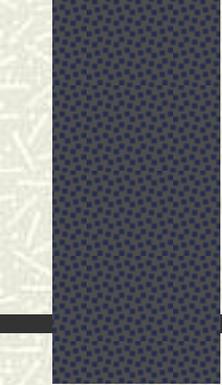




KHARKIV NATIONAL MEDICAL UNIVERSITY (KHARKIV, UKRAINE)

**CARDIAC HEMODYNAMICS DISTURBANCES, RENAL
FUNCTION IN PATIENTS WITH CHRONIC HEART FAILURE
AND CHRONIC KIDNEY DISEASE**

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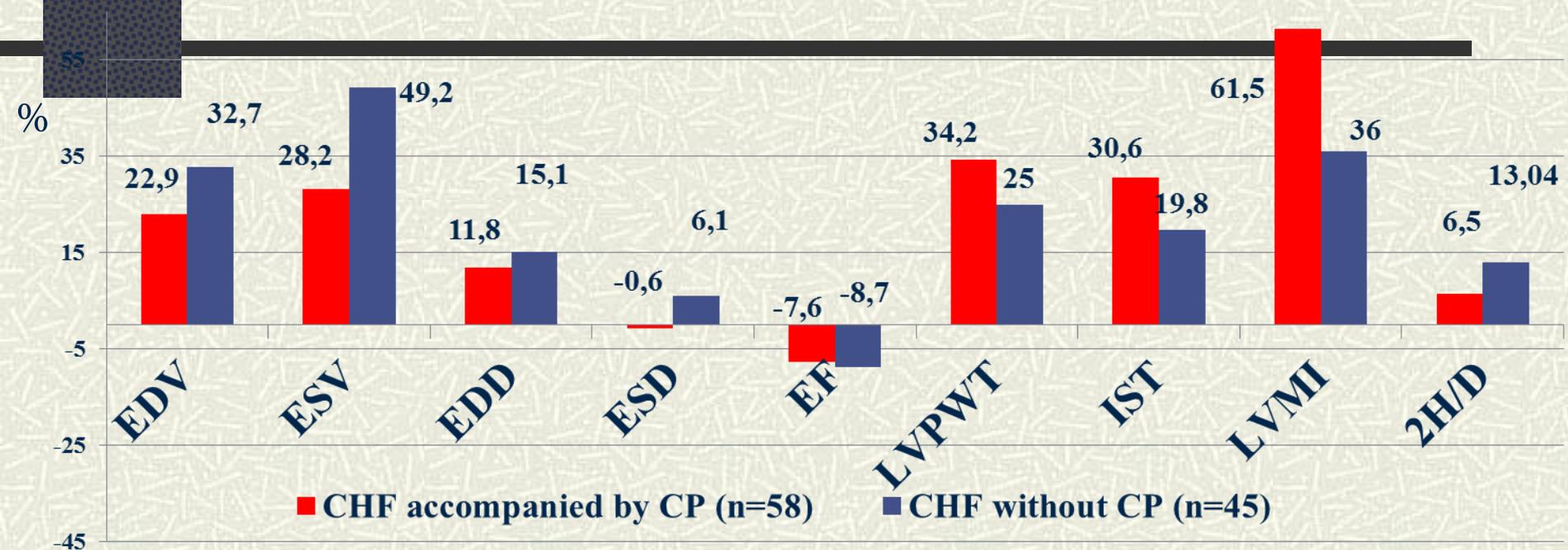
The aim of the study was to evaluate the hemodynamics parameters, markers of renal function, the role of immune inflammation in formation of structural and functional parameters of myocardium in patients with chronic heart failure (CHF) and early stages of chronic kidney disease (CKD I-II stages) caused by chronic pyelonephritis (CP).

Materials and Methods

The study was included 103 patients with coronary artery disease and CHF. The first group (I) included 58 patients with CHF accompanied by CP, the second group (II) - 45 patients with CHF without CP.

