Right ventricular strain for detecting subclinical dysfunction of the right ventricle in systemic sclerosis

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Introduction: Right ventricular (RV) function and cardiac involvement in systemic sclerosis (SSc) is important factor for the prognosis of SSc but often remains undetectable despite echocardiographic screening.[1,3] Speckle derived strain (2D-STE) of the right ventricle (RV GLS) was utilized to detect subclinical abnormalities in regional and global contractility in SSc patients with no echocardiographic signs of pulmonary arterial hypertension. Aim of pilot study was to study the advantages of 2D speckle-tracking echocardiographic derived parameters in identifying RV dysfunction in SSc patients for quantifying myocardial deformation and conventional RV indexes in patients with SSc and to investigate whether these could be indicative of right heart failure or can be used as non-invasive methods of screening in SSc.

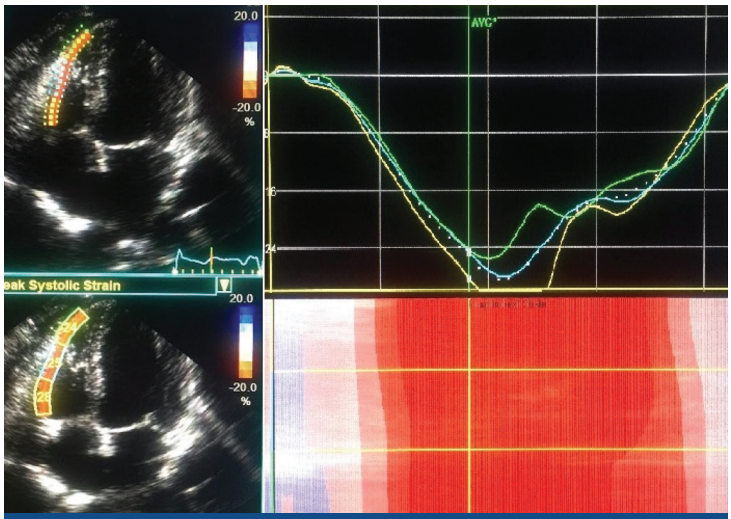

FIGURE 1. **Global longitudinal strain (LS) of the right ventricle (RV) calculated by averaging the LS value of 3 segments of the RV free wall in RV focused apical 4-chamber view.**

Methods and Results: 27 SSc patients (mean age, 54.3 years; 96% female) with technically adequate echocardiograms were studied. Standard morphological measurements of RV chamber function, tricuspid annular plane systolic excursion (TAPSE), fractional area change (FAC), tricuspid tissue Doppler annular velocities (TDIs), right ventricular myocardial performance index (RIMP) and global longitudinal right ventricular free wall strain (RV FW GLS) were obtained. Twenty-two patients without pulmonary arterial hypertension (PAH) due to systemic sclerosis were studied. When we used the cutoff value recommended by the American Society of Echocardiography Guidelines to identify abnormal RV function[4], patients were determined to have normal RV function, TAPSE 21.9 (±2.21), RV FAC 49.4 (±3.45), RIMP 0.44 (±0.08) respectively. Global longitudinal strain (LS) of the RV was calculated by averaging the LS value of 3 segments of the RV free wall in RV focused apical 4-chamber view (**Figure 1**). 40.9% of those patients had abnormal RV FW GLS (-14.8%) more pronounced in the basal regional longitudinal strain.

Conclusion: Right ventricular strain reveals a diverse pattern of regional strain in SSc that is not detected by conventional measures of function, suggestive of subclinical RV myocardial disease and could be used as non-invasive method in screening for PAH in SSc to select patients eligible for right heart catheterization or to monitor the effects of PAH therapy.[1-3]

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