

## MEDICINE AND PHARMACY

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### AGE AND GENDERS DIFFERENCES OF MORPHOFUNCTIONAL PARAMETERS OF THE HEART IN COMORBID PATIENTS

***Abstract.** Women with a long course of hypertension, which leads to the development of chronic heart failure, valid factors are the presence of diabetes mellitus, coronary artery disease and the advantage of a favorable concentric type of LV remodeling with preserved systolic function. In men of the same age, myocardial remodeling has a less favorable course with an increase in the size of the left ventricle and LA on the background of a more pronounced decrease in systolic function.*

***Keywords.** diabetes mellitus, obesity, arterial hypertension, women, men, age, gender.*

For several decades, cardiovascular pathology has occupied the first place in the structure of mortality. Cardiovascular diseases are an epidemic among chronic non-communicable diseases worldwide [1, 2].

The comorbid pathogenetic link between arterial hypertension (AH), type 2 diabetes mellitus (DM2) and obesity (AH) causes an increased cardiovascular risk and leads to the development of threatening complications [3, 4].

Gender and age differences in the development and course of the most socially significant diseases, which primarily include cardiovascular disease, require a comprehensive study in different age groups, clarifying their nature, establishing differences between men and women for their primary and secondary prevention, as well as the compilation of an individualized algorithm of examination and treatment [5].

The aim of this work was to determine the sex and age characteristics of hemodynamic parameters and myocardial changes in patients with hypertension, diabetes mellitus and coronary heart disease.

### **Materials and methods.**

67 patients with hypertension, diabetes mellitus and coronary artery disease were examined, and the studied parameters were compared depending on the sex and age of the patients.

The diagnosis of hypertension was established according to the recommendations of the International Society of Hypertension (ISN), 2020. Diagnosis of diabetes mellitus<sup>2</sup>, OJ was established on the basis of clinical, instrumental, biochemical criteria in accordance with the recommendations of WHO experts, the European Society of Endocrinologists.

Echocardiographic examinations were performed according to the standard method of H. Feigenbaum on an ultrasound device RADMIR (Ultima PRO 30) (Kharkov, Ukraine). In the M-mode, the following parameters of the left ventricle (LV) were determined: final diastolic size (FDS) (cm), final systolic size (FSS) (cm), posterior wall thickness (PVT) (cm), interventricular septal thickness (IVST) (cm). Final diastolic (FDV) and systolic volume (FSV) (ml) of the left ventricle were calculated by the method of Simpson (1991), after which the ejection fraction

(LVEF) of the left ventricle (%) was calculated. The mass of the LV myocardium (LVMMI) was calculated by the formula of R. Devereux et al.:  $1.04 \times [(IVST + TLVPW + EDD)^3] - [EDD]^3 - 13,6$ . The calculation of the LV myocardial wall thickness index (TILVMW) was performed according to the formula:  $TILVMW = (PVTd + IVSTd) / EDD$ . Then the LV myocardial mass index (LVMMI) relative to the growth of patients was calculated:  $LMWH (g / m^2) = LMWH / PPT$ , where PPT is body surface area ( $m^2$ ).

The size of the left atrium (LE) (cm) was also determined by the size between the posterior wall of the LP and the posterior wall of the aorta on the parasternal image along the long axis. The aorta (cm) was measured on a parasternal image along the long axis to the axis of the aorta in four places from the anterior edge of the proximal wall to the anterior edge of the distal wall at the end of systole and at the end of diastole. the size of the aorta is indexed to the square root of the patient's body surface area. For a more accurate assessment of the geometric type of LV modeling, the values of the relative thickness of the posterior wall (RIVST) and interventricular septum (IVST) were separately calculated, which allows to identify the asymmetric nature of LV geometry by the formulas:  $RIVST = (2 \times TLVPW) / EDD$ ;  $TLWPV = (2 \times TILVMW) / EDD$ .

The obtained results are presented as the mean value  $\pm$  deviation from the mean value ( $M \pm m$ ). Statistical data processing was performed using the software package "Statistica" version 6.0. Evaluation of differences between groups in a distribution close to normal was performed using Pearson's test. Differences at  $p < 0.05$  were considered statistically significant.

### Results and discussion.

A comparison of hemodynamic parameters of the heart depending on the age and sex of patients (Table 1).

*Table 1*

Indexes	Indicator value ( $M \pm m$ )			
	Average age		Elderly age	
	Women (n=16)	Men (n=40)	Women (n=18)	Men (n=17)
EDV, ml	201,56 $\pm$ 3,20	205,24 $\pm$ 3,50	206,37 $\pm$ 3,30	208,16 $\pm$ 3,40
ESV, ml	98,18 $\pm$ 1,90	100,69 $\pm$ 2,10	101,03 $\pm$ 2,30	104,34 $\pm$ 2,10

Table continuation 1

Indexes	Indicator value (M ± m)			
	Average age		Elderly age	
	Women (n=16)	Men (n=40)	Women (n=18)	Men (n=17)
EDD, cm	6,39±0,09	7,42±0,08*	6,81±0,10	7,95±0,11 <sup>#</sup>
ESD, cm	3,81±0,07	4,37±0,06*	4,05±0,08	4,80±0,07 <sup>#</sup>
LVEF, %	46,29±1,00	40,25±0,89*	44,18±1,20	37,54±0,89 <sup>#</sup>
LA, cm	4,15±0,06	4,88±0,08*	4,25±0,06	5,10±0,07 <sup>#</sup>
LVM, g	300,29±6,70	284,67±7,01*	309,41±6,90	293,29±7,29 <sup>#</sup>
LVMMI, g/m <sup>2</sup>	155,90±4,49	152,12±4,40	162,92±4,79	158,79±4,69

Notes: the difference is significant compared to that

\* - between average-aged men and women,

# - between average-aged men and women

Thus, a comparative analysis by sex of patients showed a significant increase in the size of LV and LA against the background of a more pronounced decrease in systolic function in men with hypertension, diabetes mellitus and coronary heart disease compared with women regardless of age. In middle-aged men, the indicators of FDS, FSS and LA ( $p < 0.05$ ) differed significantly from women. The data obtained can be characterized as a consequence of prolonged and more common among women hypertension.

It should be emphasized that similar changes were observed in elderly patients compared with the elderly. At present, there are a sufficient number of studies that indicate the peculiarities of the course of cardiovascular pathology in people of different genders. Most researchers claim that the sex of the patient is a significant and independent prognostic factor that determines the severity of chronic heart failure due to heart remodeling [6, 7].

In all examined patients there was a violation of geometric adaptation: the concentric type of remodeling was squeezed out mainly at women, at men - eccentric remodeling of LV was more often stated.

### Conclusions.

1. In women with a long course of hypertension, which leads to the development of chronic heart failure, valid factors are the presence of diabetes mellitus, coronary artery disease and the advantage of a favorable concentric type of LV remodeling with preserved systolic function.

2. In men of the same age, myocardial remodeling has a less favorable course with an increase in the size of the left ventricle and LA on the background of a more pronounced decrease in systolic function.

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