Type 1 diabetes mellitus and atrial function: A complex relationship

The left atrium (LA) has an essential role in the left ventricular (LV) filling, and this is enabled by three main functions: reservoir, conduit, and booster pump (1). The negative influence of type 2 diabetes mellitus (DM) on LA remodeling and long-term clinical outcome is well known (2, 3), whereas the impact of type 1 DM on LA changes has been significantly less investigated.

Three-dimensional (3DE) assessment provides accurate LA measurements, comparable with magnetic resonance referent values (4). 3DE-derived strain analysis enables the simultaneous evaluation of various wall motion parameters in three orthogonal plains (longitudinal, circumferential, and radial), whereas area strain represents a combination of longitudinal and circumferential strains (5).

In this issue this journal, Nemes et al. (6) reported the results of the MAGYAR-path study entitled "Complex evaluation of left atrial dysfunction in patients with type 1 diabetes mellitus by three-dimensional speckle tracking echocardiography: results from the MAGYAR-Path Study." That revealed significantly changed 3DE-derived volumetric and strain parameters in type 1 DM patients, suggesting an early LA remodeling in these patients. The authors indicated that LA maximum and minimum volumes, as well as LA volume before atrial contraction, had significantly increased in diabetic patients. In a prior study, Acar et al. (7) did not show any difference in 3DE LA volume indices between type 1 DM patients and controls. Our study group reported that 3DE LA volumes were higher in subjects with type 2 DM; however, after adjustment for body size, these differences disappeared (8).

The findings of the MAGYAR-path study demonstrated that 3DE LA total stroke volume was elevated, whereas passive emptying fraction was reduced (6). Interestingly, the authors did not find any difference in the total and active emptying fractions. Acar et al. did not report any difference in the 3DE LA total emptying volume; however, they detected increased active and decreased passive emptying fractions (7). Similar findings were reported from our research group (8).

To our knowledge, this is the first study that used 3DE-derived LA strain in the assessment of type 1 DM patients. The investigators did not find any difference in the 3DE global multidirectional strains. However, they reported increased longitudinal and area strains of the LA basal segments and decreased circumferential and area strains of superior segments in type 1 DM participants. These findings indicate that amplified systolic function of LA basal segments could potentially compensate the reduction of circumferential function in the LA basal segments. Additionally, this suggests that LA impairment in diabetic patients may develop in the mitral annulus–LA roof direction.

Although the MAGYAR-path study provided insight into the LA mechanical function of diabetic patients, it has to be emphasized that 3DE-derived LA strain technique has not yet been validated. Furthermore, the causal relationship between type 1 DM and LA phasic function could not been determined in this research because of the cross-sectional nature of this study. Another important topic is the association between the parameters of glycemic control and LA phasic function, which was not evaluated in this investigation. Further longitudinal studies with larger number of participants are required to determine the possible predictive value of LA mechanical parameters in type 1 DM patients.

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