The study of structural and functional parameters of the myocardium was measured by Echocardiography and Doppler-echocardiography. The levels of immune inflammation markers (tumor necrosis factor - α (TNF- α), transforming growth factor- β 1 (TGF- β 1), markers of renal function (cystatin C, urine- β 2-microglobulin (β 2-MG)) were examined by ELISA.

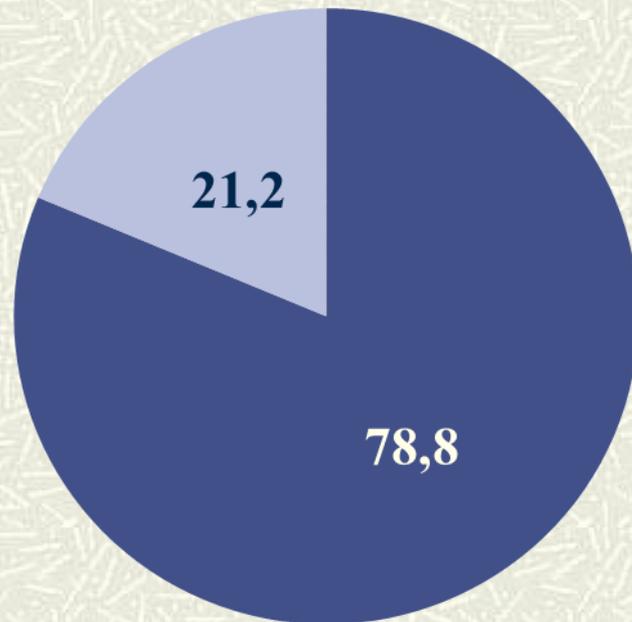
Cardiac hemodynamics parameters in patients with CHF accompanied by CP and without CP (%)



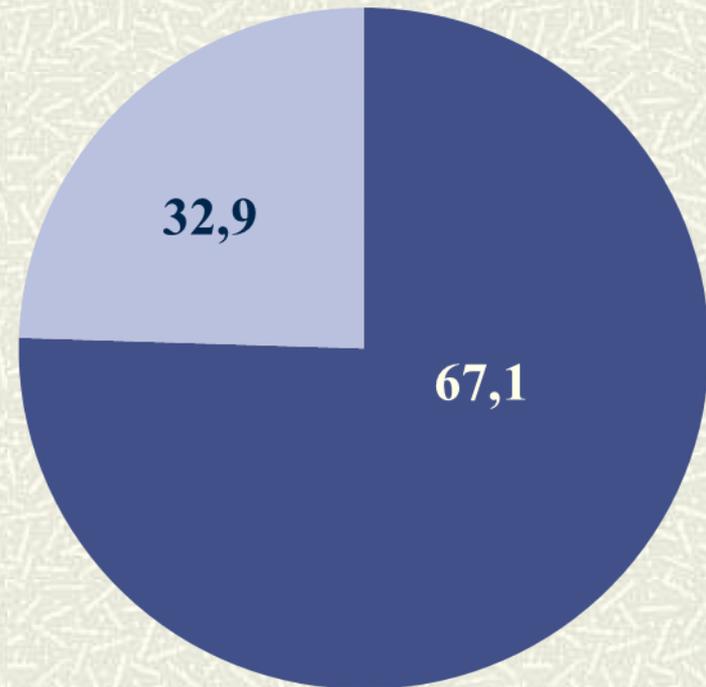
In patients with CHF and CP compared to patients with CHF without CP (with the same clinical symptoms and similar values of ejection fraction (EF)) higher rates of Left Ventricular Hypertrophy (LVH) indicators, such as Left Ventricular Posterior Wall Thickness (LVPWT), ($p=0,045$), Interventricular Septum Thickness (IST), ($p<0,05$), Left Ventricular Mass Index (LVMI), ($p<0,05$), and reduction of left ventricular cavity size and volume, such as End-diastolic Volume (EDV), ($p<0,05$), End-systolic Volume (ESV), ($p<0,01$), End-systolic Dimension (EDD), ($p<0,05$), LV relative wall thickness index (2H/D), ($p=0,04$) were identified.

