (IWI) patients.

Methods: We found a significant decrease in all LA diameters after MVR (49±7 mm for anterior-posterior, 49±9 mm for medial-lateral, 56±7 vs 49±9 mm for anterior-posterior diameters) as well as LV parameters of systolic and diastolic function improved (LVEF, 65±5; p=0.02); as well as significant growth in TDI peak velocity in AF negative group versus AF positive group (68±5 versus 65±5; p=0.02).

Conclusions: In patients with NVAF, mitral regurgitation results from vund up the mitral ring and restricted mitral ring motion because of LA dys-function.

494 Atrial strain 2d by velocity vector imaging, a novel method for the evaluation of clinical improvement post cardiac resynchronization treatment

A.R. Martinello1; P. Caso1; C. Gippa2; S. Padula1; M.V. Betancourt C1; I. Caso1; G. Tonti2; R. Calabro1; 1Monaldi Hospital, Cardiology Dept., Naples, Italy; 2S.S. Annunziata Hospital, Cardiology Dept., Sulmona, Italy

Background: Cardiac resynchronization therapy (CRT) induces left ventricular remodeling reversal (LVR) in patients (pts) with congestive heart failure (CHF). However, the prediction of benefit on diastolic performance is controversial. The left atrial (LA) reservoir plays an important role in left ventricular (LV) filling. Velocity Vector Imaging-Siemens (VVI) is a novel 2D grayscale image analysis independent analysis to assess atrial function that may eliminate the inherent limitations of Doppler Tissue Imaging (DTI).

Aim of this study: To assess the value of regional compliance of the LA wall in the prediction of improvement of NYHA class in ischemic (ICH) and non-ischemic (NI) inferior wall ischemia and infarction (IWI) patients.

Methods: VA of the LA in the apical 4C (A4C) view was done in 14 ICH pts with LBBB (67±10 yrs, 23±6 EF %, 12 male). By tracing a region of interest that encompassed the LA myocardium, atrial peak strain reservoir function (E/A) mitral flow ratio (EA), deceleration time E mitral flow (DT) were calculated; E mitral flow/E mitral atrial annulus ratio (E/Ea), E mitral flow/E septal annulus ratio (E/Es) were measured using DTI.

Results: SMR of interatrial midwall septal predicted improvement of NYHA class at 3-6 months f.u. The overall rate responders at 3 month f.u. was 7/14: 6.7±3.8 vs 2.2±2 SMR (%), p<0.05. The overall rate responders at 6 month f.u. was 7/13 pts: 6.7±3.8 vs 1.7±2 SMR (%), p<0.05. SMR of interatrial midwall septal showed significant correlation with E/A (r 0.50, p<0.05) and DT (r 0.67, p=0.004) of mitral inflow pattern post CRT.

Conclusions: Regional assessment of LA function was easily calculated using 2D grayscale image. SMR of interatrial midwall septal predicts, in ISCH pts, improvement of NYHA class post CRT.

495 Left atrial remodeling in patients undergoing mitral valve repair for mitral regurgitation: size or shape?

F. Antonini-Canterin1; C.C. Beladan1; B.A. Popescu1; C. Ginghina1; A.C. Popescu1; P. Buzza1; B. Zingone1; G.L. Nicola1; 1ARC, Ospedale Civile, Cardiology Dept., Pordenone, Italy; 2Institute Of Cardiovascular Diseases, Cardiology Dept., Bucharest, Romania; 3Etas Hospital, Cardiology Dept., Bucharest, Romania; “Ospedali Riuniti, Cardiochirurgia Dept., Trieste, Italy

Background: Left ventricular (LV) remodeling in patients (pts) undergoing mitral valve repair (MVR) for severe mitral regurgitation (MR) has been evaluated in several studies. Few studies, however, emphasized left atrial (LA) size as a predictor of outcome in pts with chronic MR and none of them specifically addressed the changes in LA geometry after surgery. We sought to assess LA remodeling (in terms of size and shape) in patients undergoing MVR for symptomatic, isolated MR.

Methods: The study group consisted of 54 pts (aged 63±11 years, 36 men) who underwent MVR for symptomatic, isolated MR and who had echocardiographic assessment before and within one year after surgery (3±2 months). LA superior-inferior, medial-lateral, antero-posterior diameters, area, volume, and LA sphericity index (the ratio between medial-lateral and antero-posterior diameters) as well as LV parameters of systolic and diastolic function were assessed off-line by a single, blinded investigator. Seven pts (13%) had concomitant coronary artery bypass surgery (CABG) at the time of MVR.

Results: We found a significant decrease in all LA diameters after MVR (68±7 vs 56±6.8 mm for medial-lateral, 56.7±6 vs 66±10 mm for superior-inferior, 43.8±4.9 vs 69.7 mm for antero-posterior), area (26±7 vs 34±10 cm²), volume (95±42 vs 49±37 cm³) and LA volumes were significantly lower at follow-up (p<0.05).

Conclusions: LA remodeling after MVR is significant and this decrease in LA size and shape is more pronounced in anteroposterior and lateral diameters.
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Left atrial surface cut point to detect trapezoidal shape for characterisation of atrial anatomical remodelling
D.C. Cozma 1; C. Mornos 1; L. Petrescu 1; A. Ionac 1; L. Stoica 1; S.I. Dragulescu 1
1Institute Of Cardiovascular Medicine, Cardiology Dept., Timisoara, Romania

Background: Complete geometrical and shape characterization of left atrium (LA) has not been performed. Ellipse formula has been proved to underestimate the real LA volume. The aim of the study is to analyze the relation between LA area and shape in order to predict their value in the assessment of the severity of anatomic remodeling.

Methods: 216 consecutive patients (pts) aged 53±27 years, were included. The following parameters were assessed: LA dimensions (LAd=M-mode, parasternal short axis view), A and LLI are the measurements of short- and long-axis in apical four chamber view), SA surface in apical four chamber view (LAS). A new measurement was introduced, the basal dimension of the LA (LAB) as the maximal transverse distance at the base of LA apical four chamber view. LA measurements were calculated at end-systole (maximal). Trapezoidal LA shape was defined if transverse dimension < basal dimension. LA area and shape were correlated.

Results: LA ranged 10.5-45.4 cm². Trapezoidal LA was found in 149 pts. ROC curve for prediction trapezoidal LA showed a 0.89 area under the curve. The analysis demonstrates a cutoff value of 22.3 cm² for LAD to detect trapezoidal shape with a sensitivity of 85% and specificity of 82.5%. The simple regression analysis demonstrated a statistically significant correlation between LAD and LSA (r²=0.63, p<0.0001) but LA was better correlated with LAS (r²=0.7, p<0.0001). Using LAS>22 cm² as cut point, along with trapezoidal shape, diastolic heart failure can be detected with a sensitivity of 91% and specificity of 80%; positive predictive value was 82.5%, and negative predictive value was 89%. Trapezoidal LA with atrialization of the pulmonary veins and predominant dilatation of basal atrium than annular side may explain underestimated volume of LA based on ellipse formula.

Conclusion: LAS is a reliable parameter and may be the best choice to estimate LA area. LAS is related to structural remodeling: LA is a better parameter than LAd for estimating LA dilatation and complete characterization of LA remodeling should include shape definition and LAS.

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Abnormal atrial myocardial deformation properties in obese, non-hypertensive, children: an abpm, standard echocardiographic and strain rate imaging study
G. Di Salvo 1; G. Pacileo 1; F. Natale 1; G. Limongelli 1; A. Rea 1; T. Miele 1; B. Castaldi 1; R. Calabro 1
1Second University of Naples, Cardiology Dept., Naples, Italy

Background: The prevalence of obesity is increasing among children in the developed world. Obesity is associated with an higher occurrence of atrial arrhythmias. Obese children, without arterial hypertension, may be a unique clinical opportunity to evaluate the effect of obesity, per se, on atrial myocardial function, excluding the influence of possible comorbidities. We sought to define the preclinical effects of obesity on the atrial function, of healthy children with excess weight who have no other clinically appreciable cause of heart disease, by using the more sensitive ultrasound derived strain (S) and strain rate (SR) imaging.

Methods: We studied 278 subjects divided into 2 groups: 1- Obese children (Group 0: n=150; age: 12±3 years); 2- Healthy lean children, comparable for age and sex. Atrial stage (Referents) and obese children (Obese) compared to Referents (31±14 years). Standard echocardiographic indices of global systolic function were similar in the 2 groups. Intima-media thickness measured at the common carotid artery was increased (p=0.41) in obese children (0.46±0.07 mm) compared to Referents (0.45±0.07 mm). Obese children showed atrial peak systolic SR (2.5±1.2 vs 1.7±1.2) values lower (p<0.0001) than that of Referents (4±1.1) in both left and right atria. In multivariable analysis, the average peak systolic SR in Group 0 was significantly correlated with Glicemia (p<0.05; coefficient, -0.23), BMI (p<0.01; coefficient, -0.19), and Lymphas (p<0.05, coefficient, -0.17).

Conclusions: Our study demonstrated that obesity, in absence of hypertension, is associated with abnormal atrial myocardial deformation properties already in childhood involving both right and left atria. Thus, our data support the prevention of obesity in pediatric age, because already in child, obesity is responsible of abnormal atrial myofunctional.

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Thoracoscopic doppler echocardiography for the assessment of left atrial appendage dimensions and blood flow velocities: a multicenter study
T. Infusino 1; S. Scaletta 1; C. Coletta 2; A. Auriti 3; P. Trambaiolo 4; C. Giannocosta 5; E. De Marchis 1; A. Salustri 6
1University La Sapienza, S. Andrea Hospital, Cardiolog Dept., Rome, Italy; 2S. Spirito Hospital, Cardiolog Dept., Rome, Italy; 3Filippo Hospital, Cardiolog Dept., Rome, Italy; 4 Pigout, Cardiolog Dept., Rome, Italy

The aim of our study was to compare the thoracoscopic second harmonic echocardiography (TTE) and the transesophageal echocardiography (TEE) for the assessment of left atrial appendage (LAA) dimensions and blood flow velocities.

Methods: We considered 86 consecutive patients (56 males, mean age 64±13 years) referred for routine TEE and TTE two-dimensional and pulsed-wave Doppler (PWD) echocardiography. At the moment of ultrasonography, 36 patients (42%) were in sinus rhythm. 44 (51%) showed atrial fibrillation and 6 (7%) that had flutter. TEE and TTE were consecutively performed in blind conditions and in random order or different operators. By TTE, LAA transverse diameter was measurable in 78 patients (91%), with a high image quality in 42 (54%). By TEE, LAA transverse diameter was measurable in all patients, with a high image quality in 80 patients (99%, p<0.001 vs TTE). The peak and mean LA blood flow velocity assessment was feasible in 72 patients by PWD TEE and in all patients by PWD TEE (84 vs 100%).

Results: Mean LAA end-systolic transverse diametral TEE and TTE were comparable (15.6±3.8 vs 16.2±3.5 mm) and significantly correlated (r=0.77; p=0.001) using LAS in patients with high image quality; p<0.0001). The peak (50.4±23 vs 47.3±21 cm/sec; r=0.67, p<0.0001) and mean (37.8±24 vs 31.3±18 cm/sec; r=0.74, p<0.0001) LAA blood flow velocities at TTE and TEE were also comparable and significantly correlated (r=0.89 in all patients and r=0.98 in patients with high image quality; p<0.0001). TEE and TTE gave comparable LAA peak velocities in sinus rhythm patients (60.2±61.4 cm/sec) and in patients with atrial fibrillation or flutter (38.4±36.7 cm/sec).

