Arterial stiffness in assessment of impaired left atrial function

Arterial stiffness arises as a result of structural and functional changes in the vascular system wall (1). Its measure has gained importance in recent years in the evaluation of vascular risk due to its important correlation with some of the target organ damage that causes hypertension (2, 3) as well as in a non-hypertensive population (4). The ambulatory arterial stiffness index (AASI) is very useful for assessing arterial stiffness, and it shows a strong correlation with other classical measures such as pulse wave velocity (5, 6). It is common to find left ventricular (LV) dysfunction, which is sometimes associated with left atrial (LA) dysfunction in the absence of LA enlargement or impaired LV relaxation (7), in hypertensive patients, and two-dimensional speckle-tracking echocardiography (2D-STE) has facilitated its early detection.

In the paper "Ambulatory arterial stiffness index is associated with impaired left atrial mechanical functions in hypertensive diabetic patients: A speckle tracking study," published in this issue of the Anatolian Journal of Cardiology by Kalaycioğlu (8). The authors evaluated the association between arterial stiffness measured with AASI and LA functions using 2D-STE. Results were obtained in a sample of hypertensive diabetic patients who had no history of cardiovascular disease. E (early diastolic mitral inflow velocity)/E' (early diastolic tissue velocity) and LA volume index were the two parameters of conventional echocardiography and 2D-STE which were positively correlated with AASI in the univariate analysis, whereas S-LAs, S-LAe, and SR-LAs (peak LA strain rate during ventricular systole) were negatively correlated, and an independent association was found between AASI and SR-LAs in the multiple linear regression analysis (β=-0.175, $p<0.001$).

Changes in the vascular system wall are favored by the presence of vascular risk factors, such as hypertension and diabetes mellitus, which could accelerate them. However, it is difficult to determine which of these changes occur first: the functional or structural ones. The enlargement of LA diameter may be an important predictor of endothelial dysfunction and may be considered to be an indicator to assess target organ damage in hypertensive patients (9).

Although speckle-derived strain has been validated in various circumstances, there is a paucity of data supporting its use in stress echocardiography (10). It was introduced as a post-processing feature of tissue Doppler imaging with velocity data converted to strain and strain rate, and strain imaging information has more recently also been derived from speckle tracking computer processing (11). Its advantages over tissue Doppler echocardiography include the lack of dependence on the angle of the incident ultrasound beam and the lack of the requirement for specialized imaging because speckle analysis is performed on routine B-mode images. Nevertheless, strain imaging is currently regarded as a research tool.

Although the authors present an interesting topic, the limitations of their study only allow finding an association between an increased AASI and an impaired LA function. It will be necessary to conduct further studies with a larger sample and in which arterial stiffness will be measured with another more accurate technique for confirming the results.

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