astolic dysfunction is frequently observed in patients with AH complicated with HF. The purpose of this study was to evaluate tissue Doppler imaging (TDI) in heart failure with atrial fibrillation. In 82 consecutive patients with nonvalvular atrial fibrillation (age 72 ± 9.4 yrs, 32 males) mitral atrial early diastolic velocity (Ea) was measured by TDI, mitral V velocity, deceleration time (DT), mitral E/Ea ratio, ejection fraction (EF) and Ea/Ea ratio were calculated. Pulmonary artery systolic pressure (PASP) was calculated from the tricuspid regurgitation velocity. Systolic heart failure was defined as clinical symptoms and EF = <40% and diastolic heart failure as clinical symptoms and EF = >40%. Pts were divided into 4 groups: I (no heart failure, EF = <50%): 12 pts; II (no heart failure, EF = <40%): 8 pts; III (diastolic heart failure): 20 pts; IV (systolic heart failure): 12 patients. There was no difference in age, heart rate and DT between the groups. In heart failure E and Ea/Ea were significantly higher (103 ± 19 vs 88 ±17 cm/s, p < 0.001 and 6.6 ± 1.9 vs 5.3 ± 1.3, p < 0.001). PASP was significantly higher (41 ± 12 vs 33 ± 9 mm Hg, p < 0.01) than without heart failure. In systolic dysfunction only E/A was discriminated heart failure (group IV) from no heart failure (group II) patients (7.2 ± 5.4 vs 1.3 ± 0.5). There was no difference in any variable between systolic heart failure group (group IV) and diastolic heart failure (group III). Diastolic heart failure was different from no heart failure (group III vs group II) in E: 106 ± 19 vs 88 ±17 cm/s, E/Ea 6.4 ± 1.7 vs 5.4 ± 1.3 and PASP 42 ± 13 vs 32 ± 8 mm Hg, all p < 0.01. There was no correlation of E, Ea and Ea/Ea with either age or heart rate.

Conclusions: 1. There is no age dependence of either mitral or myocardial early diastolic velocity in atrial fibrillation. 2. E/Ea is equally elevated in patients with systolic and diastolic heart failure in atrial fibrillation.

Echocardiography in arterial hypertension complicated with heart failure

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Purpose: Hypertension (AH) is now second to ischaemic heart disease as a cause of heart failure (HF). The purpose of this research was to study the changes of left ventricular function, left ventricular structure and parameters of left ventricle in patients with AH complicated with HF.

Methods: 879 patients with AH without signs of myocardial infarction, were examined by EchoCG. 278 patients, I group, had congestive HF (144 female, 134 male; 62 patients had I, 91 - II, 97 - III, 28 - IV class HF according to the NYHA classification). 601 patients (II group) had unaccompanied AH (278 female and 323 male). All patients examined by standard EchoCG. Left ventricular (LV) diastolic function was studied by PW and Color M-mode Doppler flow Dopplergram and Pulsed Doppler Tissue imaging (DTI). Right ventricular (RV) diastolic function was studied by PW tricuspid flow Dopplergram and DTI. Mean pulmonary arterial pressure (PAP) was estimated by pulmonary arterial flow acceleration time. In I gr. 50 patients with atrial fibrillation were not included in analysis of diastolic function.

Results: Systolic, diastolic, myocardial systolic and atrial pressure and PAP, LV and RV wall and cavity dimensions in diastole, LV mass and mass index was significantly greater, LV EFs, S wave maximal velocity on LV TDI was significantly lower in patients with HF. Mitral flow E wave velocity and Ea ratio, tricuspid flow E wave velocity and Ea ratio was significantly greater and tricuspid flow A wave velocity LV flow propagation velocity on color M-mode Dopplergram was significantly lower in patients with HF. The parameters of RV DT did not show any difference between groups. The overall prevalence of sex-adjusted LVH in I gr was 83.6% (49.9 - 11 gr.). The most frequent geometric pattern of LV in this group was eccentric hypertrophy (49.3%). 96% of patients with HF and 67.9% without HF (p < 0.01) had LV diastolic dysfunction. Restrictive filling pattern was found in 27.2% of HF patients with LV diastolic dysfunction and 0.83% of patients without HF. RV diastolic dysfunction was registered frequently in I gr. than in II gr. (78% vs 31%).

Conclusions: The patients with AH complicated with HF have significant changes of EchoCG parameters of heart structure and function. LV and RV hypertrophy, elevated PAP, restrictive pattern of LV dysfunction and RV diastolic dysfunction is frequently observed in patients with AH complicated with CHF than in patients without this complication.

Tissue Doppler imaging in heart failure: sinus rhythm vs atrial fibrillation

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In heart failure left ventricular filling pressure (LVFP) is increased. Tissue Doppler imaging (TDI) has been used to assess LVFP mostly in sinus rhythm. The purpose of this study was to compare the value of TDI in heart failure patients in sinus rhythm and in atrial fibrillation.

