



FEATURES OF CLINICAL AND STRUCTURAL AND FUNCTIONAL HEART CHANGES IN PATIENTS WITH AH ACCORDING TO TISSUE DOPPLEROGRAPHY DATA

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Annotation

Arterial hypertension (AH) remains one of the most important causes of chronic heart failure (CHF). In recent years, close attention has been paid to the study of indicators of tissue Doppler ultrasonography, as early markers of the development of CHF [A. Lerman, 1993; M. Davis, 1994; European guidelines for the diagnosis and treatment of CHF, 2005]. In hypertension, the study of tissue Doppler imaging parameters can serve as a reliable marker of diastolic heart failure. At the same time, tissue Doppler data are extremely important for assessing the prognosis in hypertension, especially in concomitant CHF.

Keywords: arterial hypertension, isovolumic relaxation, Doppler.

The aim of the study: optimization of the assessment of the cardioprotective efficacy of antihypertensive therapy in patients with arterial hypertension on the basis of tissue Doppler ultrasonography.

Discussion of the results . Against the background of antihypertensive therapy, the decrease in systolic blood pressure in hypertensive patients with the ratio $E / E_m < 8$ was 9.6% and 12.1%, with $E / E_m > 8$, the decrease in diastolic blood pressure was 8.3% and 10.4% respectively. At the same time, in patients with a ratio $E / E_m > 8$, the number of patients with increased fatigue decreased from 42.4% to 24.2% ($p > 0.05$), heartbeat - from 18.2% to 3.0% ($p > 0.05$) and shortness of breath - from 30.3% to 21.2% ($p > 0.05$).

The main indicators of standard EchoCG and DEHOCG of the transmitral and transtricuspid flows, including LV myocardial mass and peak velocities E, did not change significantly against the background of antihypertensive therapy. According to tissue Doppler sonography, on the contrary, regardless of the initial value of the E / E_m ratio, a significant decrease in the value of the Tei-index was noted in comparison with the initial data. Thus, in both groups, there was a decrease in the Tei-index along all LV walls, including the lateral wall.





Moreover, the decrease in the value of the Tei-index was more significant in patients with the initial value of the combined index $E / Em > 8$, and this dynamics mainly occurred due to a decrease in the duration of the isovolumic relaxation time. Thus, the decrease in the time of isovolumic relaxation along the lateral wall of the LV in hypertensive patients with an initial value of $E / Em < 8$ was 1.2% ($p > 0.05$), while with an $E / Em > 8$ - 15.6% ($p = 0.004$), in the IVS area this dynamics was, respectively, 13.3% ($p = 0.001$) and 14.7% ($p = 0.007$), in the anterior wall - 14.4% ($p < 0.001$) and 18.8% ($p < 0.01$), lower wall - 8.1% ($p = 0.04$) and 15.4% ($p < 0.01$). In patients of the 2nd group, a more pronounced dynamics of the Tei-index was associated with an active decrease in blood pressure.

Thus, in hypertensive patients with an initial value of $E / Em < 8$, its significant increase was noted in the area of the LV lateral wall. In patients with an initial value of the E / Em ratio > 8 , on the contrary, there was a significant decrease in this indicator, as compared with the initial data, indicating an improvement in LV diastolic function. Moreover, this dynamics was due to an increase, against the background of antihypertensive therapy, in the regional velocity of early diastolic movement of the myocardium in the area of the LV lateral wall by 20.1%, IVS - by 9.3% and the lower wall - by 11.4%.

In hypertensive patients with an initial value of $E / Em < 8$, an insignificant decrease in this indicator in the region of the anterior LV wall was also associated with an increase in the peak rate of Em by 8.3%.

In a more detailed analysis of the dynamics of E / Em , it was noted that out of 53 patients with an initial value of $E / Em < 8$, only 42 patients (79.2%) had this indicator remained less than 8 and amounted to 6.1 ± 1.2 , while in the remaining 11 (20.8%) patients, the ratio of this indicator underwent negative dynamics, that is, the value of the E / Em ratio became more than 8 and amounted to 9.3 ± 1.08 . For a more detailed analysis, these patients were divided into 2 subgroups. In turn, out of 33 hypertensive patients with an initial $E / Em > 8$ in 15 patients (45.5%), this indicator remained more than 8 and amounted to 9.9 ± 1.4 , while in 18 patients (54.5%), on the contrary, the value of this indicator became less than 8 and amounted to 7.0 ± 0.72 . Taking into account the revealed dynamics, these patients made up 3 and 4 subgroups, respectively. When analyzing the effect of antihypertensive therapy on the dynamics of the E / Em indicator, it was noted that regular intake of antihypertensive drugs and, accordingly, the achievement of target blood pressure levels more often took place in 1 and 4 subgroups.



