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Diabetes mellitus type 2, left atrium and atrial fibrillation

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Aim: To evaluate the structural and functional features of the left atrium in patients with type 2 diabetes with paroxysmal (PAF) and persistent atrial fibrillation (AF).

Methods: We studied 64 patients with type 2 diabetes with normal left ventricular ejection fraction, without severe chronic renal failure. 14 patients (66+7 years) had PAF episodes on standard or Holter ECG recording (group 1), 20 patients (54+8 years) had persistent nonvalvular AF (group 2), 30 patients (66+6 years) without verified AF (group 3). Patients undertook standard echocardiography for assess LA volumes (LA Vol), LA ejection fraction (LAEF), Tissue doppler measurements for assess signs of LV diastolic dysfunction as the evidence of high ratio (>10) of the peak E transmitral flow to peak Em of septal mitral annulus (E/Em). Interatrial septum systolic strain and strain rate (Sstr and Sstr-r), lateral wall systolic strain and strain rate (Lstr and Lstr-r) were calculated in all patients groups.

Results: In clinical characteristics (age, sex, BMI, systolic and diastolic BP levels, duration of DM, HbA1c levels, the nature of glucose-lowering and antihypertensive therapy), LVEF, the wall thickness and volume of LV groups did not differ between themselves. All groups of patients showed signs of LV diastolic dysfunction by E/Em (group *1 17,7+2,4*, group *2 22,9+9,3*,group *3 14,9+5,2*). A most marked impairment was observed in patients with a persistent form of AF compared with patients without AF ($p<0.05$). LAEF was significantly smaller in group 1 (*33,5+4,5%*) and group 2 (*22,6+3,7%*) than in group without AF (*50,1+3,4%*) ($p<0.05$). When comparing systolic strain and strain rate of LA walls was found that the groups of patients were significantly different among themselves too. The greatest deformation of LA walls was observed in patients without AF (Sstr *33,3+1,6%*, Sstr-r *2,8+0,8* s-1, Lstr *32,3+1,8%,* Lstr-r *2,17+0,2* s-1), significantly more than in patients with PAF (Sstr *18,1+1,5%,* Sstr-r *1,9+0,7* s-1, Lstr *21,3+1,2%,* Lstr-r *1,7+0,3* s-1), and patients with a persistent form of AF (Sstr *14,3+2,0%,* Sstr-r *0,8+0,8* s-1, Lstr *12,13+1,6%,* Lstr-r *1,0+0,7* s-1). Also patients with a persistent form of AF had significantly smaller data of septal and lateral strain than patients with PAF ($p<0.05$).

Conclusion: These results suggest that the LV diastolic dysfunction, impaired LA function may associate with risk of atrial fibrillation in patients with type 2 diabetes. The degree of reduction of LA walls deformation may be predictor of development of paroxysmal and persistent AF in patients with type 2 diabetes.

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