Left ventricular hypertrophy frequency in patients with CHF and CP and without CP (%)

**CHF accompanied by CP
(n=58)**



CHF without CP (n=45)

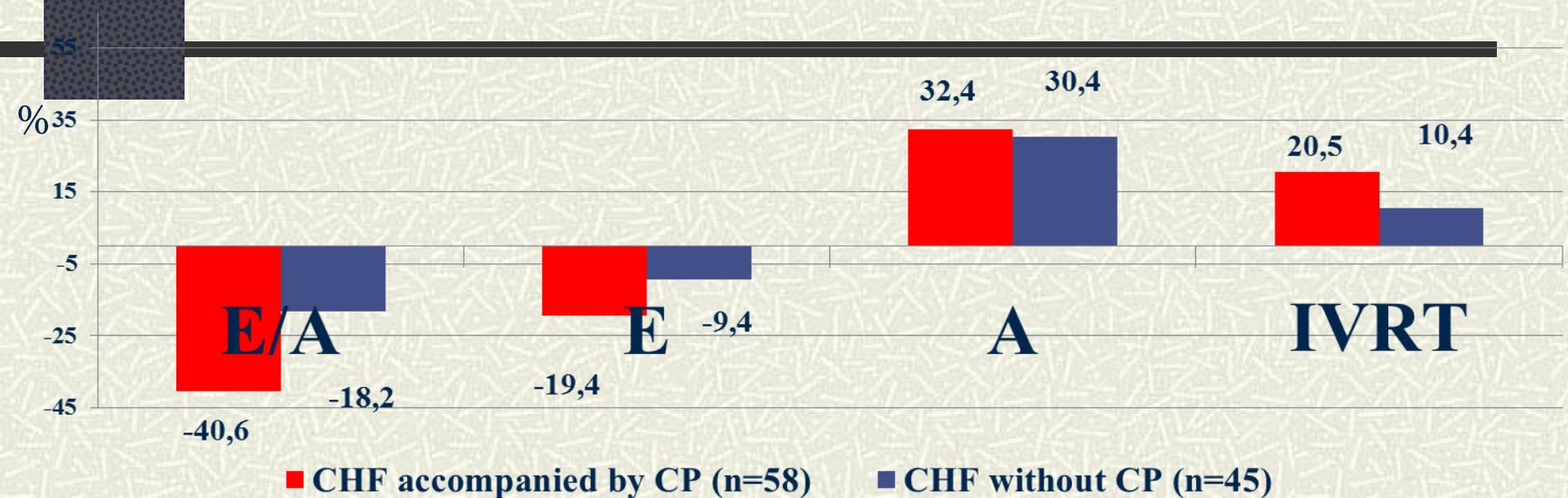


■ Patients with LVH

□ Patients without LVH

**LVH was identified in 78,8% in CHF with CP patients and
67,1% in CHF without CP patients.**

Cardiac hemodynamics parameters in patients with CHF and CP and without CP (%)



