The predictive value of left atrial expansion index and left atrial contractile strain in younger hypertensive patients with atrial fibrillation

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BACKGROUND: Arterial hypertension (HTN) is the most prevalent risk factor for Atrial fibrillation (AF) through structural and functional changes of the left atrium. Paroxysmal AF is mainly asymptomatic and silent forms in patients with HTN are associated with thromboembolic complications. However, prompt identification of HTN patients at risk for AF may be strategic for preventing purposes.

PURPOSE: To assess sensitive and predictive parameters for AF onset in HTN patients using two-dimensional (2D) conventional and speckle tracking echocardiography of the left atrium (LA) and left ventricle (LV).

METHODS: A total of 165 consecutive patients were screened for participation in the study. Only 80 patients met the inclusion criteria (age below 60 years; with well controlled HTN or HTN with AF; without concomitant disease or other risk factors for AF).They were separated in two groups: 43 with HTN and 37 patients with AF and HTN. All patients underwent standard 2D echocardiography with volumetric and Speckle tracking analysis for assessment of: LV global longitudinal strain; LA total (LATEF), passive (LAPEF), active (LAAEF) emptying fractions; LA stiffness and expansion index; LA - reservoir (LASr), conduit (LAScd) and contractile (LASct) strain.

RESULTS: There were statistically significant differences between patents with HTN and HTN with AF group in: LASr (30.88 ± 3.99% vs. 27.89 ± 8.21 %, p= 0.049), LASct (-17.64 ± 2.04% vs. -14.4 ± 6.74 %, p= 0.007) and LA expansion index (122 ± 42% vs. 174 ± 115%; p = 0.014). There were no significant differences in other LV and LA structural and functional indices. Multiple regression analysis demonstrated that LASct (B= - 0.043' p= 0.001; 95%CI -0.063- -0.023) and expansion index (B= 0.023; p= 0.001, 95%CI 0.117- 0.349) are independent predictors of AF in hypertensive patients.

Conclusion: Preserved LA compliance and contractile function are essential for maintenance of sinus rhythm in younger HTN patients. These findings could be used for prediction of cardiovascular events and preventing AF onset in younger hypertensive population with a huge social impact.