A LAA blood flow peak velocity <25 cm/sec at TTE was the best cut-off value to identify patients with LAA blood flow velocity <20 cm/sec at TEE (sensitivity =93%, specificity =87%; area under ROC: 0.94). A LAA blood flow velocity >40 cm/sec at TTE (sensitivity =50%, specificity =96%; area under ROC: 0.87).

Conclusion: A reliable correlation between LAA dimensions and blood flow velocities as assessed by TTE and TEE in consecutive patients referred for routine examination was found. By TTE, patients with lower and, respectively, higher LAA blood flow velocities could be reliably identified, helping for the individual embolic risk assessment.

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Left atrial shape and electroanatomical remodelling with age
D.C. Cozma 1; C. Mornos 1; L. Petrescu 1; A. Ionac 1; F. Golda 1; L. Stoica 1; S.I. Dragulescu 1
1Institute Of Cardiovascular Medicine, Cardiology Dept., Timisoara, Romania

Background: Atrial fibrillation (AF) is a common arrhythmia associated with atrial dilation, premature beats and decreased atrial conduction velocities, but little is known about age related changes in left atrial shape and the relation to electrophysiological properties. In the other hand prevalence of AF is increased in elderly. The aim is to evaluate and analyze the relation between age, atrial shapes and new index of dynamic interatrial conduction time in a homogene population of patients (pts) with structurally normal heart without AF.

Methods: 56 patients (pts) without structural heart disease aged 42±15 years referred for electrophysiologic study or ablation were analyzed. LA surface (LAS) was assessed at end-systolic (maximal). Trapezoidal LA shape was considered if transverse dimension < basal dimension (four chamber view). To examine the atrial electrophysiologic characteristics we studied interatrial conduction time, double potentials and fragmented atrial activity during premature stimulation of high right atrium using two extrastimulus method; decremental index (DI) was calculated as previously described as maximal percentage prolongation of interatrial conduction time during atrial extra stimulation. Pts with vulnerable atrium (inducible AF) were excluded. DI>50%

repetitive atrial activity and fragmented electrograms was defined as susceptibility to vulnerability.
500 Changes in regional left atrial deformation in hypertension
A.T. Baltabaeva 1; M. Marciniak 2; B. Bijnen 3; F. He 4; G. Macgregor 4; G.R. Sutherland 5

1St. George's University Of London, Cardiac And Vascular Sciences Dept., London, United Kingdom; 2St. George’s University Of London, Blood Pressure Unit, London, United Kingdom; 3St. Geroge’s Hospital Medical School, Cardiology Dept., London, United Kingdom

As a result of raised left ventricular (LV) filling pressure, hypertension (HTN) can result in left atrial (LA) dysfunction due to chamber dilation and increased peak wall tension during the LA active contraction. This makes the atrium prone to develop acute and chronic atrial fibration and other complications. Currently there are no clinical methods to assess LA contractile function. Strain (S) and strain rate (SR) imaging (S/SRI) can be use for the assessment of LA regional deformation.

Objectives: To assess LA regional deformation during the active LV filling in hypertensive patients.

Methods: In 74 HTN (BP 150/92±1.3/1.1 mmHg) patients and 35 age-matched normotensive (NTN: BP 112/71±2.3/1.2 mmHg) subjects standard Echocardiography to assess LA volume was performed and S/SR were measured in the lateral LA wall in the 4 chamber view during late diastole. LA S was calculated as the difference between maximum and minimum S during late diastole. In all subjects, office and 24 hour blood pressure (BP) were measured.

Results: Although within the normal limits, HNT patients had a significantly increased volume at reservoir, conduit and contractile (p<0.01) phases of LA performance. Atrial input in LV filling measure on PW Doppler was also significantly increased (p<0.01). In the HTN group there was a significantly increase in atrial S (23.7±1.3 vs -12.4±1.5%, p<0.0001) and SR (4.95±0.2 vs -2.7±0.2 1/s, p<0.0001) compared to NTN. BP correlated significantly with atrial S (R=0.35, p<0.0005) and SR (R=0.43, p<0.0001) during late LV filling.

Conclusions: LA deformation during late diastole was significantly increased in hypertension. The degree of changes in active LA deformation relates to the degree of elevation in BP in HTN.

501 Association between atrial function assessed by 2-d strain imaging and exercise capacity during cardiopulmonary test in patients with idiopathic dilated cardiomyopathy
A. D'andrea 1; P. Caso 1; R. Scarlatti 2; S. Salerno 2; G. Limongelli 2; L. Santangelo 3; S. Cuomo 3; R. Calabro' 3

1Naples, Italy; 2Monaldi Hospital, Cardiology Dept., Naples, Italy; 3Second University of Naples, Cardiology Dept., Naples, Italy

Background: Left atrial (LA) function has been associated with left ventricular (LV) diastolic filling and cardiac output response to physical exercise. The relation between LA function and exercise performance has not been adequately evaluated in patients dilated cardiomyopathy (DCM).

Aim of the study: To investigate the possible association between LA function assessed by 2-D Strain Imaging and exercise capacity in patients with idiopathic DCM undergoing cardiopulmonary exercise testing (CPT) and six-minute walking test.

Methods: Fifty patients with a LV end-diastolic dimension >60 mm and a LV ejection fraction <35%, in normal sinus rhythm, with normal coronary angiography were selected. Patients were divided into group A and group B according to their exercise peak oxygen uptake (VO2) (group A, 28 patients: peak VO2 >14 mL/kg/min; group B, 22 patients: peak VO2 <14 mL/kg/min). LA function indexes were defined as follows: LA end-systolic diameter (L ASD), LA systolic volume (LASV), atrial longitudinal strain from the apical 4-chamber view for the LA lateral wall, and for the mid segments of LA septum (Vivid 7-GE ultrasound system).

Results: LV diameters and ejection fraction were comparable between the two groups, while L ASD and LASV were significantly increased in group B (both p<0.001). By 2-D strain analysis, Group B patients showed impaired LA lateral (p<0.001) and LA septum (p<0.01) strain deformation indexes. In addition, Group B during CPT had significantly shorter exercise duration, and decreased anaerobic threshold levels (p<0.001), and during six-minute walking test showed reduced achieved distance and higher scored degree of exertion. By univariate analysis, there were close correlations of peak VO2 with LASV (r=-0.46, p=0.001) and with LA lateral strain (r=-0.61, p=0.0001). In the overall population, by use of stepwise forward multivariate linear regression analyses, LASV (b coefficient =-0.42, p<0.01) and LA Septal strain (b coefficient =-0.56, p<0.0001) were the only independent determinants of peak VO2.

Conclusions: Decreased LA strain and increased LA sizes were associated with lower peak VO2 during CPT in patients with DCM. In these patients, direct assessment of atrial deformation by 2-D strain may better reflect atrial mechanical function than transmitral atrial velocity, and therefore represent an useful tool to predict exercise performance in patients with chronic heart failure.

502 Neither dobutamine stress echocardiography nor gated-single photon emission computed tomography is suitable to detect asymptomatic coronary stenosis in diabetic patients under dialysis
Y.F. Bernard 1; N. Meneveau 2; D. Boumal 2; S. Borot 2; E. Richard 2; R. Sabbah 2; J.F. Toussaint 2; A. Penfornis 2

1Hospital Jean Minjaz, Service De Cardiologie, Pole Coeur-Poumons, Besancon, France; 2University Hospital Besancon, Cardiology Dept., Besancon, France; 3Hotel-Dieu, Medical Imaging Center, Paris, France

Silent myocardial ischemia (SMI) is frequent (50%) in diabetic patients (pts) under dialysis. Current guidelines recommend detection of SMI firstly by exercise stress testing (EST) and then by gated-single photon emission computed tomography (SPECT) or dobutamine stress echocardiography (DSE) when EST is impossible or inconclusive. Whether SPECT and DSE are equivalent in detecting SMI in diabetics under dialysis is unknown. The aim of this study was to assess the efficacy of these two tests compared to coronary angiography (angio) for the detection of SMI in this population.

Methods: 30 asymptomatic dialysed diabetic pts with normal resting ECG, aged 25-75 years were prospectively enrolled and submitted to exercise or dipyridamole SPECT, DSE and angio within 1 month. All investigations were interpreted blindly.

Results: Patients were mostly males (70%) with type 2 diabetes (80%); average age 61±10 with a known duration of diabetes of 16±7 years; BMI was 27±5 kg/m2, and HbA1C was 8.6±1.5%. Angio was positive (at least 1 stenosis >70%) in 12 pts (45%); 6 had 1- vessel, 2 had 2- vessel and 2 had 3- vessel disease. Five pts underwent a revascularisation procedure (19%) (coronary angioplasty with stenting in 3, coronary artery by-pass grafting in 2). No serious complication occurred during the procedures. EST was conclusive in 6 pts only (20%). SPECT detected 2 out of 5 stenosis in pts who underwent a revascularisation procedure, DSE detected only 1. The diagnostic value of both investigations is shown in the table. False negative results were mainly observed in pts with 1- vessel disease.

Conclusions: While DSE has an excellent specificity, its sensitivity is poor, leading to an unacceptably high number of non-diagnosed stenoses. In contrast, SPECT has a slightly better sensitivity but lower specificity, leading to non useful coronaryographies. Such non satisfactory results justify evaluating other non invasive techniques such as coronary scan or MRI.

Table 1

<table>
<thead>
<tr>
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<th>SPECT</th>
<th>DSE</th>
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<tr>
<td>Sensitivity</td>
<td>0.58</td>
<td>0.10</td>
</tr>
<tr>
<td>Specificity</td>
<td>0.60</td>
<td>0.69</td>
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<tr>
<td>PPV</td>
<td>0.54</td>
<td>0.50</td>
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<tr>
<td>NPV</td>
<td>0.64</td>
<td>0.59</td>
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503 Detection of significant coronary artery stenosis by resting wall motion abnormalities, in patients with suspected coronary artery disease
I.S. Craciunescu 1; M. Serban 1; S. Vasile 1; D. Deleanu 2; I. Ghiorghiu 2; C. Mihaescu 2; I.G. Aron-Niculescu 1; C. Ginghina 2

1Institute Of Cardiovascular Diseases, Cardiology Dept., Bucharest, Romania; 2Academy of Economic Studies, Statistics Dept., Bucharest, Romania

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Background: Resting wall motion abnormalities (WMA) in 2-dimensional echocardiography may be encountered in patients with clinically suspected coronary artery disease. In patients without previous myocardial infarction, resting WMA may be attributed or not to a significant coronary artery stenosis.

Objective: The goal of the study was to assess the value of resting WMA in the prediction of a significant coronary artery stenosis, in patients with pectotis angina.

Methods: We studied 84 patients, with resting WMA at 2D echo exam, with or without previous known myocardial infarction. To assess changes in ventricular function in vascular territories, the 16 vascular segments were grouped into two vascular regions: the left anterior descending (LAD) coronary artery territory, comprising the apical, anterior, and septal segments (n=7), while the other 9 segments formed the combined right and circumflex coronary territory. A wall motion score index (WMSI) was derived for the entire left ventricle, and for each vascular territory using the sum of individual scores divided by the respective number of segments. All patients underwent coronary angiography, within 7 days from echo exam. >70% reduction of coronary lumen was considered a significant coronary artery stenosis.