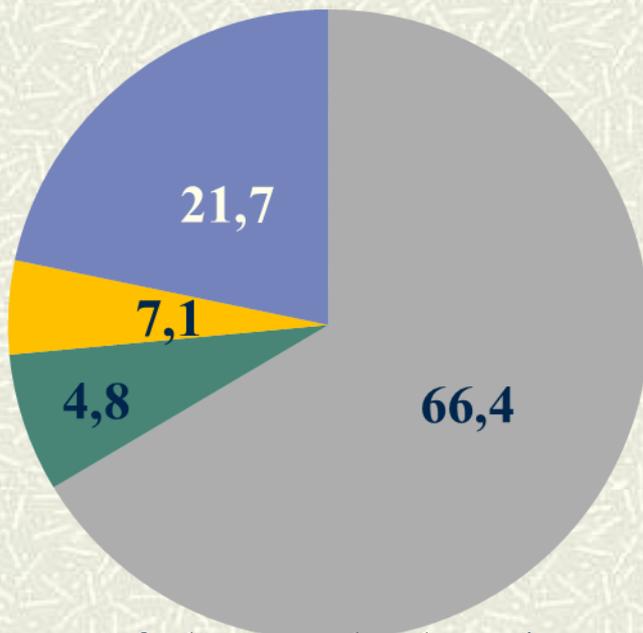
In patients with CHF accompanied by CP and CHF without CP a significant decrease of early diastolic velocity (E) on 9,4 % and 19,4% ($p < 0,01$, $p < 0,05$), increase of atrial velocity (A) on 32,4% and 30,4% ($p < 0,05$, $p < 0,05$), reduction E/A ratio on 40,6 % and 18,2 % ($p < 0,01$, $p < 0,05$) compared to normal levels was determined.

Reduction of of E and E/A indicators degree was more prominent in patients with CHF accompanied by CP ($p < 0,05$, $p < 0,05$).

Extension of isovolumic relaxation time (IVRT) in both groups of patients exceeded the control level for 20,5 % and 10,4 % ($p < 0,05$, $p < 0,05$).

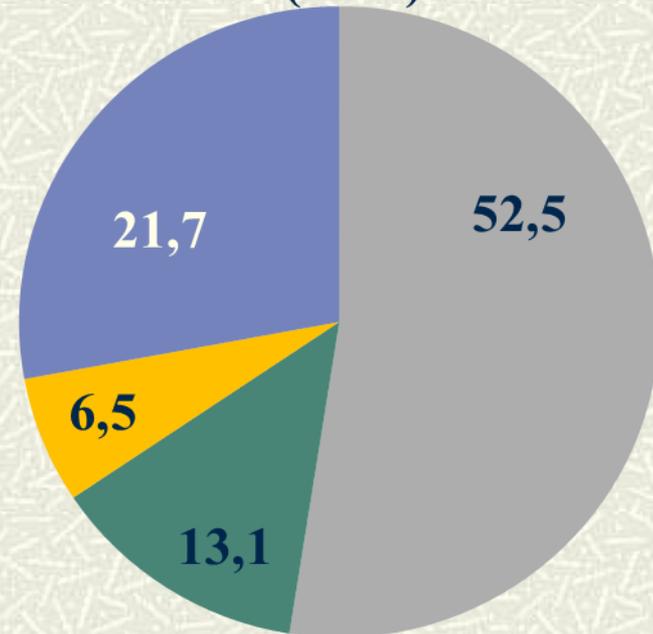
Types of diastolic dysfunction in CHF with CP and without CP patients (%)

Patients with CHF accompanied by CP (n=58)



