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The effect of percutaneous renal revascularization upon cardiac structure and function in patients with significant atherosclerotic renal artery stenosis

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Introduction: Different consequences concerning the cardiac function and structure in patients with renal artery stenosis (RAS) and completely different patterns of activation of the renin-angiotensin-aldosteron system were reported, depending on RAS severity. These changes might have an impact upon the outcomes after renal revascularization.

Purpose: The study was aimed to analyze the effect of renal stenting upon echocardiographic parameters of cardiac structure and function in the studied population and by comparison between 3 different RAS-profile patients. Methods: A total of 78 hypertensive patients diagnosed by renal angiography with significant RAS (>70%) were prospectively enrolled, thus subsequently resulting in 3 groups (34-unilateral RAS, 28-bilateral RAS, 14-RAS in a solitary kidney). Clinical, laboratory and echocardiographic parameters (left ventricular (LV) dimensions, LV mass index (LVMI), relative wall thickness (RWT), type of cardiac geometry, systolic and diastolic function, LV filling pressures) were assessed before renal stenting and 12 months after the procedure. The evolution of renal function was based on the glomerular filtration rate (eGFRCKD-EPI). Blood pressure evolution after revascularization was defined as cured, controlled, improved or stationary.

Results: Similar baseline characteristics were found for the 3 study groups regarding demographics, cardiovascular risk factors, baseline LV diameters, RWT and LVMI (p>0.05), although higher values of echocardiographic parameters were observed in solitary kidney RAS patients. Only 9.6% of all cases had normal geometry, the majority of the patients presenting concentric hypertrophy (58.9%) of similar proportions in the defined groups. Analyzing variations of echocardiographic parameters before and 12 months after stenting confirmed significant changes in all structural parameters (LV walls dimensions, LVMI, RWT, p<0.05), with significant differences between the 3 study groups. The most favorable evolution after revascularization was observed in bilateral-RAS patients (significant decreased cardiac mass, p=0.018), while RAS in a solitary kidney was associated with non-significant changes of the analyzed parameters. The evaluation of cardiac geometry evolution 12 month after renal stenting showed a stationary cardiac remodeling profile (p>0.05).

Conclusions: The current analysis showed favorable outcomes after renal angioplasty with stent in RAS patients with regard to structural changes of the LV (regression of LVMI, RWT). However, the impact of these beneficial changes did not have the magnitude for producing a significant effect upon cardiac geometry one year after renal revascularization.