

Left ventricular and vascular remodeling and diastolic dysfunction in hypertensive patients with obesity

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Purpose. To investigate the patterns of left ventricular (LV) remodeling, prevalence and types of LV diastolic dysfunction (DD) and common carotid artery (CCA) remodeling in obese patients with hypertension.

Methods. 51 obese (21 male, 30 female) and 24 non-obese (11 male, 13 female) hypertensive patients with preserved LV systolic function were observed. An ultrasound examination of heart (M, B, D, TDE modes) and CCA was performed. LV geometric pattern, E/A and E/Em ratios, ring segment weight (VM) of CCA were calculated. The statistical analysis was conducted using Mann-Whitney and Pearson χ^2 methods.

Results. Patients with obesity had higher LVMM ($309,3 \pm 15,9$ vs $258,8 \pm 16,8$ g, $p < 0,05$), but not MMI ($148,5 \pm 7,1$ vs $139,7 \pm 7,9$ g/m², $p > 0,05$). LV concentric hypertrophy (CH) was observed in 29 (56,9%) obese patients and 8 (33,3%) – without obesity, $\chi^2 = 0,028$; eccentric hypertrophy – (EH) 9 (17,6%) and 10 (41,7%), $\chi^2 = 0,015$; concentric remodeling – 7 (13,7%) and 1 (4,2%), $p > 0,05$; normal LV geometry – 6 (11,8%) and 4 (16,7%), $p > 0,05$. LV CH prevalence in obese patients was significantly higher compared to EH, $p < 0,0001$. LV DD was revealed in 48 (94,1%) obese patients (including 23 (100%) with II-III st. obesity) and 19 (79,1%) – without obesity, $p = 0,05$. Type I of DD was observed in 31 (60,8%) obese patients, type II – in 17 (33,3%), $p = 0,028$; in non-obese patients – 12 (50,0%) and 7 (29,2%) accordingly, $p = 0,07$. CCA wall hypertrophy was observed in 44 (86,3%) obese patients (including 22 (95,7%) with II-III st. obesity) and 18 (75,0%) – without obesity, $p < 0,01$. Parameters of CCA structure and mitral valve annulus motion are given below in table 1 as median [LQ; UQ].

Conclusion. Concentric patterns of LV remodeling, type I DD and CCA wall hypertrophy were specific for obese patients with hypertension, rising along with BMI. LV DD can be revealed on early stages by the estimation of mitral valve annulus motion indices.

	IMT, mm	VM, g/cm	Sm, cm/sec	Em, cm/sec	Exc, mm	E/Em
Non-obese patients, n=24	0,9 [0,7; 1,1]	0,332 [0,266; 0,420]	10,03 [8,61; 10,81]	10,5 [8,71; 12,73]	13,7 [11,8; 15,4]	6,86 [5,58; 8,57]
I gr. obesity, n=28	1,0* [0,8; 1,2]	1,0* [0,8; 1,2]	1,0* [0,8; 1,2]	1,0* [0,8; 1,2]	13,0 [10,8; 14,8]	7,12 [5,44; 8,66]
II-III gr. obesity, n=23	1,0 [0,9; 1,3]	0,394* [^] [0,339; 0,451]	8,65* [7,99; 9,71]	9,18* [7,67; 11,2]	12,3 [11,5; 15,3]	7,69 [^] [6,31; 8,96]

* - $p < 0,05$ compared to group without obesity; [^] - $p < 0,05$ compared to I st. obesity group.