Results: The presence of hypokinesis in a segment from LAD territory has a sensitivity of 75.4% and a specificity of 69.4% in detecting a significant LAD artery stenosis (likelihood ratio (LR+) = 2.38, p < 0.001). The presence of hypokinesis in a segment from right and circumflex coronary territory has a sensitivity of 72% and a specificity of 58.7% in detecting a significant non-LAD artery stenosis (LR+ = 1.66, p < 0.001). Analyzing separate the territories of circumflex artery and right coronary artery, the presence of 2 or more dysfunctional segments has a poor sensitivity in identifying a significant coronary artery stenosis (LR+ < 1.3). This might be due to an anatomical overlapping between these two arteries.

Conclusions: The presence of resting WMA in patients with suspected CAD, without previous myocardial infarction has a good predictive value for the presence of significant coronary artery stenosis. The results have a higher accuracy for LAD territory.

S80 Abstracts

504 Could surgical revascularization alone correct ischemic mitral dysfunction?
J. Kochanowski, P. Szczol; R. Piatkowski, P. Suwalski, D. Kosior, M. Rok, G. Opolski
Warsaw Medical University, Cardiology Dept., Warsaw, Poland

The aim of the study was to assess coronary artery bypass grafting (CABG) alone impact on ischemic mitral small and moderate regurgitation (IMR) observed before surgery.

Materials and methods: We analyzed 286 patients (pts) (62±11 years old, men - 196, women - 90) with a history of Q-wave myocardial infarction (MI) during the last 12 months, qualified towards CABG. During transthoracic echocardiography (TTE) before CABG we found no MR in 88 (31%) pts (group I), small MR in 110 (38%) pts (group II), moderate MR in 60 (21%) pts (group III), and severe MR in 28 (10%) pts (group IV). Two weeks and 6 months after CABG TTE was performed for MR evaluation. TTE was performed using Philips Sonos 5500 and IE33 equipment, and recorded on a magneto-optic disc and SVHS tape for future assessment by 2 independent cardiologists. In case of 28 pts with severe IMR, CABG with mitral valve reconstruction (22) or annuloplasty (6) was performed.

Results: Analysis of IMR after CABG (2 weeks/6 months): Group I - no MR change 70(79%)/69(78%), decreased MR- 0/0, increased MR- 7/12 Group II - no MR change 82(74%)/80(73%), decreased MR- 16/16, increased MR-12/14 Group III - no MR change 40(87%)/38(83%), decreased MR- 18/20, increased- 2/1 Group IV - no MR change 0/0, decreased MR- 28/27, increased- 0/0. Next we analyzed 170 pts with IMR before CABG (except group IV) - see table 1. Conclusions: 1. CABG alone has no significant impact on the frequency and severity of small and moderate IMR. 2. IMR, mainly pts with a history of antero-lateral MI-In the case of the group with were considered, the groups being similar when other echo parameters were concerned (LA, LVDD, EF, WMSI) before CABG.

<table>
<thead>
<tr>
<th>Table 1. Data of pts with IMR before CABG</th>
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<tr>
<td>No change</td>
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<tr>
<td>n</td>
</tr>
<tr>
<td>MI antero-lateral</td>
</tr>
<tr>
<td>MI inferior</td>
</tr>
<tr>
<td>LA (cm)</td>
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<tr>
<td>LVDD (cm)</td>
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<tr>
<td>EF (%)</td>
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<td>WMSI</td>
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505 Viability estimation during the recovery phase of stress echocardiography
S.E. Karagianis, H. Ferings, J. Bab; V. Rvdakovic, V. Vandsemburg, R. Valkema, D. V. Cockinos, D. Poldermans
Rotterdam, Netherlands; Leiden, Netherlands; Athens, Greece

Objective: To assess the additional value of viability estimation in patients with poor left ventricular function during the recovery phase of dobutamine stress echocardiography (DSE) after receiving acute beta-blockade compared to findings at low-high dose DSE, using dual-isotope single photon emission tomography (DISA-SPECT) as reference.

Methods: Patients with ejection fraction 75% were enrolled. The study population included 49 consecutive patients (mean age: 59±11 years; 35 men). All the patients underwent DSE and DISA-SPECT examination for evaluation of viability and a revascularization procedure followed within 3 months. Radionuclide ventriculography was performed during viability estimation and twelve months after the revascularization procedure.

Results: Viability with DISA-SPECT was detected in 463 (59%) segments, whereas 154 (19.7%) segments were scar as scar. The number of viable segments increased from 415 (53%) at DSE to 463 (59%) at DSE + recovery. The relevant changes in sensitivity, specificity, accuracy, positive predictive value and negative predictive value at DSE and DSE + recovery are shown in the figure. Multivariate analysis showed that, DSE + recovery phase results in total were the only independent predictors of improved left ventricular function after revascularization (p=0.04, odds ratio OR=14.65, 95% CI 1.34-133.7).

Conclusion: To our knowledge this is the first study that demonstrates the additional value of the recovery phase of DSE in the estimation of viability. An increased sensitivity of the test, as we found, could add to the clinical usage of DSE in this respect.

506 Cytokine-associated gene-A bearing strains of Helicobacter pylori and atrial fibrillation due to ischemic origin. Is there a link?
H. Badran, M.E. Mahfouz
Tanta University, Biological Science Dept., Tanta, Egypt

Objectives: Previous studies suggested an association between infection by cytotoxic CagA bearing Helicobacter pylori (Hp) strains and atherosclerosis. We hypothesized that CagA strains could increase the risk for atrial fibrillation (AF) in patients with chronic coronary heart disease (CHD) by induction of systemic inflammatory reactions.

Our aims were: (1) to verify the association between CagA strains and CHD; (2) to attest the presence of Cag A strains in AF due to ischemic etiology.

Methods and subjects: Serological status for Hp cagA by a semi-quantitative commercial (ELISA) kit against the p120 antigen of CagA, C-reactive protein, total leucocytic count and atrial size using echocardiography were determined in 185 patients with proved CHD. Patients were assigned to CHD and AF (Group A, n=82) or CHD with sinus rhythm (Group B, n=103). Eighty subjects from the same geographical area free of clinical cardiovascular disease matched for age and sex were assigned to a control group.

Results: 52 (63%) patients were seropositive for Hp Cag A in Group A versus 40 (39%) in Group B (odds ratio 2.35 with 95% confidence interval 1.94-6.0). Only 21 (26%) of the control were seronegative. A significant association between seropositivity for Hp Cag A and having previous myocardial infarction (68 versus 53%, odds ratio 2.04 with 95% CI: 1.02-2.82, p = 0.034) was observed. These findings remained valid in a multivariate analysis including possible confounding factors (for instance age, sex, smoking and hypertension; odds ratio 2.35 with 95% CI 2.01-4.83). Left atrial dimension and CRP were significantly increased in CagA seropositive compared with seronegative subgroups (4.31±0.66 vs 3.15±0.58 cm; Δ 3.32±0.86 vs 1.79±0.27 mg/l in group A and 3.7±0.62 vs 2.85±0.66 cm & 2.5±0.54 vs 1.62±0.5 mg/l in group B respectively (p<0.01).

Conclusions: This study provides further support for the hypothesis that there is a causal relationship between chronic infection with Hp and CHD, especially if AF arises. The positive association between Hp (Cag A) with elevated CRP and increased atrial size in patients having CHD and AF may reflect the inflammatory changes in the atrial structure that promotes the development or persistence of AF.

507 Significance of fasting plasma glucose in left ventricular diastolic dysfunction in nondiabetic patients with treated coronary artery heart disease
I. Korzh, I. Fedotova, V. Nemsanova
Kharkov Medical University, Kharkov, Ukraine

Left ventricular (LV) hypertrophy and LV diastolic dysfunction are common cardiac changes in patients with coronary heart disease, and these changes are modified by various factors other than blood pressure. The present study
was conducted to investigate the influence of mild abnormalities in glucose metabolism on LV structure and function in coronary heart disease. In 182 nondiabetic patients with treated coronary artery disease, two-dimensional and Doppler echocardiographic examinations were performed, and relative wall thickness (RWT), LV mass index (LVMi), fractional shortening, and the ratio of the peak velocity of atrial filling to early diastolic filling (E/A) were calculated. Fasting plasma glucose (FPG) and HbA1c levels were positively correlated with the E/A ratio and the deceleration time of the E wave. However, these plasma levels had no correlation with RWT, LVMi, or fractional shortening. Peak A wave velocity and the E/A ratio were significantly higher in patients who had FPG ≥100 mg/dl, although age, blood pressure, RWT, LVMi, and fractional shortening did not differ between the two groups. In a multiple regression analysis of all subjects, only FPG and age were independent determinants of the E/A ratio. These observations suggest that FPG is a sensitive predictor for LV diastolic dysfunction in nondiabetic patients with treated coronary heart disease. Since a slight increase in plasma glucose levels is associated with abnormalities in diastolic function independent of LV hypertrophy, an early stage of impaired glucose metabolism in coronary heart disease may specifically deteriorate cardiac diastolic function.

508 Ultrasound measured endothelial function in exertional angina women during the reproductive period and the menopause
L. Karpova 1
1Belarusian Scientific Center Of Cardiology, Cardiology Dept., Minsk, Belarus

Considerable metabolic disorders, increasing activity in sympathetic nervous system and ARA index is a prognostic marker for changes in endothelial function in women during menopause. The aim of the investigation was to compare endothelial vasomotor function indices and myocardial ischemia in exertional angina women during the menopause and the reproduction period.

Methods: 18 exertional angina women functional class (FC) II, in menopause (group I) were included into investigation (47.4±2.8 years of age), 20 reproduction age women, suffering from exertional angina FC II, (aged 44.8±2.2 years) constituted the control group (group II). Concomitant arterial hypertension frequency was comparable in both observational groups (88.9% in group I vs 90% in group II). Angina was verified by exercise and myocardial ischemia was revealed by ECG mapping in 60 exercises. Endothelial microcirculatory function was studied by high-resolution ultrasound method according to D. Celermajer (1992) with percent change in brachial artery diameter in endothelial-dependent test with reactive hyperemia (RH), index of brachial artery sensitivity to vasodilatation being determined by Hynova O.V. (1997).

Results and discussion: Disorders in endothelial vasomotor function were observed in 88.9% pts in group I; sensitivity of brachial artery to vasodilatation was reduced in 86.7% cases. The reactivity of brachial vessels in response to RH was decreased in 44.4%, was totally absent in 27.8%; patho- logical vasconstriction was observed in 16.7% pts. Simultaneously, endothelial vasomotor function changes took place twice as less in women of the control group; no pathophysiological vasocconstriction was observed. Disorders in vasodilatation function were accompanied by more frequent manifestation of myocardial ischaemia in group I pts. Thus, it was observed in 83.3% cases in group I and was expressed by total ST segment depression 8.2±0.67 mm in group I and 9.2±0.72 leades; in group II it was noticed only in 35% pts (5.1±0.56 mm, 5.6±0.64 leades).

Conclusion: Thus, expressed disorders in endothelial vasomotor function accompanied by significant myocardial ischaemia was characteristic for angina plena in menopause unlike the situation with reproductive age pts.

509 New methods for the assessment of arterial stiffness in patients with vasospastic angina
J. Keller 1; D. Mikkan 1; Z. S. Sarszegi 2; B. Gaszer 1; L. Papp 1
1University of Health Sciences, Hungary; 2University of Szeged, Hungary

Arterial stiffness is an important risk factor of cardiovascular disease. It has been shown to be an independent marker of CV morbidity and mortality. Several methods may be used to determine arterial stiffness. Ultrasound based measurements are in use by several large epidemiological studies. The aim of our clinical prospective study was to measure arterial stiffness in patients with known vasospastic angina pectoris with M mode and echo tracking (e-tracking) method.

