



**LABORATORY AND INSTRUMENTAL MARKERS OF MYOCARDIAL
REMODELING IN WOMEN WITH OBESITY**

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Abstract. Obesity is a major risk factor for cardiovascular diseases, causing structural and functional changes in the heart muscle through chronic inflammation, insulin resistance, and hemodynamic overload. This study aimed to identify laboratory and instrumental markers of myocardial remodeling in women with obesity. The study involved 80 women with obesity. Anthropometric indicators, lipid profile, glucose, HbA1c, and high-sensitivity C-reactive protein were assessed. Instrumental examinations included electrocardiography and echocardiography. The results revealed lipid metabolism disorders, elevated C-reactive protein levels, and metabolic changes. Echocardiography showed increased left ventricular myocardial mass, concentric remodeling, and left ventricular hypertrophy. A positive correlation was found between body mass index and myocardial mass index. Early identification of these markers is important for predicting cardiovascular complications and developing preventive measures.

Keywords: obesity, myocardial remodeling, echocardiography, laboratory markers, women, cardiovascular diseases, C-reactive protein, left ventricular hypertrophy.

Materials and methods. The study involved 80 women with obesity aged 25-55 years (mean BMI 34.2 ± 4.8 kg/m²). Exclusion criteria included coronary artery disease, valvular heart disease, chronic kidney disease, and diabetes mellitus. Anthropometric indicators, blood pressure, fasting lipid profile, glucose, HbA1c, and hs-CRP were measured. Echocardiography was performed using a Vivid E9 system (GE Healthcare). Measurements included LVEDD, IVST, LVPWT, LVEF, and LVMI calculated by the Devereux formula. Statistical analysis was performed using SPSS 25.0, with Pearson correlation and $p < 0.05$ considered significant.

Results. Mean BMI was 34.2 ± 4.8 kg/m², waist circumference 98.6 ± 9.3 cm. Laboratory analysis showed elevated total cholesterol (62.5%), LDL-C (58.7%), triglycerides (71.2%), reduced HDL-C (45.0%), and elevated hs-CRP (68.7%, mean 4.8 ± 2.3 mg/L). Echocardiography revealed increased LVMI in 55.0% (mean

112.4±18.6 g/m²). Concentric remodeling was found in 42.5%, concentric hypertrophy in 31.2%, eccentric hypertrophy in 23.8%. LVEF was preserved (62.4±4.2%). Diastolic dysfunction was observed (E/e' 9.8±2.1, E/A 1.12±0.28). Strong positive correlations were found: BMI-LVMI (r=0.72, p<0.001), waist circumference-LVMI (r=0.68, p<0.001), hs-CRP-LVMI (r=0.58, p<0.001), triglycerides-IVST (r=0.51, p<0.01), and HbA1c-LVPWT (r=0.44, p<0.01).

Discussion. The high prevalence of concentric remodeling (42.5%) and hypertrophy (31.2%) in our cohort aligns with literature showing obesity as a major risk factor for left ventricular geometric changes. The strong BMI-LVMI correlation (r=0.72) confirms that adiposity directly contributes to myocardial mass accumulation. Elevated hs-CRP (68.7%) and its correlation with LVMI (r=0.58) support the inflammatory hypothesis of obesity-induced cardiac remodeling, as adipose tissue releases pro-inflammatory cytokines promoting myocardial fibrosis. Dyslipidemia and impaired glucose metabolism also contribute, as shown by correlations between triglycerides, HbA1c, and cardiac structural parameters. Preserved LVEF with diastolic dysfunction is characteristic of early obesity-related cardiomyopathy. Early screening through combined laboratory and echocardiographic assessment enables timely intervention before overt heart failure develops.

Conclusion and recommendations. Women with obesity exhibit significant myocardial structural changes, predominantly concentric remodeling and hypertrophy. Elevated C-reactive protein, dyslipidemia, and impaired glucose metabolism are important laboratory markers, while LVMI and RWT are reliable instrumental markers. Regular screening with combined laboratory and echocardiographic assessment is recommended for early risk identification. Lifestyle interventions (diet, physical activity) should be first-line measures, with pharmacological therapy (antihypertensives, statins) considered in high-risk individuals. Periodic echocardiographic monitoring is advised for all women with obesity, particularly those with metabolic risk factors. Further longitudinal studies are needed to establish prognostic values and optimal intervention thresholds.

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