

Characteristics of vessels wall, myocardium and epicardial fat in patients with heart failure with preserved ejection fraction with and without metabolic syndrome

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Background: The structure of the vessels wall and myocardium is an independent predictor of cardiovascular events among patients with heart failure (HF). There is a data that metabolic syndrome (MS) accelerates the progression of structural and functional disorders of the vessel wall and myocardium. Epicardial fat thickness was shown to correlates with visceral fat thickness and to be an independent predictor of cardiovascular diseases.

Objectives: To investigate the characteristics of vessels wall, myocardium and epicardial fat in patients with HF with preserved ejection fraction (HF-PEF) with and without MS.

Materials and Methods: A total of 59 patients with HF-PEF were included. First group — patients without MS ($n = 29$), second group — patients with MS ($n = 30$). Following characteristics were evaluated: Arterial stiffness (stiffness index [SI]), reflection index (RI), augmentation index (Alp). The function of big vessels was evaluated by phase shift (PS), of the small vessels — by the occlusion index (OI). Investigations were performed by the device “angioscan.” Sizes of the heart chambers and the thickness of the myocardium wall and epicardial fat thickness were evaluated echocardiographically.

Results: Among the patients from both groups significant changes of the vessels wall and myocardial structure were found. SI at the first group was 8.26 ± 1.72 m/s, at the second group — 9.62 ± 5.61 m/s (non-significant, $P = 0.25$). RI at the first group was $39.79 \pm 18.12\%$, at the second — $31.43 \pm 17.23\%$ (non-significant, $P = 0.086$). Alp at the first group was 23.47

$\pm 14.69\%$, at the second — $11.16 \pm 17.14\%$ (significant, $P = 0.011$). PS at the first group was 8.05 ± 7.72 ms, at the second — 5.34 ± 4.4 ms (non-significant, $P = 0.36$). OI at the first group was $1.34 \pm 0.58\%$, at the second — $1.46 \pm 0.54\%$ (non-significant, $P = 0.46$). Significant intergroup differences were found in the interventricular septum thickness: 10.3 ± 1.2 mm at the first group and 11.3 ± 1.6 mm at the second ($P = 0.01$); left ventricle wall thickness: 10.1 ± 1.1 mm at the first group and 11.3 ± 1.6 mm — at the second ($P = 0.001$); left ventricle myocardium mass: 157.75 ± 46.11 g at the first group and 201.19 ± 58.82 g — at the second ($P = 0.005$). The epicardial fat thickness was 14.8 ± 1.8 mm at the first group and 36.7 ± 1.7 mm — at the second group (significant, $P = 0.001$).

Conclusion: Among patients with hypertension and HF-PEF with and without MS significant changes in the structure of the vessel wall and myocardium were found. The presence of MS lead to more pronounced myocardial remodeling. The epicardial fat thickness is significantly higher among patients MS.

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The authors declare: No significant relationship.