Patients and methods: We observed 23 consecutive patients with vasospastic angina pectoris by typical clinical history, stress test and negative coronary angiography. We compared the data with the measurements of 27 control healthy volunteers. We performed e-tracking on the left carotid and left distal brachial artery with ALOKA ProSound 5500 ultrasound system. Arterial compliance (AC), arterial pressure (MAP), pulse wave velocity (PWV), augmentation index (AIx) were measured by TensioMed Arteriograph, using oscilometric principles. PWV represents the flexibility of the aortic wall, e-tracking data show local carotid and brachial arterial stiffness and AIx varies proportionally with the resistance of peripheral small arterries. We scanned the patients before without vasodilative medication, and then with complete vasodilative medication after 2, 4 and 6 weeks. Exhaled NO was also measured by LR 2500 exhaled NO Analyzer.

Results: PWv measured by arteriograph correlates significantly with brachial PWv (r=0.56; p<0.001). PWv was ≥0.50 and augmentation index (r=0.76; p<0.001), measured by echo tracking. Carotid e-tracking data did not correlate with arteriograph data. Carotid beta correlates significantly with brachial beta (r=0.26; p<0.05) and brachial compliance (r=0.48; p<0.05). Signifi- cant correlations could be found between carotid pwv and brachial beta (r=0.036; p<0.05), brachial AC (r=0.482; p<0.05), brachial pwv (r=0.48, p<0.05). Exhaled NO did not correlate significantly with the stiffness parameters, but was significantly lower in vasospastic patients.

Conclusion: Non-invasive methods for arterial stiffness - measured by echo tracking, arteriograph – and exhaled NO measurements are useful, eligible tools to get more information about endothelial function in patients with ischaemic heart disease.

510 Predictors of cardiac events in patients undergoing coronary artery bypass surgery
G. Bakraktarli 1; D.uncan 1; M. Henein 1
1The Royal Brompton Hospital, Echocardiography Dept., London, United Kingdom

Background: Left ventricular (LV) systolic function and restrictive filling are predictors of survival in patients with coronary artery disease. Total isovolumic time (t-IVT): time in the cardiac cycle when the ventricle is neither ejecting nor filling, which tolerance to exercise tolerance in ischaemic cardiomyopathy. The predictors of cardiac events following coronary artery bypass grafting (CABG) are less clear.

Aim: The aim of our study was to assess the prognostic role of echocadio- graphic variables in predicting cardiac events after CABG.

Methods: We studied 74 patients undergoing routine CABG. An echo-Doppler study performed 1-month before CABG recorded end-diastolic (EDD) and end-systolic (ESD) dimensions, fractional shortening (FS), E/A ratio, and t-IVT (in mm; calculated as: 60 - [total ejection time - total filling time]).

Results: Mean±SD follow-up was 18±12 months. Of 74 patients (age 65±3 years, 6 male), 29 had a post-operative hospital admission for a cardiac event. There were no differences in age, gender, right ventricular dimen- sion, LV mass index, or LA size in patients who experienced cardiac events compared to those that did not. However, FS was lower in patients with cardiac events compared to those who survived (23.2% vs 32.8%, p<0.001), t-IVT was longer (16.5±4 mm vs 10.3±3 mm, p<0.001), and E/A ratio and LV ESD were greater (E/A ratio: 1.9±1.0 vs 1.2±0.7, p=0.003; ESD: 44±9 mm vs 39±10 mm, p=0.019).

Univariate predictors of cardiac events (odds ratio (95% confidence interval): low FS (0.97 [CI: 1.00-1.09], p<0.001), restrictive filling (0.63 [CI: 0.43-0.94], p=0.025), and increased ESD (0.68 [CI: 0.49-0.94], p=0.020). Independent predictors of cardiac events were low FS (1.05 [CI: 1.00-1.09], p=0.019) and long t-IVT (0.92 [CI: 0.85-0.98], p=0.045).

Conclusions: Despite complete revascularisation by CABG, the combina- tion of systolic dysfunction and long t-IVT suggest persistent ventricular dyssynchrony that contribute to post-operative cardiac events. Detailed as- sessment of such patients for potential benefit from electrical resynchronisation may optimise their cardiac performance and hence clinical condition.

511 Baseline flow propagation velocity and late diastolic peak-A velocity are the best predictors of adverse events after myocardial infarction
E. Knova 1; N. Zlataraeva 1; A. Goudev 1
1University Hospital “Queen Giovanna”, Cardiology Dept., Sofia, Bulgaria

Left ventricular (LV) systolic function has proven to be predictor of poor prognosis. Since LV systolic and diastolic function are interrelated rises the question if some of diastolic parameters may predict adverse events and if so are they stronger predictors than systolic parameters.

Aim: To investigate the prognostic significance of LV diastolic indices measured in acute phase of a first myocardial infarction (MI) for development of severe heart failure (NYHA class III/II), reinfection and cardiac death.

Methods: Two-dimensional and pulsed and color M-mode Doppler echocardiography were performed during first 72 hours of MI in 117 con- secutive patients. Seventy of them were followed-up in a 40.5±15 month- period.

Results: Patients were divided into two groups according to ejection fraction (EF): Group 1 without systolic dysfunction with EF≥50% (n=72) and Group 2 with EF<50% (n=45). Significantly different diastolic parameters are measured during this period (213±33 ms vs 184±45 ms, p=0.003) and flow propaga-
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Gender and myocardial salvage after reperfusion treatment in acute myocardial infarction. Results of Acute Myocardial Infarction Contrast Imaging (A.M.I.C.I) multicenter trial

L. Agati 1 ; L. Galiuto 2 ; S. Funaro 3 ; M.P. Madonna 4 ; B. Garramone 3 ; M. Berardi 1 ; F. Celani 1

1La Sapienza University, Cardiovascular Dept., Rome, Italy; 2Catholic University (Sacro Cuore), Cardiovascular Dept., Rome, Italy; 3Catholic University (Sacro Cuore), Cardiovascular Dept., Campodarseo, Italy; 4Pollicino Casilino, Cardiovascular Dept., Rome, Italy

**Objectives:** The aim of this study was to investigate whether there are gender-associated differences in the amount of myocardial salvage after reperfusion in patients with ST-segment elevation acute myocardial infarction (STEMI).

**Background:** Despite having a more adverse cardiovascular risk profile, women with STEMI have similar or even better outcomes after primary PCI compared with men. The reasons for these findings are unclear.

**Methods:** A total of 110 patients with first STEMI successfully reperfused within 6 hours from symptom onset were enrolled in the Acute Myocardial Infarction Contrast Imaging (A.M.I.C.I) multicenter study. The primary end-point of the study was the assessment of myocardial perfusion damage evaluated by intravenous myocardial contrast echocardiography (MCE) using continuous infusion of Sonovue (Bracco SpA) in real-time imaging. The endocardial length of contrast defect (CDL%) on day 1 after reperfusion (T1) and at pre-discharge (T2) was calculated. The extent of wall motion abnormalities (WMA%), LV end-diastolic volumes (EDV), and ejection fraction (EF%) at T1 and T2 and at 3-months follow-up (T3) were also calculated.

**Results:** Baseline clinical and angiographic characteristics were similar in the two groups. Initial perfusion defect and extent of wall motion abnormalities did not differ significantly between women and men (CDL%, 11% vs 18% of the left ventricle, p=0.12, WMA% 33% vs 40%, p=0.23, respectively). Final perfusion defect and infarct size measured at predischarge were similar in the two groups (CD% 10% vs 15%, p=0.23 and WMA% 29% vs 34%, p=0.45, respectively). After adjustment for baseline characteristics, female gender didn’t result as an independent predictor of greater myocardial salvage after reperfusion. No significant differences in EDV and EF between women and men were observed at 3-months follow-up.

**Conclusion:** The efficacy of reperfusion in patients with STEMI appears to be not gender-dependent. Myocardial salvage achieved after coronary reperfusion is similar in women and in men.

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Improved prognosis of infarcted patients with preinfarction angina

Z. Madenovac 1 ; A. Ristic Angelkovic 1 ; Z. Mijalovic 1 ; S. Obradovic 1 ; B. Gligic 2 ; D. Kalimanovska Ostric 3 ; B. Baskot 3

1Belgrade, Serbia and Montenegro; 2Medical Military Academy, Coronary Unit, Belgrade, Serbia and Montenegro; 3Institute for Cardiovascular Diseases, Cardiology Dept., Belgrade, Serbia and Montenegro

Several studies have demonstrated improved prognosis of infarcted patients, who have experienced several episodes of a preinfarction angina (PA) before acute myocardial infarction (AMI). It was revealed through less extensive infarct size and a better short- and long-term survival.

**Aim:** In our investigation, we tried to assess the relation of PA to extent of myocardial injury, preservation of myocardial perfusion, regional and global contractile function and to the recovery of global left ventricular contractile function after AMI.

**Methods:** We prospectively enrolled 52 consecutive patients admitted after first, uncomplicated, single vessel disease, AMI. Further, patients were classified into three groups depending on if they experienced PA 60 days before AMI or had a complete absence of any symptoms before the onset of AMI, 38 (73.1%) had an AMI with ST elevation and underwent PCI, while 14 (26.9%) patients with non-Q wave AMI were treated medically.

**Results:** LV global systolic echocardiography and Technetium-99m-tetrofosmin scintigraphy were performed to all patients from 7 to 10 days after AMI and control resting echocardiography 7 to 12 months later.

**Results:** There was no difference in acute basal ejection fraction (EF) of left ventricle 43.38 ± 7.62 vs 48.68 ± 8.41, p=0.29. Global contractile function expressed through WMSI 1.58 ± 0.27/1.47 ± 0.21, p = 0.124 and regional shown as number of segments with intact contractile function 1.43 ± 1.16/4.22 ± 1.18 was better preserved in patients with PA (p<0.01). Scintigraphic results demonstrated a better protection of myocardial perfusion in patients with PA than in group without PA, who had a higher number of all segments with intact perfusion greater than 50% 3.65 ± 2.92/3.23 ± 3.29, p=0.087 and of segments with activity from 60 to 75% 1.77 ± 2.09/1.29 ± 1.74, p = 0.364, respectively. Whereas, segments with severe defects (reduced perfusion up to 50-60%, 2.19 ± 2.52/6.5 ± 1.98, p=0.411 and damaged perfusion (activity less than 50%, 2.19 ± 1.91/1.01 ± 1.22, p=0.027) were significantly more common in patients with PA. Stepwise regression analysis selected PA (R2=0.43, p=0.005), as most powerful independent predictor for progestational recovery of EF after a follow up period.

**Conclusion:** Preinfarction Angina resulted in improved maintenance of regional and global contractile function of left ventricle, and a better preservation of microcirculation in infarcted patients. PA is a most powerful predictor of recovery of global contractile function later after AML.

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Left ventricular global strain in patients with acute myocardial infarction treated with thrombolysis predicts viable myocardium

B. Spajic 1 ; S. Omri 2 ; T. Vartdal 1 ; H. Ihlen 1 ; T. Edvardsen 1 ; H. Brunvand 1 ; Pericoronary coronary intervention - PCI

1Sorlandet Hospital, Cardiology Dept., Arendal, Norway; 2Stavanger University Hospital, Cardiology Dept., Stavanger, Norway; 3Rikshospitalet University Hospital, Cardiology Dept., Oslo, Norway.