The distribution of hypertensive patients depending on the regularity of taking antihypertensive drugs, the effectiveness of the therapy and the dynamics of the combined E / Em index is presented in Table 1.

Table 1. Distribution of hypertensive patients depending on the regularity of taking antihypertensive drugs, the effectiveness of the therapy and the dynamics of the combined indicator E / E m

Subgroup	Regular intake of antihypertensive drugs (n = 63)	Reaching the target blood pressure level (n = 51)
one	34 (54.0%)	32 (62.7%)
2	7 (11.1%)	4 (7.8%)
3	9 (14.3%)	5 (9.8%)
four	13 (20.6%)	10 (19.6%)

At the same time, in the 1st subgroup, ACE inhibitors (perindopril or enalapril) in combination with hydrochlorothiazide were regularly taken by 80.9% of patients, the target blood pressure level reached 76.2%. In subgroup 4, 72.2% of patients regularly took antihypertensive drugs and 55.5% of patients achieved target blood pressure levels.

Deterioration of LV diastolic function in subgroup 2 or preservation of the initial signs of LV diastolic dysfunction in subgroup 3 were associated with insufficient effectiveness of the therapy, since target blood pressure levels in these subgroups reached less than 40% of patients, although 63.6% of patients 2- of the 1st subgroup and 60.0% of the patients of the 3rd subgroup regularly took antihypertensive drugs.

Patients with hypertension of the 1st and 2nd subgroups were initially comparable in age, BNP level, heart rate, office numbers of systolic and diastolic blood pressure, while patients of the 3rd subgroup, on the contrary, initially had higher blood pressure, especially compared with patients of the 2nd subgroup.

Despite the higher BP indices in patients of the 3rd subgroup, the analyzed subgroups initially did not differ in the main structural, geometric and functional parameters of the LV. Baseline indices of standard echocardiography and DEchoCG of the left ventricle in hypertensive patients, depending on the dynamics of the combined E / Em index against the background of antihypertensive therapy. However, taking into account the value of the index of the relative wall thickness and the mass of the LV myocardium, it can be assumed that a slightly more pronounced structural and geometric rearrangement of the LV still took place in patients of the 3rd subgroup, while the patients of the 1st subgroup initially had less pronounced structural disorders. functional state of the LV. According to tissue Doppler sonography, in patients with hypertension of the 3rd subgroup, higher





blood pressure values were accompanied by pronounced changes in the functional state of longitudinal LV fibers. Thus, in patients of the 3rd subgroup, there was a significant decrease in the peak velocity of systolic movement of the myocardium in the area of the IVS, the lateral and lower walls of the LV, compared with patients of the 1st subgroup. With this, the value of the Tei-index as a whole indicated more pronounced, in comparison with the first two subgroups, violations of the functional state of the LV. It should be noted that the initial indicators of the regional state of the LV did not significantly differ in patients of the 1st and 2nd subgroups. During the follow-up period, the deterioration of the LV diastolic function in patients of the 2nd subgroup was associated with insufficient effectiveness of the performed antihypertensive therapy. Thus, with the initial value of $E / E_m < 8$, only in patients of the 1st subgroup, antihypertensive therapy was accompanied by a significant dynamics of the BNP level, due to a decrease in both systolic and diastolic blood pressure.

In patients of the 2nd subgroup, also against the background of antihypertensive therapy, there was a decrease in SBP and DBP, however, this dynamics was insufficient to prevent the appearance of signs of LV diastolic dysfunction. In patients with hypertension of the 3rd subgroup on the background of the therapy, there was also a significant, compared with the initial data, decrease in SBP and DBP, but this dynamics was not enough to improve LV diastolic function.

Output. Thus, in the presence of signs of regional disorders of systolic or diastolic LV function, a more pronounced dynamics of SBP and DBP is required to further improve its parameters. Regular antihypertensive therapy especially when the target blood pressure not only alerting the development of diastolic dysfunction, but also helps to normalize it over 6 months observation.

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