A.B. Nogradi[1], A. Porpaczy[1], F. Molnar[1], T. Minier[2], L. Czirjak[2], A. Komocsi[1], R. Faludi[1], **[1]Heart Institute of PTE - Pecs - Hungary**, [2]Department of Rheumatology and Immunology, PTE - Pécs – Hungary:

Speckle tracking derived right atrial strain parameters show strong correlation with phasic volume indices in systemic sclerosis patients

Abstract: P5236

Speckle tracking derived right atrial strain parameters show strong correlation with phasic volume indices in systemic sclerosis patients

Authors:
A.B. Nogradi[1], A. Porpaczy[1], F. Molnar[1], T. Minier[2], L. Czirjak[2], A. Komocsi[1], R. Faludi[1], [1]Heart Institute of PTE - Pecs - Hungary, [2]Department of Rheumatology and Immunology, PTE - Pécs - Hungary,

Topic(s):
Echocardiography - Ventricular and atrial function

Citation:
European Heart Journal (2017) 38 (Supplement), 1092-1093

Background: Right atrial (RA) size and function is a novel focus of research in conditions involving the right heart, such as systemic sclerosis (SSc). Parameters of the RA function may serve as additional markers of the disease progression, may show potential prognostic value or reflect functional capacity. Several methods such as volumetric measurements with two- or three-dimensional echocardiography or cardiac MRI, and the novel method of speckle tracking echocardiography are used for the assessment of the RA function. Nevertheless, the new, speckle tracking derived parameters of the RA reservoir, conduit and contractile function have never been validated against the classical phasic volume indices. The aim of our study was to evaluate the correlation between volumetric and 2D speckle tracking derived strain parameters of the RA phasic function in systemic sclerosis patients.

Patients, methods: 70 patients with SSc (age: 57±12 years, 64 female) were investigated. Patients with pulmonary arterial hypertension, atrial fibrillation or significant left sided valvular disease were excluded. RA reservoir (εR), conduit (εCD) and contractile (εCT) strain were measured with 2D speckle tracking technique. Using the atrial borders created for speckle tracking analysis, RA volume curves were generated by the same software. RA volumes were measured at three points of the cardiac cycle: maximal RA volume (Vmax) just before the opening of the mitral valve; minimal RA volume (Vmin) at the closure of the mitral valve; and the volume preceding atrial contraction (Vp), at the beginning of P wave. The following phasic volume indices of the RA function were calculated: total emptying fraction (TEF) as (Vmax - Vmin /Vmax) x 100; expansion index (EI) as (Vmax - Vmin/Vmin) x 100; active emptying fraction (AEF) as (Vp - Vmin/Vp) x 100; passive emptying fraction (PEF) as (Vmax - Vp / Vmax) x 100. TEF and EI have been assumed to reflect RA reservoir function while AEF and PEF are the parameters of the RA contractile and conduit function, respectively. Intraobserver variability of RA volume and strain measurements was assessed with the intraclass correlation coefficient.

Results: Intraclass correlation coefficients were 0.93, 0.90 and 0.88 for RA Vmax, Vmin and Vp, and 0.91, 0.96 and 0.91 for reservoir, contractile and conduit strain, respectively. RA reservoir strain showed a strong correlation with EI (r=0.705, p=0.000) and TEF (r=0.704, p=0.000) while RA conduit strain with PEF (r=0.546, p=0.000). RA contractile strain correlated significantly with AEF (r=0.691, p=0.000). (Figure 1)

Conclusion: 2D speckle-tracking echocardiography is feasible in the detection of the phasic changes in RA function. Intraobserver variability data for the strain parameters were similar as those observed for the RA volumetric indices. Speckle tracking derived strain parameters showed strong correlation with the identical phasic volume indices in our SSc population.