**Background:** Assessment of viable myocardium by measurement of infarct size is important in risk stratification. The reasons for these findings are unclear.

**Methods:** We prospectively enrolled 52 consecutive patients admitted after first uncomplicated single vessel disease, AMI. Further, patients were classified into three groups depending on if they experienced PA 60 days before AMI or had a complete absence of any symptoms before the onset of AMI, 38 (73.1%) had an AMI with ST elevation and underwent PCI, while 14 (26.9%) patients with non-Q wave AMI were treated medically.

**Results:** The mean ± SD of LV global strain, LVEF and infarct size were -16.9±2.6%, 54±9% and 13.2±9.7%, respectively. LV global strain correlated well with infarct size (standardized beta coefficient =0.72, p<0.001). There was, however, no correlation between LVEF and infarct size (p=NS).

**Conclusion:** In patients with STEMI treated with thrombolysis, LV global strain may predict myocardial infarct size better than LVEF within the first 48 hours. Thus, LV global strain may be a helpful tool in the choice of treatment strategy in these patients.
not show change ESVLV. The reduction was however significantly higher in gr A (42.4% vs. 35.7% p<0.05). WMSI decreased in all gr (A+P+V1.4±0.03 to 1.1±0.02; p<0.05; A+V 1.5±0.04 to 1.3±0.05; p<0.05; A+P 1.4±0.03 to 1.2±0.04; p<0.05), although most in pts allocated to A+P (A+V vs. A+P 21.4% vs. A+V 13.3% vs. A+P 14.2% p<0.05). EF increased in all gr (A+P+V43.8±3.5 to 56.8±4.2; p<0.05, A+V 44.5±3.5 to 55.0±3.1; p<0.05, A+P 45.9±1.9 to 51.1±2.1; p<0.05), by 19% in gr B, by 11% in gr C with most benefit in gr A by 25% (p<0.05 in gr A compared with C and B). EF was increased by 26% in gr A and by 18% in gr B, by 16% in gr C compare with initial rate, although only in gr A this was significant: (0.7±0.05 to 1.03±0.03 p<0.0001). Intima-media thickness was lower significantly correlated with ESVLV (r=-0.36, p<0.02). EF (r=-0.45, p<0.05), WMSI (r=+0.55, p<0.05), E/A (r=-0.52, p<0.01). Dur- ing 21 days there were 42 end points; 9 (21 %) in gr A, 11 (26 %) in gr B, 16 in gr C (68).The relative risk reduction (RRR) in end point in gr A was 31% (p<0.0001) in comparison to gr B, 25% (p<0.01) to gr C.

Conclusion: Combination of A with P and V showed positive effect on ECHO parameters and significantly reduces cardiovascular events.

516 Comparative effects of losartan and losartan colchicines combination therapy in unstable angina patients with hyperuricaemia

R.S. Gabrielyan1 ; A.V. Davtyan1 ; A.B. Gabrielyan1
1Ischaemic Heart Disease, Cardiology Dept., Yerevan, Armenia

Aims: To investigate the effects of losartan with losartan at the same dose combined with colchicine on ECHO- parameters, on levels of markers of inflammation - C reactive protein (hs-CRP), leukocitosis in unstable angina (UA) patients (pts) with hyperuricaemia. To determine the nature of the relationship between hs-CRP, increased serum uric acid lev- els, WMSI, and endpoints of pts with unstable angina.

Material and methods: 46 pts (age 58.8±0.7) with UA randomly assigned to treatment with losartan 50 mg once daily (group I, n=23) or a treatment with losartan & colchicine 2 mg iv for the first day and then 1mg in every 6 hour for the second day and 1 mg daily for at least 21 days (group II, n=23). The values of hs-CRP and uric acid were analysed at baseline and at 7 day. 21 days after admission pts underwent echocardiogra- phy to determine left ventricular end systolic volume(ESVLV), wall motion score index (WMSI), exercise fraction (EF). The end point was defined as death, recurrent angina or nonfatal MI, need for coronary intervention, which- ever occurred in hospitalization.

Results: In pts with increased levels of hs-CRP serum uric acid levels were shown to be higher in pts with normal hs-CRP: value of pts with normal hs-CRP were (40.0±15.8 ml/m2 to 34.1±14.3 ml/m2; p<0.0001) after stent implantation of revascularized vessel. In patients with natural progression of coronary artery disease %DS showed negative correlation with observed end points. In multivariate Cox regression analysis, the only independent predictor of coronary events was MJS (p=0.0044). According to ROC curve, value of MJS the best predictive for adverse events was 48.75, and Kaplan-Meier survival curve showed significant worse outcome of pts with MJS ≥48.75 in comparison to pts with MJS ≤48.75. Conclusion: Patients with lower MJS are in a high risk of acute coronary events in patients with natural progression of coronary artery disease, because of the presence of higher amount of potentially ischemic myocardium and moderate coronary artery stenosis. This confirms the need for integrated evaluation of functional significance of coronary artery disease.

Table 1. Cox regression analysis

<table>
<thead>
<tr>
<th>Variable</th>
<th>Regression Coef</th>
<th>95% CI</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>univariate predictors</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>%DS</td>
<td>-0.004</td>
<td>0.94-0.99</td>
<td>0.007</td>
</tr>
<tr>
<td>MJS</td>
<td>-0.02</td>
<td>0.97-0.99</td>
<td>0.004</td>
</tr>
<tr>
<td>Positive Ex</td>
<td>1.7</td>
<td>75.30-0.35</td>
<td>0.045</td>
</tr>
<tr>
<td>multivariate predictors</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MJS</td>
<td>-0.02</td>
<td>0.97-0.99</td>
<td>0.004</td>
</tr>
<tr>
<td>%DS - percent diameter stenosis; MJS - myocardial jeopardy score; Ex - exercise stress echo;</td>
<td></td>
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</tbody>
</table>

519 Predictors of improvement in Left Ventricular Function after stent implantation of chronic coronary occlusion

F. Akgül1 ; T. Babyaliev2 ; Z. Karben3
1Mustafa Kemal University; Cardiology Dept, Antalya/Hatay, Turkey; 2Sari Konukoglu Medical Center, Cardiology Dept., Gaziantep, Turkey

Aims: The effect of coronary stent implantation of chronic coronary occlusion on left ventricular (LV) performance is not well known. So, the aim of this study was to assess the effect of stent implantation on LV ejection fraction (EF) and to examine whether clinical and angiographic factors may have an effect on recovery of LV EF.

Methods and results: Three hundred and four patients who underwent suc- cessful stent implantation for chronic occlusion of a major epicardial coro- nary artery existing for at least six weeks were included into the study. Echocardiographic examination was performed before and six months after stent implantation. A significant increase in LV EF (52.3±11.9% to 57.2±11.1% p<0.0001) with a decrease in both LV end-diastolic volume index (85.6± 18.9 ml/m2 to 80.1±17.1 ml/m2 p<0.0001) and LV end-systolic volume index (40.0±15.8 ml/m2 to 34.1±14.3 ml/m2 p<0.0001) after stent implantation of coronary occlusion was observed. Multivariate analysis revealed dia- betes mellitus existence, angiostenosis conversion enzyme use, occlusion dura- tion >3 month and baseline LV EF=50% to be significant predictors of left LV EF improvement during the first 6 months after stent implantation. Conclusion: Stent implantation for a chronic coronary occlusion has a ben- eficial effect on LV EF during the first 6 months after the stent implantation,
especially in patients with occlusion duration <3 months and depressed LV function.

520
Carotid and femoral atherosclerotic lesions in patients with coronary heart disease confirmed by angiography
A. Lisowska 1; B. Nowak-Jez 1; Z. Tabor 1; M. Trusz-Gluza 1
Medical University in Bialystok, Cardiology Dept., Białystok, Poland

Introduction: Clinically evident atherosclerosis is preceded by preclinical changes in the arterial wall. These changes are characterized by increased thickness of the intima-media complex (IMT).

Aims: A complex ultrasound assessment of peripheral vessels as well as an attempt to find ultrasound parameters correlating with the atherosclerotic lesions of the coronary arteries.

Methods: 231 patients (men, mean age 52.8) who underwent both coronary angiography and ultrasound examination of the following arteries: common carotid artery (CCA), carotid bulb and common femoral artery (CFA) were analyzed. The IMT value, presence of plaque and Doppler blood flow parameters were evaluated. Selected clinical and biochemical risk factors of atherosclerosis were assessed. Two groups of patients were compared: 200 patients with coronary artery disease (CAD) confirmed by angiography (study group), and 31 patients with normal coronary arteries (control group).

Results: Significantly higher values of the IMT in the peripheral arteries were found in patients with coronary artery lesions than in those without (CCA-0.91 vs 0.61 mm, carotid bulb-1.31 vs 0.67, CFA-1.38 vs 0.63 respectively, p<0.0001). Atherosclerotic plaques were present only in patients with CAD. IMT values of the CCA, carotid bulb and CFA were significantly higher in patients with severe coronary artery disease (three vessel disease) than in patients with lesions in one or two coronary arteries (CCA-1.01 vs 0.84 mm, p<0.001, carotid bulb-1.51 vs 1.18, p<0.005, CFA 1.64 vs 1.37, p<0.02).

Conclusions: Patients with coronary lesions present increased IMT values and higher plaque occurrence. Complex ultrasound evaluation of different peripheral arteries (CCA, carotid bulb and CFA) may be used as part of the cardiovascular risk stratification.

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Serial NT-proBNP assessment to determine LV remodeling at 6 months in patients with acute anterior myocardial infarction and primary PCI
K. Wita 1; A. Rybińska-Musiałik 1; M. Nowak 1; A. Drzewiecka-Gerber 1; J. Krauze 1; B. Nowak-Jez 1; Z. Tabor 1; M. Trusz-Gluza 1
Silesian Medical School, 1st Department of Cardiology, Katowice, Poland

Left ventricular remodeling after acute myocardial infarction (MI) despite early reperfusion strategy is crucial for long term prognosis. The study addresses the value of serial NT-proBNP assessment as a LV remodeling predictive parameter in patients after acute MI at medium term follow-up.

Methods: 83 consecutive patients (62 males, aged 56.8±11 years) admitted with the first, only anterior MI ~12 hours from symptom onset treated with early PCI were enrolled. On the second day of MI echocardiography examination was performed to determine global and regional systolic LV function. The mean LV ejection fraction (LVEF) was 40.1±6.1%, WMSI 1.4±0.2, and end diastolic volume (LVEDV) 105.8±31 ml. NT-proBNP was assessed at admission (1), discharge (2) and at 30 day follow-up (3). Regional and global LV function was analyzed at 6 months: LV remodeling was defined as an increase of LVEDV >20% and the study population was divided into group A (60 pts) without LVEDV increase, and group B (23 pts) with remodeling.

Results: In medium term follow-up LV EF increased to 49.4±13.6%, and LVEDV to 123±33 ml in entire population. LVEDV was significantly lower in group A (75±36 ml, p<0.0005). NT-proBNP NT-proBNP2 and NT-proBNP3 values were 2629±2580 pg/ml, 1448±1437 pg/ml and 1415±1540 pg/ml, respectively. Logistic regression analysis was used to determine cut-off values of NT-proBNP (1-3) for LV remodeling prediction at 6 months. The values of NT-proBNP1 over 4750 pg/ml (p=0.008), NT-proBNP2 over 1821 pg/ml (p<0.001) and NT-proBNP3 over 2235 pg/ml (p<0.002) were distinguishing patients with remodeling. Sensitivity, specificity, accuracy and positive predictive value for different NT-proBNP measurements are shown in table.