Methods: Left ventricular ejection fraction (EF) and mitral E velocity were measured by standard transthoracic echocardiography. Myocardial Ea velocity was obtained by TDI at the lateral mitral annulus and Ea/Ea ratio was calculated. Normal TDI values were determined in 70 healthy subjects (age 49.2 ± 20.1, 22 males). E was 74.2 ± 19.1 cm/s, Ea 16.8 ± 4.6 cm/s, Ea/Ea 4.6 ± 1.3. 74 consecutive heart failure patients were prospectively studied: age 76.9 ± 10 years, 30 males. Patients were divided into 2 groups: sinus rhythm 35 pts, EF 50 ± 18% (group I) and atrial fibrillation 39 pts, EF 50 ± 6 ± 16% (1% group II). There was no difference in age, EF and E velocity (99.2 ± 25 and 103 ± 18 cm/s resp), but heart rate was higher in group II (77.7 ± 17.8 vs 96.1 ± 2.8, p < 0.01). Ea was lower in group I (14.1 ± 3 cm/s) than in group II (16.0 ± 3.2 cm/s) and lower than in normals (16.8 ± 4.6) both p < 0.01. There was no difference in E/Ea between the two groups, but both were higher than in normals (7.4 ± 2.6 vs 4.6 ± 3.2 p < 0.001 and 7.1 ± 1.9 vs 4.6 ± 3.2 p < 0.001). In normals both Ea and E/Ea was significantly inversely related to age (r = -0.76 and r = -0.66 resp, both p < 0.01). Mitral Ea velocity, anular velocity and Ea/Ea did not correlate with either age or heart rate in the heart failure patients.

Conclusions: 1. Increased E/Ea indicating higher LVFP were equally present in heart failure patients with sinus rhythm or atrial fibrillation; 2. The age dependency of Ea, and E/Ea is lost in heart failure.

Systolic function in patients with heart failure. Tissue Doppler study

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Background: The echocardiographic determination of left ventricular systolic function (EF) is commonly used to estimate left ventricular systolic function (SF). According to the latest reports, normal EF does not mean normal SF.

Aim: to assess systolic function by tissue Doppler (TD) in patients (pts) with congestive heart failure (CHF) according to EF value.

Material and method: 96 pts (57 males; mean age 64.5 ± (+11.4) with signs and symptoms of CHF and 20 healthy volunteers were enrolled into the study. CHF diagnosis was confirmed by Xray. Patients were divided in two groups according to EF value (group 1 with EF < 45% and group 2 with EF > 45%). S' wave velocity in four points of mitral valve annulus and in four basal segments of left ventricle was measured by TD. ROC for EF 45% was 4.9 cm/s with 90% sensitivity and 70% specificity. In each group the number of points with reduction of S' wave velocity was evaluated.

Results: The results were presented in the table 1.

Conclusions: Systolic function is impaired in patients with congestive heart failure regardless of ejection fraction value, though it is more expressed in group with reduced ejection fraction. In group commonly called diastolic heart failure over 60% of patient have at least one point with abnormal systolic myocardium velocity, assessed by tissue Doppler.

Assessment of longitudinal shortening of the left ventricle in patients with heart failure and preserved ejection fraction

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1Hospital de Galdakao, Cardiology Dept., Galdakao, Spain

The presence of symptoms and signs of heart failure, abnormal diastolic and preserved ejection fraction have been defined as diastolic heart failure. The systolic velocities measured at the mitral annulus by pulsed tissue Doppler imaging (TDI) and the displacement of the mitral annulus by M mode are likely to be indexes of global longitudinal function of the left ventricle. The aim of this study was to evaluate the longitudinal subendocardial systolic function in patients with heart failure and normal ejection fraction. We studied 43 patients with heart failure who had ejection fraction >50% and 80 healthy controls. S' wave velocity in four points of mitral valve annulus and in four basal segments of left ventricle was measured by TD. ROC for EF 45% was 4.9 cm/s with 90% sensitivity and 70% specificity. In each group the number of points with reduction of S' wave velocity was evaluated.

Results: The results were presented in the table 1.

Conclusions: Patients with heart failure and preserved ejection fraction, who seem to have diastolic dysfunction might have also systolic dysfunction, as is evident by analysis of tissue Doppler imaging.
assessed by measuring mitral annulus velocities with TDI and mitral annulus displacement. These findings suggest that pure diastolic dysfunction is probably rare and that some systolic dysfunction is present in many patients with heart failure and normal ejection fraction.

Results:

<table>
<thead>
<tr>
<th>Table 1</th>
</tr>
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<tbody>
<tr>
<td>EF</td>
</tr>
<tr>
<td>---</td>
</tr>
<tr>
<td>Control (25)</td>
</tr>
<tr>
<td>Heart Failure (43)</td>
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</tbody>
</table>

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Does chronic kidney disease alter cardiac geometry and function in patients with chronic heart failure?

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Background/Aim: In patients (pts) with chronic heart failure (CHF), chronic kidney disease (CKD) is associated with increased morbidity and mortality, but the impact of CKD on cardiac geometry and function has not been clearly elucidated.

