

Left ventricular diastolic function is a determinant of the left atrial mechanics in systemic sclerosis

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Left ventricular diastolic dysfunction is common in systemic sclerosis and is associated with poor prognosis. The correlation between left ventricular diastolic function and left atrial size has been already proved. Less is known about the relationship between left ventricular diastolic function and left atrial mechanics. Speckle-tracking-derived strain is a well-known tool to assess left atrial function. The aim of our study was to investigate the correlation between left ventricular diastolic function and left atrial mechanics in systemic sclerosis patients by using 2D speckle tracking technique.

Patients and methods: 72 systemic sclerosis patients (age: 57±11 years, 66 female, 33 limited cutaneous form) were investigated. Patients with pulmonary arterial hypertension, atrial fibrillation or significant left sided valvular disease were excluded. Maximal left atrial volume was measured with 2D Simpson's method. In addition to the spectral Doppler parameters of the mitral inflow (E, A), systolic (S), early- (e') and late- (a') diastolic myocardial longitudinal velocities were measured on the lateral and septal mitral annulus. Lateral and septal myocardial velocities were averaged. E/A and E/e' ratios were calculated. LV diastolic function was classified according to the recent guideline (I: normal, II: impaired relaxation, III: pseudonormal). LA reservoir (ϵ R), conduit (ϵ CD) and contractile (ϵ CT) strain were measured with 2D speckle tracking technique. Differences between groups were tested for significance using ANOVA. Post hoc tests were performed by LSD method.

Results: Left atrial ϵ R and ϵ CD showed significant correlation with average mitral e' (ϵ R: $r=0.552$, $p=0.000$; ϵ CD: $r=0.707$, $p=0.000$), average mitral E/e' (ϵ R: $r=-0.376$, $p=0.001$; ϵ CD: $r=-0.374$, $p=0.001$) and maximal left atrial volume (ϵ R: $r=-0.461$, $p=0.000$; ϵ CD: $r=-0.438$, $p=0.000$). ϵ CT showed significant correlation with maximal left atrial volume ($r=-0.248$; $p=0.036$) and average mitral a' ($r=0.512$; $p=0.000$). ϵ R (I: 45.5±8.6%, II: 40.8±7.2%, III: 35.8±6.8%; ANOVA $p=0.001$) and ϵ CD (I: 27.7±5.5%, II: 20.5±5.2%, III: 18.9±6.3%, $p=0.000$) showed significant deterioration with the worsening of the diastolic dysfunction. The highest ϵ CT values were measured in patients with impaired left

ventricular relaxation (I: $17.7 \pm 4.6\%$, II: $20.2 \pm 3.9\%$, III: $16.9 \pm 2.9\%$, $p=0.011$) (Figure 1).

Conclusion: Left atrial ϵ_R and ϵ_{CD} show strong correlation with the deterioration of the left ventricular diastolic function in systemic sclerosis. The high value of ϵ_{CT} in the early stage of the diastolic dysfunction may be the sign of the compensatory behavior of the left atrium.

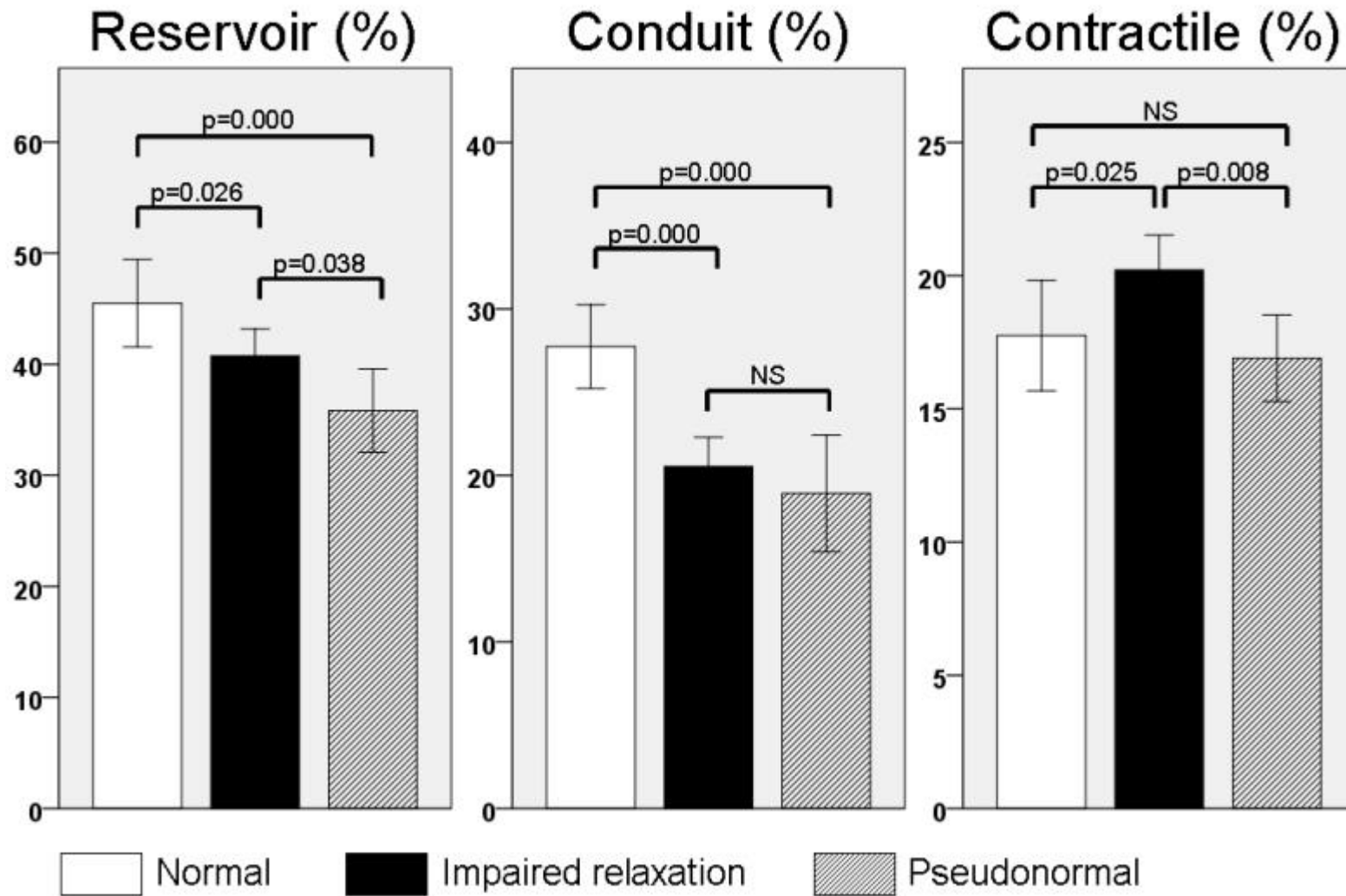


Figure 1