Conclusions: Serial NT-proBNP analyses in patients with acute anterior MI, especially at the discharge are highly predictive for LV remodeling in medium term follow-up.

522
Evaluation of left ventricular wall motion abnormalities by limited hand-carried echocardiography in patients with acute coronary syndrome
V. A. Kuznetsov 1; A. D. Kazhurina 1; D. V. Kimochkin 1; A. V. Plusnin 1; L. F. Zafryl 1
1Tyumen Cardiology Center, Tyumen, Russian Federation; 2Northwestern University Medical School, Chicago, United States of America

Echocardiography gives valuable information for assessment of wall motion abnormalities in patients with coronary artery disease. The absence of acute wall motion abnormalities excludes acute ischemia and myocardial infarction in most of cases.

The objective of the present investigation was to assess the value of transthoracic limited hand-carried echocardiography in revealing of acute left ventricular wall motion abnormalities in patients with acute coronary syndrome.

Material and methods: 133 patients were studied, mean age 60.6±0.93 years with suspicion of acute coronary syndrome who were admitted to coronary care unit. Patients with history of myocardial infarction were excluded. Acute coronary syndrome was determined by clinical data, ECG, troponin-test. Using a hand held device patients underwent limited echocardiography, which included assessment of left ventricular wall motion abnormalities.

Results: Acute coronary syndrome was diagnosed in 37 patients (27.8%). Among them left ventricular wall motion abnormalities were found in 21 patients. 14 false positive results and 16 false negative results were registered. Thus sensitivity of the method was 56.7%, specificity was 85.4%, negative predictive value was 83.6%, positive predictive value was 60.0% and predictive accuracy was 77.4%. Duration of echo examination averaged 6 min. The cost of the echocardiogram was comparable with ECG and twice less than troponin-test.

Conclusions: Despite low sensitivity, limited hand-carried echocardiography had high specificity in detection of acute coronary syndrome. So, this method can be recommended as an additional tool supporting or excluding acute myocardial ischemia.

523
Adiponectin is associated with echocardiographic parameters of systolic and diastolic function
R. Schnabel 1; E.D. Ludus 1; P.W. Wild 1; J.W. Wild 1; H.R. Rupprecht 1; C.B. Bickel 1; T.M. Muenzel 1; S.B. Blankenberg 1
1On behalf of: AltheroGene; Johannes-Gutenbus-Universität, 2nd Med. Clinic, Mainz, Germany; Klinikum Ruesselsheim, Mainz, Germany; Bundeswehrzentralkrankenhaus Koblenz, Mainz, Germany

Background: Recent data have demonstrated beneficial metabolic effects of adiponectin. The intracellular lipid content in human muscle is negatively correlated with adiponectin. Few data are available on adiponectin levels in association with echocardiographic parameters of systolic and diastolic cardiac function.

Methods: In 537 consecutive patients with documented coronary artery disease (angiography) left ventricular ejection was measured by transthoracic echocardiography via planimetry. As indicators of diastolic function left atrial size and diastolic mitral inflow velocities and deceleration time were determined. Diastolic function was categorized as normal, impaired relaxation, pseudonormal and restrictive. Blood was drawn under standardized conditions and adiponectin levels were measured by ELISA technique.

Results: Adiponectin levels ranged from 1.4-100.1 pg/ml with a median (25th/75th interquartile range) concentration of 9.11 µg/L (6.7/13.32) and negatively correlated with left ventricular ejection fraction. Left ventricular ejection fraction decreased over quartiles of adiponectin concentration (p=0.013) (figure). In patients with preserved systolic function (LVEF 50% or more) adiponectin levels were significantly lower 8.8 µg/L (6.4/12.9) in comparison with patients who suffered from impaired ejection fraction 9.7 µg/L (7.1/14.8) p=0.02. In contrast adiponectin concentrations seemed to decrease over quartiles of left atrial size. Similarly, adiponectin levels were highest in individuals with preserved diastolic function and revealed a trend of decrease according to severity of diastolic impairment (p=0.01).

Conclusions: The current cohort of consecutive patients with coronary artery disease for the first time demonstrates an association of adiponectin levels and left ventricular performance measured by echocardiographic parameters. Whether these findings can contribute to risk stratification has to be evaluated.

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The pivotal role of posteroinferior wall asynery in patients with ischemic mitral regurgitation
S. Lima 1; A.M. Ferreira 2; M.J. Andrade 2; R. Couto 2; L. Raposo 2; R. Gomes 2; R. Gouveia 2; A. Silva 2
1Lisboa, Portugal; 2Hospital Santa Cruz, Cardiology Dept., Lisbon, Portugal

Introduction: Significant Mitral Regurgitation (MR) may occur as a functional consequence of Myocardial Infarction (MI) due to alterations of the geometrical relationship between the ventricular walls and the valve apparatus. The relative contribution of regional vs global remodeling to the development of significant MR after MI, remains controversial. Moreover, reports on the association between MR and the location of MI are conflicting. We hypothesized that posteroinferior wall asynery would be the main echocardiographic determinant of significant post-MI MR.

Material and methods: We studied 40 consecutive patients (pts) (24 men, mean age 68±11) with previous non-recent (>6 months) MI and significant MR measured using Doppler methodology (area of the regurgitant jet >6 cm² and/or effective regurgitant orifice area >10 mm²) - group 1. This study group was compared with a control group of 40 consecutive pts (38 men, mean age 64±11) with previous MI but absent or trivial MR - group 2.
Echocardiographic evaluation was focused on LV volumes, and indices of global (ejection fraction, global WMSI) and regional function (WMSI for septum and posterior wall). Results: A different pattern of geographic distribution of dyssynergy was found between groups, despite similar end-diastolic volumes and global WMSI. The degree of involvement of the posterior and inferior walls was the main determinant for the occurrence of mitral regurgitation - see Table 1.

Conclusions: Our results underscore the importance of posteroinferior wall asynergy over global remodeling and LV dysfunction for the occurrence of IMR after MI.

Table 1. Comparison between groups 1 and 2

<table>
<thead>
<tr>
<th></th>
<th>No significant MR</th>
<th>Significant MR</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>EF %</td>
<td>39±9</td>
<td>34±8</td>
<td>0.024</td>
</tr>
<tr>
<td>EDV ml</td>
<td>180±42</td>
<td>184±65</td>
<td>0.781</td>
</tr>
<tr>
<td>WMSI global</td>
<td>29±5</td>
<td>30±7</td>
<td>0.855</td>
</tr>
<tr>
<td>WMSI ant-sept-ap</td>
<td>2.1±0.6</td>
<td>1.7±0.6</td>
<td>0.001</td>
</tr>
<tr>
<td>WMSI post</td>
<td>1.4±0.6</td>
<td>2.3±0.7</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>WMSI inf</td>
<td>1.8±0.7</td>
<td>2.3±0.6</td>
<td>0.001</td>
</tr>
</tbody>
</table>

525 The presence of mitral regurgitation is an independent predictor of 1-year mortality in STEMI patients with cardiac shock on admission

K.D. Sjauw 1; M.M. Vis; R.J. Van Der Schaal; J. Baan Jr; K.T. Koch 1
1Academic Medical Centre, Cardiology Dept., Amsterdam, Netherlands

Background: Cardiogenic shock (CS) remains the most serious complication of acute myocardial infarction, with a mortality rate of approximately 50%. Mitral regurgitation (MR) constitutes the eology of CS in about 10% of the cases. However, insight in the prognostic value of the presence and severity of MR is limited. Early echocardiography infrequently is performed in the setting of CS and most prior studies primarily evaluated CS due to predominant left ventricular failure. Therefore the purpose of this study was to determine the prognostic importance of MR in ST-segment elevation myocardial infarction (STEMI) patients with CS on admission.

Material and methods: From January 1997 through March 2005 292 consecutive STEMI patients with CS on admission were treated by primary percutaneous coronary intervention (PCI). Early echocardiograms were performed in 147 patients, which constituted the final study cohort. Color Doppler of MR was graded with a 0 to 3 scale (0=none; 1=mild; 2=moderate; 3=severe; n=40; 3=severe; n=19).

Results: Overall 1-year mortality was 38%. One-year mortality was 8%, 23%, 30% and 58% for patients with no, mild, moderate and severe MR respectively (p=0.05) or ST elevation myocardial infarction and left ventricular function <40%. Acquired data from three apical projections can be visualised in an easily understandable bull’s eye plot.

Conclusions: The presence of MR on early echocardiography is an important independent predictor of 1-year mortality in STEMI patients with CS on admission treated by PCI. Early identification of MR can aid risk assessment and triage to other treatment strategies than primary PCI, i.e. surgery or PCI combined with percutaneous mitral valve replacement or repair.

526 The efficacy of Trimetazidine MR in improvement of left ventricular function and reduction of major cardiovascular events in patients with coronary heart disease

E. Bobescu 1; M. Radi 1; G. Datcu 2; A. Burduceanu 1; C. Strempek 1
1Transilvania University Faculty of Medicine; Clinic of Cardiology Clinic County Hospital, Brasov, Romania; 2Gr T Popa University of Medicine and Pharmacy, Clinic of Cardiology University Hospital, Iasi, Romania; 3Clinic County Emergency Hospital; Clinic of Cardiology, Brasov, Romania

Background: Energetic metabolism during myocardial ischemia and reperfusion is connected with cardiac function. T. nitratime is act as a specific partial inhibitor of fatty acid oxidation with indirect increase in glucose metabolism and many cardio protective mechanisms which may include diminished mitochondrial uncoupling, enhances efficiency of mitochondrial ATP production and reduced apoptosis.

Aims: To evaluate the efficacy of treatment with trimetazidine modified release (TMZ MR) in addition to optimal standard medical therapy (OSMT) in patients (pts) with coronary heart disease (CHD) - stable angina (SA), unstable angina (UA) and non ST elevation myocardial infarction (NSTEMI) with CHD and addition of TMZ MR to optimal standard medical therapy (OSMT). Pts were evaluated clinical and para clinical (biochemical analyses, echocardiography, electrocardiography) at 1, 6, 12 and 24 months.

Methods: 252 pts with high risk CAD were included in a prospective study for a period of 24 months and divided in six groups in relation with type of CHD and addition of TMZ MR to optimal standard medical therapy (OSMT). Pts were evaluated clinical and para clinical (biochemical analyses, echocardiography, electrocardiography) at 1, 6, 12 and 24 months.

Results: Treatment with TMZ MR in addition to OSMT was followed at 24 months of follow up by a significant improvement of left ventricular function in pts with NSTEMI (p<0.05) and UA(p<0.025) in comparison with OSMT pts. Primary endpoint was significantly reduced in all TMZ MR treatment added to OSMT pts at 24 months of follow up respectivelly: NSTEMI -20%, p<0.001, relative risk (RR) 0.35), UA-13.6%, p<0.001, RR 0.29 and SA-7.7%, p<0.001, RR 0.19. Ejection fraction of left ventricle as a measure of global function was significantly improved at 24 months of follow up in NSTEMI and UA TMZ MR added to OSMT pts, only 15% of NSTEMI pts (p<0.05) and 9.1% of UA pts (p<0.05) remained with an ejection fraction <40% in comparison with 35.7% of NSTEMI and 28.3% of UA OSMT pts.

Conclusions: In patients with stable angina, unstable angina and non ST elevation myocardial infarction, treatment with trimetazidine MR in addition to optimal standard medical therapy was followed by a significant reduction in primary endpoint composite of cardiovascular death, acute myocardial infarction and stroke and by a significant improvement in left ventricular function at 24 months of follow up.

