Tissue Doppler, Speckle Tracking and Strain Imaging

Dynamics of left ventricle myocardial deformation, soluble ST2 and cardiotrophin-1 in hypertensive women on combined valsartan/hydrochlorothiazide therapy

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Background. The treatment-induced regression of left ventricular hypertrophy (LVH) is associated with improved prognosis in patients with arterial hypertension. However, the assessment of LVH by echo is restricted by substantial measurement variability and low sensitivity to changes during follow-up. The alternative approach could be the dynamic evaluation of myocardial deformation parameters and biochemical markers of cardiac remodeling. The purpose of this study was to assess the dynamics of left ventricle (LV) myocardial deformation, soluble ST2 and cardiotrophin-1 levels in hypertensive women treated with combination of valsartan/hydrochlorothiazide.

Methods. The study involved 100 postmenopausal women (mean age – 57.7 ± 4.3 years) with uncomplicated arterial hypertension. All patients were treated with combination of valsartan (80-320 mg; average dose 195 mg) and hydrochlorothiazide (12.5 mg). Ambulatory blood pressure monitoring, conventional and 2-dimensional speckle tracking echocardiography were performed before and 6 months after treatment. The concentrations of cardiotrophin-1 and soluble ST2 were determined by ELISA method. The data are presented as median and interquartile range.

Results. Treatment with valsartan/hydrochlorothiazide was effective and well tolerated. Target blood pressure level was achieved in 64 % of the patients. The LV global longitudinal strain (GLS) raised significantly after 6 months of treatment (Table). We found the reduction of mechanical dispersion - parameter, which indirectly reflects myocardial tissue homogenicity. The levels of circulating cardiotrophin-1 and soluble ST2 decreased by 37.93% and 19.74%, respectively ($p < 0.0001$).

Conclusions. The 6-month therapy with valsartan/hydrochlorothiazide was associated with improvement of myocardial deformation parameters with concomitant reduction of soluble ST-2 and cardiotrophin-1 levels. These markers could be more sensitive than standard parameters for hypertensive patients" follow-up. However, this approach should be confirmed in future studies.

Parameter	Baseline	6-month	p
Office SBP, mm Hg	148 (140; 157)	135 (124; 143)	<0.0001
Office DBP, mm Hg	89 (82; 96)	81 (74; 87)	<0.0001
LV GLS, %	-19.6 (-18.1; -21.1)	-20.4 (-18.9; -21.8)	0.01
Mechanical dispersion, ms	43 (37; 51)	41 (37; 48)	0.04
Cardiotrophin-1, pg/ml	12.2 (9.4; 16.81)	8.5 (6.26; 10.82)	<0.0001
Soluble ST2, ng/ml	25.3 (17.93; 29.72)	18.2 (13.93; 25.96)	<0.0001

Values are given as median and interquartile range