■ Pattern of abnormal relaxation
■ Restrictive pattern

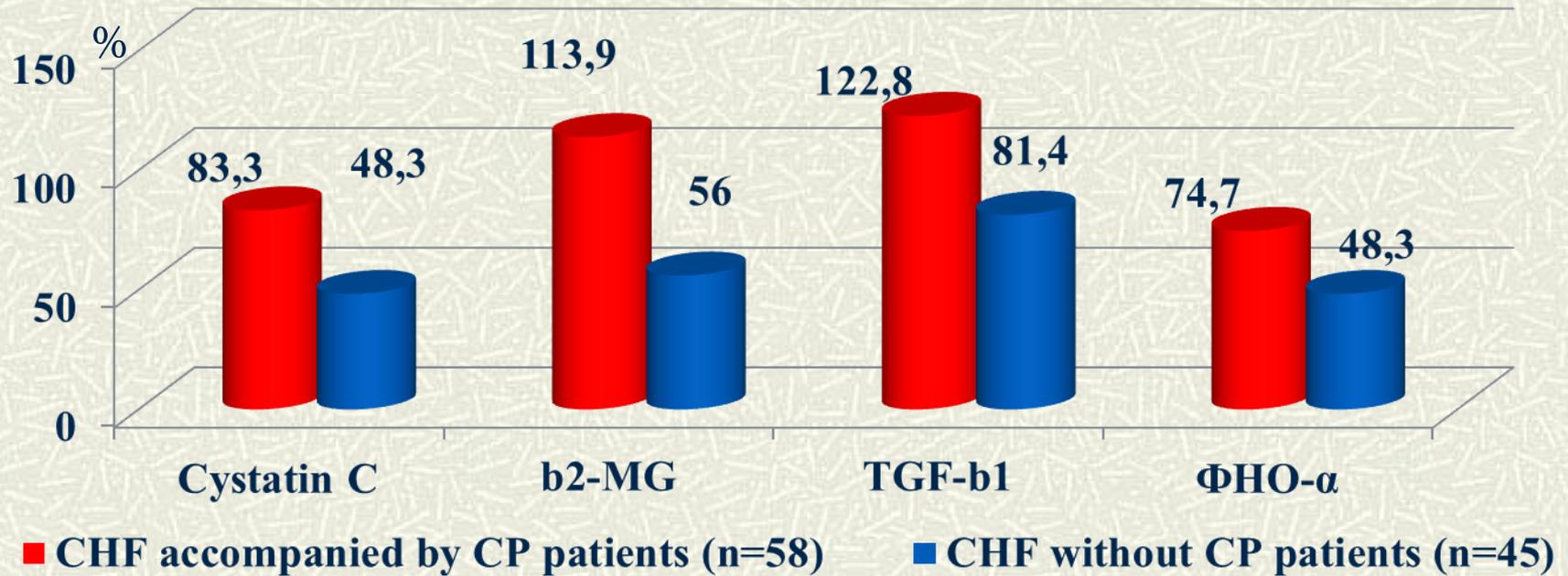
Patients with CHF without CP (n=45)



■ Pseudonormal pattern
■ Normal diastolic pattern

Pattern of abnormal relaxation of diastolic dysfunction was predominant.

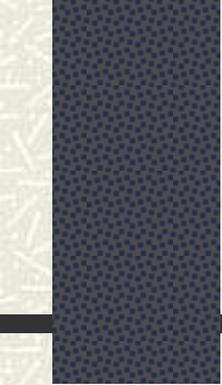
Markers of immune inflammation and kidney dysfunction in patients with CHF accompanied by CP and without CP (%)



Levels of cystatin C, β 2 -MG, TNF - α , TGF- β 1 were significantly higher in patients with CHF and CP compared to patients with CHF without CP.

In patients with CHF accompanied by CP determined positive correlation between the LVMI and cystatin C ($r=0,37$, $p<0,01$), TGF- β 1 ($r=0,68$, $p<0,001$), TNF- α ($r=0,34$, $p= 0,04$) and negative correlation between TGF- β 1 and E/A ($r=-0,37$, $p <0,01$), cystatin C and EDV ($r=- 0,29$, $p<0,05$), ESV ($r = -0,30$, $p<0,05$), E/A ($r=-0,44$, $p<0,01$).

In patients with CHF without CP a positive correlation between LVMI and cystatin C ($r = 0,37$, $p<0,01$), TGF- β 1 ($r = 0,54$, $p <0,001$), TNF- α ($r = 0,27$, $p <0,04$) was determined.



Therefore, hemodynamics in patients with CHF accompanied by CKD I-II stages compared to CHF without CKD is associated with more severe left ventricular hypertrophy and diastolic dysfunction. Increase of levels of TNF- α , TGF- β 1, cystatin C plays an important role in modifying of structure of hemodynamic parameters.