527 Bull’s eye presentation of speckle tracking data - A simple and user independent method for detection of regional myocardial ischemia

P.-H. Jacobsen 1; R. Winter 1; A. Bjallmark 1; M. Larsson 1; M. Nygren 1; C. Westholm 1; L.-Å. Brodin 1
1Karolinska University Hospital, Clinical Physiology and Cardiology Dept., Stockholm, Sweden; 2Royal Institute Of Technology, Stockholm, Sweden

Background: Echocardiography is a powerful, but user dependent tool for bedside detection of regional myocardial ischemia. The 2D strain software (GE Echopac), based on speckle tracking, allows for automated quantitative analysis of both longitudinal and transversal myocardial displacement and strain. Acquired data from three apical projections can be visualised in an easily understandable bull’s eye plot.

Conclusions: Nine consecutive patients with acute myocardial infarction were included in this pilot study. Echocardiography was performed bedside in the coronary care unit within 24 hours from onset of symptoms and prior to coronary angiography. Digital data was acquired using the GE Vivid 7 ultrasound system from three apical views with a frame rate between 40-50.

Results: The best predictors of ongoing regional ischemia were regional decrease in longitudinal displacement and strain, visually assessed from the bull’s eye plot. Eight cases demonstrated an unequivocal anatomical correlation between a decreased regional displacement and the culprit lesion assessed from coronary angiography. The ninth patient had undergone by-pass surgery prior to this event and the bull’s eye presentation showed a more general decrease of displacement and strain, without a clear anatomical correlation to the culprit lesion.

The figure illustrates a typical pattern of a significant LAD stenosis.

Conclusions: The bull’s eye presentation from 2D strain data is a new and promising technique for simple intuitive and user independent analysis of regional myocardial dysfunction due to ischemia. The predictive value of the anatomical localisation of the culprit lesion in acute myocardial infarction seems to be very strong. There is however a need for further studies to confirm these findings in larger patient materials.
and severe LV systolic dysfunction are independent predictors of sudden cardiac death. However, it has been uncertain the significance of LV remodelling and function in the development of VA in patients with coronary artery disease (CAD) without heart failure and severe arterial hypertension.

**Aim:** To compare LV geometry and systolic function in patients with CAD with and without VA occurring during myocardial ischaemia.

**Methods:** We studied 48 patients with CAD who had electrocardiographic signs of ischaemia during ergometer exercise testing. Nitrates, calcium antagonists and 8-blockers were abolished the day before the investigation. All patients were divided into 2 groups: 24 subjects (16 men) with reproducible VA occurred at peak exercise or during recovery were included in the group I. Group II consisted of 24 patients (20 men) without VA. Mean age of the patients did not differ among the groups I and II (58.1±8.2 vs 59.4±6.0 years, respectively). 13 patients in group I and 9 ones in group II had a history of myocardial infarction (0.54 vs 0.38, respectively, ns). None of the patients had severe arterial hypertension or signs of heart failure. Assessment of LV geometry and systolic function was performed using B- and M-mode echocardiography.

**Results:** LV mass indices were increased in both groups I and II (149±29 vs 136±25 g/m², respectively, ns). The prevalence of various LV geometry pattern differed significantly among the groups. So, eccentric hypertrophy was observed in the most of the patients (18) in group I and only in 9 patients in group II (0.75 vs 0.38, respectively, p<0.01), and LV relative wall thickness was lower in the group I compared with group II (0.39±0.04 vs 0.43±0.07, respectively, p<0.01). LV end systolic and end-diastolic volume indices were increased in the group I and greater compared with group II (68.1±14 vs 68.1±13 ml/m², respectively, p=0.004; and 30.8±24 vs 24.7±ml/m², respectively, p=0.002). There were no significant differences in LV wall motion score indices among the groups I and II (1.0±0.20 vs 1.07±0.17, respectively, ns). LV ejection fraction was lower in the group I compared with group II (62.4±5.3 vs 55.9±6.5%, respectively, p<0.05).

**Conclusions:** The patients with CAD and VA occurring during ischaemia compared with ones without VA have structural and functional LV peculiarities such as eccentric hypertrophy and initial global systolic dysfunction.

### 529

**The correlation of electrocardiographic findings and left ventricular systolic function in patients treated invasively for acute myocardial infarction**

J. Stabryla-Deska 1 ; Z. Sliwinska 1 ; W. Streb 1 ; A. Sedkowska 1 ; P. Jarski 1 ; J. Kochanowski 1 ; P. Scislo 1 ; R. Piatkowski 1 ; P. Suwalski 1 ; D. Kosior 1 ; M. Roik 1 ; G. Opolski 1

**Aim:** To analyze the correlation between the electrocardiographic findings in patients with MI treated invasively and left ventricular performance assessed by echocardiography.

**Methods:** The study group consisted of 400 patients (103 - 25.8% F, mean age 58.5±11.6 years old and Killip class 1:26±0.63) with diagnosis of MI (45.5% STEMI, 54.5% NSTEMI). The group population comprised of 441 consecutive patients admitted due to acute MI. 41 patients were excluded from the analysis because of: LBBB, RBBB, pacemaker and ventricular rhythm or artifacts. QRS duration, QT and QRS wave amplitude and HR were recorded by 12 leads ECG on admission (1-ECG), within 7±2 days. Patients were monitoring within one year of STEMI.

**Results:** The correlation coefficients (r) for the mean values of analyzed ECG parameters and EF are shown in the table I.

**Table 1**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>r</th>
<th>p</th>
<th>Parameter</th>
<th>r</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q - 1</td>
<td>-0.30</td>
<td>&lt;0.001</td>
<td>QRS - 1</td>
<td>-0.25</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Q - 2</td>
<td>-0.21</td>
<td>&lt;0.001</td>
<td>QRS - 2</td>
<td>-0.27</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Q - 3</td>
<td>-0.30</td>
<td>&lt;0.001</td>
<td>QRS - 3</td>
<td>-0.27</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>R - 1</td>
<td>-0.22</td>
<td>&lt;0.001</td>
<td>HR - 1</td>
<td>-0.32</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>R - 2</td>
<td>0.23</td>
<td>&lt;0.001</td>
<td>HR - 2</td>
<td>0.34</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>R - 3</td>
<td>0.30</td>
<td>&lt;0.001</td>
<td>HR - 3</td>
<td>0.35</td>
<td>&lt;0.001</td>
</tr>
</tbody>
</table>

**Conclusion:** The QRS duration, as well as amplitude of Q wave and HR correlate negatively with global systolic function, whereas the amplitude of R wave correlates well with better EF.

**Purpose:** Platelet activity is believed to play an important role in pathogenesis of acute coronary syndromes. We sought to determine whether measurement of platelet activity on admission allows to identify patients with increased risk of developing left ventricular remodeling in 6 month follow-up in patients with ST-segment elevation myocardial infarction (STEMI) treated with primary coronary intervention (PCI).

**Methods:** We collected venous blood samples on admission from 140 patients with STEMI. Platelet activity (adhesion and aggregation) was estimated with the use of rapid, point-of-care platelet analyzer (PFA-100®), Dade Behring, Newark, DE as the time for flowing whole blood to occlude a collagen-adenosine diphosphate (ADP) ring, with shorter closure times (CADP-CT) indicating greater activity. An echocardiograms (2-D) were performed at baseline (within 12 h after PCI), 1 month and 6 months thereafter. An increase of more than 20% in end diastolic volume index (EDVI) at 6-months relative to the baseline value was considered as left ventricular remodeling.

**Results:** Study population was divided according to median CADP-CT (95 seconds). Considering patients with increase platelet activity during the examination performed after 6 month, significant increase of EDVI in comparison with initial values was observed (86.3 ml/m² vs 71.7 ml/m², p<0.0001). Fifty nine percent of patients of the inframedian group (n=71) were diagnosed with left ventricular remodeling, in comparison to 12% in supramedian group (n=69) in 6 month follow-up (p=0.0001). In multivariate logistic re-regression model, after controlling for a series of possible confounders, CADP-CT >95 sec. (high platelet activity) remained an independent predictor of developing left ventricular remodeling.

**Conclusions:** High platelet activity estimated by rapid, point-of-care platelet function analyzer (PFA-100®) is a strong and early predictor of developing left ventricular remodeling in 6 month follow-up in STEMI patients treated with primary PCI.

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### ISCHAEMIC HEART DISEASE

#### 531

**TIMI risk score and echocardiographic parameters in STEMI**

G. Ktitanac 1 ; Z. Vasiljevic 2 ; J. Kostic 1 ; M. Radovanovic 2 ; B. Obrenovic 1 ; G. Krljanac 1 ; Z. Vasiljevic 2 ; J. Kostic 2 ; M. Radovanovic 2 ; B. Obrenovic 1

**Aim:** To analyze the relationship between the TIMI risk score and LV global and regional systolic function at STE-phase myocardial infarction (STEMI).

**Material and methods:** The primary end points of the study were to investigate the relationships between the TIMI risk score and LV global and LV regional systolic function at early post-infarction period in pts with STEMI. The secondary end points were to evaluate predictive value of TIMI risk score on mortality at one month and at one year after STEMI. 118 consecutive pts with STEMI, mean age 56.6±10.2 years, m/f ratio 81/37, were enrolled in the study. TIMI risk score was calculated according to baseline clinical characteristics, age, body weight, risk factors, time from symptom onset and ECG findings. We assessed ejection fraction (EF), left ventricular end-diastolic volumes (LVEDV) and end-systolic, as well as global systolic function (WMSI) within 7±2 days. Patients were monitored during one year of STEMI.

**Results:** The mean value of TIMI risk score was 3.07±2.15 (min=0, max=12). The mean value of EF within 7 days was 47.83%±6.28%, and the mean value of WMSI was 1.25±0.22. There was significant positive correlation between EF and TIMI risk score (r =0.339, p=0.001), also there was significant positive corellation between WMSI and TIMI risk score (r=0.3, p=0.002). TIMI risk score was nondependent predictor of one month mortality (RR 1.57, CI 1.28-1.93, p<0.001) and was nondependent predictor of one year mortality (RR 1.52, CI 1.25-1.94, p<0.001). Cut off value of TIMI risk score for better survival was 4.5 with specificity of 85.7% and sensitivity of 81.1%.

**Conclusion:** TIMI risk score correlate with global and regional systolic function in patients with STEMI. Furthermore, TIMI risk score is nondependent predictor of one month mortality, as well as one year mortality in patients with STEMI.

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**Is the false tendon of the left ventricle thrombi risk factor after myocardial infarction?**

J. Kochanowski 1 ; P. Scislo 1 ; R. Piatkowski 1 ; P. Suwalski 1 ; D. Kosior 1 ; M. Roik 1 ; G. Opolski 1

1. Warsaw Medical University, Cardiology Dept., Warsaw, Poland

**Aim:** The aim of the study was to assess if presence of false tendon (FT) is a risk factor for left ventricle thrombi formation in patients (pts) after myocardial infarction (MI).

**Material and methods:** We analyzed 760 consecutive pts (F/M 315/465; median age 64±15 year) with history of Q wave MI, treated by percutaneous interventions (PCI) in 582 pts and by thrombolitics in 178 pts. Transthoracic echo (TTE) were performed in 1-7 days after MI. Echocardiography was performed using Philips Sonos 5500 and iE33, and recorded on a magneto-optical disc and S-VHS tape for later assessment for 2 independent experienced cardiologists.