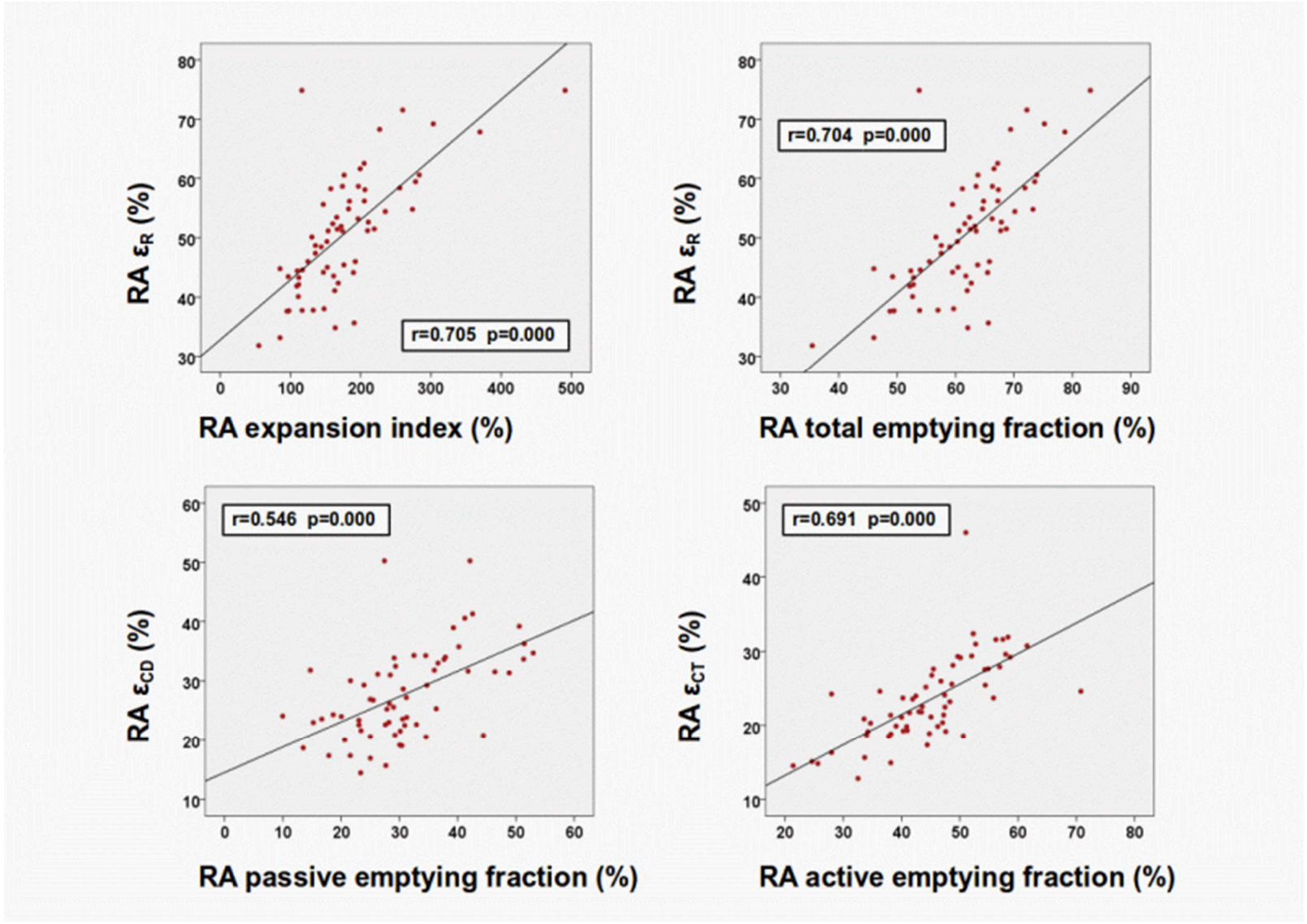
RA ε_R (%)
r=0.705 p=0.000
RA expansion index (%)
r=0.704 p=0.000
RA total emptying fraction (%)
RA ε_{CD} (%)
r=0.546 p=0.000
RA passive emptying fraction (%)
RA ε_{CT} (%)
r=0.691 p=0.000
RA active emptying fraction (%)

Figure 1