Methods: This study evaluated 322 pts with stable CHF (mean age 59±13 years, 180 with ischemic, 142 with non-ischemic cardiomyopathy), who were under current heart failure medication and had stable creatinine values for at least three months. As a measure of renal function, the glomerular filtration rate (eGFR) was estimated using the abbreviated Modification of Diet in Renal Disease Study Equation. CKD was defined as eGFR <60 ml/min/1.73 m².

Chronic kidney disease (CKD) was defined as eGFR <60 ml/min/1.73 m². Echo measurements included left ventricular (LV) dimensions/volumes, muscle mass (all indexed to body surface area), ejection fraction (EF), mitral E/A ratio, deceleration time and tissue Doppler mitral annular velocities (S', E', A').

Findings: Pts with vs without CKD did not differ with respect to EF (29% vs 31%, p=0.13), and a higher muscle mass (184±56 g/m² vs 166±47 g/m², p=0.003) in comparison to pts without CKD, but LV volumes did not differ between groups. Pts with vs without CKD did not differ with respect to EF (29% vs 31%, p=0.13), but CKD pts were in a poorer NYHA functional class (2.8±0.4 vs 2.5±0.5, p<0.001) and a restrictive mitral filling pattern was more frequent (34% vs 21%, p=0.03).

Results: CKD was present in 158 pts (49%, mean eGFR 44.5±11.9 ml/min/1.73 m²). Pts with CKD had larger LV diastolic/systolic diameters (3.6±0.5 cm/m² vs 1.7±0.73 cm/m²), 164 pts (51%) had no CKD (mean eGFR 75.6±11.0 ml/min/1.73 m²).

Conclusions: Does chronic kidney disease alter cardiac geometry and function in patients with chronic heart failure?

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Echocardiographic findings correlate with the degree of BNP elevation: Is it always true?

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Background: Severe heart failure (HF) is associated with worsening symptoms, and elevated brain natriuretic peptide (BNP). However, it is not completely understood why patients with HF present with different degrees of BNP elevation.

Hypothesis: Extremely high BNP does not necessarily reflect the severity of heart failure.

Methods: We selected patients admitted to the hospital from 12/2004 to 12/2005 with elevated BNP within three predominant ranges 1) Mild elevation: 500-1000 pg/mL, 2) Moderate elevation: 2000-3000, 3) Severely elevated group: >4000. The eligible patients are 200 and final study included 179 after excluding BNP fluctuations. Data was obtained retrospectively

Results: Number of echocardiographic and clinical parameters demonstrated severe hemodynamic abnormalities in patients with moderately high BNP compared to mildly elevated BNP as shown in the table.

Conclusion: 1. BNP elevation to 3000 pg/mL reflects severity of structural and hemodynamic changes detected by echocardiogram. 2. Extremely high levels of BNP elevation (>4000 pg/mL) does not reflect the severity of hemodynamic and clinical changes. 3. Renal function determines BNP elevation between the moderate and high BNP groups.

Table 1

<table>
<thead>
<tr>
<th>Variables</th>
<th>Low BNP</th>
<th>Moderate BNP</th>
<th>High BNP</th>
</tr>
</thead>
<tbody>
<tr>
<td>NYHA</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BNP</td>
<td>744.5±2434</td>
<td>7271.7±143.7</td>
<td>2980.6±3248.0</td>
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<tr>
<td>EF</td>
<td>39.3±26.8</td>
<td>30.6±22.9</td>
<td>19.2±16.1</td>
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<td>LVMI</td>
<td>151.8±72.5</td>
<td>200.3±64.9</td>
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<td>MR</td>
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<td>1.88±0.56</td>
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<td>1.82±23.2</td>
<td>1.72±7.4</td>
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</tr>
<tr>
<td>LA</td>
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<td>20.14±6.9</td>
<td>19.9±7.12</td>
</tr>
<tr>
<td>LV volume</td>
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<td>54.12±27.4</td>
<td>71.42±64.2</td>
</tr>
<tr>
<td>RV, cm</td>
<td>3.86±1.58</td>
<td>3.26±1.78</td>
<td>2.31±1.16</td>
</tr>
</tbody>
</table>

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Comparative analysis of three BNP assays in community assessment of LV systolic dysfunction: a cost-saving tool

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Objective: Direct access echocardiography is increasingly demanded and frequently negative. Brain Natriuretic Peptide (BNP) has a widely developing role in predicting cardiac disease, particularly LV systolic dysfunction (LVSD). We compared the use of three simultaneous BNP assays with other demographic and clinical data to predict LVSD, 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 echocardiographer was blinded to the serum BNP levels. Setting: A UK District General Hospital. Variables: Age, sex, British Society of Echocardiography (BSE) standard adult echocardiogram, Fibrinogen, chest X-ray (CXR), ECG, cardio-vascular risk factors, symptoms and signs of cardiac failure, medication, simultaneous Roche® E170 NT proBNP (R-pBNP), Bayer® Centaur BNP (BC-BNP)&Biosite® Triage BNP (BT-BNP) levels.