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Results: Pts were divided in two groups: group I - pts with FT 202 pts (26%), group II - without FT 558 (74%). Left ventricle thrombi were found in 16 pts (9%) and in 9 pts of group II (7%). 30% of pts with FT and thrombi were localized or connected to false tendon. This group of pts was treated by thrombolytics, had extensive antero-lateral MI (ET35%) and FT localized in the region of MI. Two patients of group I and 1 of group II had no reperfusion or died early postinfarction. As well we analyze frequency of thrombi occurrence dependency of therapy: PCI or thrombolytic. In group of 582 pts treated by PCI we observed thrombosis in 23 (4%) cases, in 178 pts treated by thrombolytic therapy thrombi were found in 32 (18%) pts - p<0.001.

Conclusion: 1. Extensive antero-lateral MI in pts with FT in the infarcted region, treated by thrombolytics, could be a risk factor of thrombus on FT with a possibility of neurological complications. 2. FT in LV do not increase frequency of thrombi occurrence after MI. 3. At pts treated by primary PCI significantly rare the thromb is observed in comparison to pts treated by thrombolytics.

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Study of the echocardiographic predictors for 10-year survival after thrombolytic therapy of acute myocardial infarction

C. Toto1; E. Gall1; L. Nagy1; E. Uhryj1

1Ferenc Markhot County Hospital, Cardiology Dept., Eger, Hungary

Aim: We studied retrospectively the predictive role of echocardiographic changes which took place after the thrombolytic therapy (TT) applied in acute myocardial infarction (AMI) concerning their predictive role in 10-year survival after hospital treatment.

Methods: 70 consecutive patients younger than 65 years who were treated in our department between 1990 and 1995 because of their first AMI and survived it were included in the study group. Streptokinase was used as a thrombolytic agent, which was administered in each patient within 6 hours after the onset of the chest pain. The control group consisted of 85 consecutive patients under the age of 65 who also were treated because of AMI during this period, but they couldn’t receive TT either because of the lack of indication or because of contraindication. Echocardiography was performed in each patient within 72 hours after the admission and between the 10th and 16th days of the myocardial infarction. The 10-year survival was 73% in the thrombolytic group (T gr) and 59% in the control group (C gr), and within that there was no difference in the frequency of the event-free survival - lack of myocardial reinfarction and/or coronary revascularisation - between the two patient groups.

Results: On the basis of the first echocardiogram there was significant difference between the T gr and the C gr only in the frequency of left ventricular (LV) ejection fraction (EF) lower than 40% ( T gr: 5% vs C gr: 16%, p<0.05). Among the patients who died within these 10 years LV EF lower than 40% ( T gr: 11% vs 2%; C gr: 29% vs 6%) and the LV aneurysm (T gr: 11% vs 2%; C gr: 9% vs 2%) were more frequent in both groups (p<NS for all). Incidence of LV thrombus was detected less frequently in patients who died ( T gr: 0% vs 12%; C gr: 6% vs 14%). As compared to the data of the C gr at least 10 % improvement of the LV wall motion abnormality (WMA) index (T gr: 55% vs C gr: 16%; p<0.001) and the improvement of the quality of the most severe LV segmental WMA ( T gr: 29% vs 0.9%; p<0.01) were more frequent in patients who received TT. In the T gr the improvement of the quality of the most severe LV segmental WMA was as follows: sensitivity 39%, specificity 89%, negative predictive value 35%, positive predictive value 91% from the point of view of the 10-year survival.

Conclusion: Qualitative and quantitative improvement of the LV WMA is a good prognostic factor in AMI. These changes following TT refer to successful coronary reperfusion and the lack of pathological LV remodeling.

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Left ventricle diastolic function after acute myocardial infarction: association with autonomous nervous balance assessed by heart rate variability

S.V. Potashew1; M.N. Dolzhenko1 on behalf of: Department of Cardiology and Functional Diagnosis of National Medical Academy of Postgraduate Education, Kyiv, Ukraine

1National Medical Academy Of Postgraduate Educ, Cardiology and Functional Diagnosis Dept., Kyiv, Ukraine

Left ventricle (LV) diastolic dysfunction is a predictor of progressive heart failure and high mortality in postinfarction patients as well as reduced heart rate variability (HRV), which is also proven as an established marker of mortality. We studied LV diastolic filling patterns and autonomous nervous function in the patients after first AMI (n=201). On the 10 -15 th day post AMI pulsed Doppler echocardiography and Holter ECG monitoring were performed. All patients were divided into two groups: with restrictive LV filling (LF), with abnormal LV relaxation (VRT-R<90 ms, EA<1.04, DT>150 ms). HRV indices and arrhythmic events were evaluated by 24 hour Holter monitoring (view Table; M±SD; Tp <0.05).

Time and frequency domain HRV indices were significantly reduced in patients with restrictive LV filling patterns compared to those with impaired LV relaxation. Early postinfarction patients with restrictive LV filling showed increased frequency of ventricular arrhythmias during the day. These findings reflect more pronounced nervous imbalance and may predict higher mortality in these patients.

Table 1. Correlation: HRV and LV filling patterns

<table>
<thead>
<tr>
<th>HRV indices and arrhythmic events</th>
<th>Abnormal LV relaxation</th>
<th>Restrictive LV filling</th>
</tr>
</thead>
<tbody>
<tr>
<td>(n=144)</td>
<td>(n=57)</td>
<td></td>
</tr>
<tr>
<td>SDNN, msec</td>
<td>115.6±5.48</td>
<td>94.0±3.24*</td>
</tr>
<tr>
<td>SDANN, msec</td>
<td>31.1±3.6</td>
<td>61.6±1.2*</td>
</tr>
<tr>
<td>SDNN index, msec</td>
<td>51.2±3.61</td>
<td>50.0±1.03/3,ns</td>
</tr>
<tr>
<td>RMSSD, msec</td>
<td>27.0±2.19</td>
<td>22.5±1.26*</td>
</tr>
<tr>
<td>PNN50, %</td>
<td>7.1±1.38</td>
<td>8.1±0.91*</td>
</tr>
<tr>
<td>LF, msec</td>
<td>494.8±23.27</td>
<td>389.5±10.46*</td>
</tr>
<tr>
<td>HF, msec</td>
<td>93.1±7.26</td>
<td>79.6±4.86*</td>
</tr>
<tr>
<td>LF/HF</td>
<td>5.95±2.7</td>
<td>6.5±6.28*</td>
</tr>
<tr>
<td>VPB, per day</td>
<td>45.4±10.61</td>
<td>70.1±26.97*</td>
</tr>
<tr>
<td>VPB pair, per day</td>
<td>3.02±0.84</td>
<td>5.04±1.76*</td>
</tr>
<tr>
<td>VT, episodes per day</td>
<td>0.12±0.47</td>
<td>0.34±0.47*</td>
</tr>
<tr>
<td>Heart Rate, beats/min</td>
<td>65.0±2.28</td>
<td>79.4±5.166*</td>
</tr>
</tbody>
</table>

Conclusion: 355 Serial echocardiographic follow-up of ventricular function in patients with reperfusion for ST-elevation myocardial infarction - correlations with BNP

M. Dorobantu1; A.G. Fruntelata1; R. Orut1; A. Scasa-Udrist1; D. Constantinescu1; M. Marianescu1; A. Vasile1; A. Alexandrescu1

1Emergency Hospital of Bucharest, Cardiology Dept., Bucharest, Romania

Background: Echocardiographic assessment of left ventricular ejection fraction and wall motion score index and also of ventricular long axis function, diastolic dysfunction and post-infarction remodeling is crucial for risk stratification in patients with ST-elevation myocardial infarction (STEMI). In this population, elevated brain natriuretic peptide (BNP) levels were significantly associated with adverse outcome beyond left ventricular ejection fraction (LVEF) and identified patients with survival benefit from early invasive strategy. However, correlations of BNP levels to echocardiographical measurements of ventricular function by serial follow-up to predict risk of future clinical events have not been studied.

Methods: The study (in-course) recruited 61 patients (49 males, mean age 53.95±14.05 years) with Killip class I STEMI with indication of reperfusion. Serial echocardiographic assessment of left and right ventricular function were performed before reperfusion, after 24 hours, at hospital discharge and at 30 days. Blood levels of BNP were measured on admission, 24 hours following reperfusion and after 30 days and the patients completed 30 days follow-up.

Results: Reperfusion by primary angioplasty was performed in 7 patients (11.4%), the rest were thrombolysed with various fibrinolytic agents. BNP levels were lower on admission (mean 60.27 pg/mL) and increased significantly after 24 hours (mean 196.38 pg/mL), irrespective of success of reperfusion, baseline LVEF and wall motion score index (WMSI), presence of diastolic dysfunction and of longitudinal dysfunction assessed by mitral annulus plane systolic excursion (MAPSE) averaged in 4 points. However, BNP level at 24 hours and at 30 days was correlated with WMSI at 30 days (r=0.17, p=0.006) and had a tendency towards correlation with left atrial volume (r=-0.09, p=0.05), but not with ventricular volumes. No predictive parameters for clinical events and cardiac death were identified by serial echocardiography in correlation with serial BNP levels in this small preliminary study.

Conclusion: The early (24 hours) and late (30 days) elevation of BNP in patients with reperfused STEMI seems to correlate with late echocardiographical alterations of WMSI and left atrial volume, reflecting pathological left ventricle remodeling and strain. Prognostic implications of these correlations remain to be further evaluated.

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Effects of the coronary artery by-pass graft on the systolic and diastolic function: women versus men

A. Tatu-Chitou1; S. Bradisteianu1

1Spitalul De Urgenta Floreasca (Emergency Hpl), Sectia De Chirurgie Cardio-Vasculara, Bucharest, Romania

Background: Coronary artery by-pass graft ( CABB) - in patients (pts) with ischaemic cardiomyopathy ( ICD) and depressed ejection fraction (EF) - is sometimes followed by significant improvement of the contractility. This benefit could be different for men or women, knowing the fact that women have a different postoperative outcome with a greater number of complications and negative events ( rehospitalisation, mortality).

Aim: The comparison of the CABB results of the ventricular function in women versus men.

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The relationship between echocardiographic calcium score index, systolic function.

**Aim:** To estimate the correlation between the total heart calcium score index (CSI) (the sum of AVS, MAC and ARS) and atherosclerosis.

**Background:** Aortic valve sclerosis (AVS), mitral annular calcification (MAC) and aortic root sclerosis (ARS) detected by echocardiography, have been associated with atherosclerosis. The Framingham Risk Score (FRS) is recommended for estimation of total coronary heart disease (CHD) risk over the course of 10 years. Anatomic extent of coronary artery disease can be assessed with coronary angiography.

**Methods:** 52 consecutive in-hospital patients (age, 66±9 years; 18 women) underwent: 1) the FRS evaluation (from 0= no risk to 60= very high risk) for encom-passing the known cardiovascular disease risk factors (age, gender, blood cholesterol, HDL cholesterol, blood pressure, cigarette smoking, and diabetes mellitus), 2) transthoracic echocardiographic CSI assessment (from 0= normal; 10= diffuse calcification of aortic valve, mitral annulus and aortic root), and 3) coronary angiography (with Duke score evaluation, from 0= normal to 10= severe left main disease).

**Results:** CSI was significantly correlated to FRS (p<0.05, r=0.4) (Figure), but not with angiographic coronary anatomy (Duke score) (p=0.06, r=0.2).

**Conclusions:** Echocardiographically assessed CSI is more linked to coronary risk profile than to angiographically assessed coronary artery disease.