

Prognostic role of echocardiography to predict cardiovascular involvement in systemic sclerosis

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Purpose. Cardiovascular involvement in systemic sclerosis (SSc) is frequent, often subtle, and is associated with poor prognosis. Our aim was to compare echocardiographic data of SSc patients to controls, and to assess parameters able to predict the development of cardiovascular involvement.

Methods. We enrolled 756 SSc patients (Group 1) without a previous diagnosis of cardiac involvement nor pulmonary arterial hypertension (PAH), and 614 healthy controls (Group 2) matched for age (Group 1 54.9 ± 14.6 years vs Group 2 54.4 ± 12.1 , $p = 0.6$), sex (7.3% vs 7.2%, $p = 0.8$), and prevalence of hypertension (17.8% vs 19.8%, $p = 0.2$). All subjects underwent a comprehensive transthoracic 2D and Doppler echocardiography, including tissue Doppler imaging analysis (TDI). Five hundred and two SSc patients were followed-up and the development of PAH, left-sided heart failure (LHF), right-sided heart failure (RHF), and need of implantable cardioverter defibrillator (ICD) were considered as events.

Results. Compared to controls, SSc patients showed worse left and right ventricular systolic and diastolic function, hemodynamics and right ventricle-arterial coupling (tricuspid annulus plane systolic excursion over systolic pulmonary artery pressure, TAPSE/sPAP) (Table). After a median follow-up with of 35 months, 45 composite events (PAH, LVH, RHF and ICD) occurred. In a multivariate model, only ejection fraction (EF) and TAPSE/sPAP had independent prognostic value (Table).

Conclusions. SSc patients without overt cardiovascular involvement and no PAH display subtle impairments in biventricular systo-diastolic function and right ventricle-arterial coupling. Left ventricular EF and TAPSE/sPAP can predict further cardiovascular events.

Descriptive analysis and Cox regression

VARIABLE	Descriptive			Univariate		Multivariate	
	Group 1 (SSc) n = 756	Group 2 (controls) n = 614	p	HR (95 % CI)	p	HR (95% CI)	p
Ejection fraction (%)	63 ± 5.7	63.7 ± 5.9	0.038	0.94 (0.88 - 0.99)	0.024	0.91 (0.85 - 0.98)	0.017
E/A	1.0 ± 0.46	1.2 ± 0.51	<0.0001	1.41 (0.77 - 2.58)	0.26		
e' mean (mm)	10.7 ± 3	11.2 ± 3.4	0.034	0.87 (0.76 - 0.99)	0.038	1.0 (0.87 - 1.17)	0.902
Left atrial volume index (mL/m ²)	26.5 ± 7.7	21.3 ± 6.7	<0.0001	1.03 (0.98 - 1.1)	0.24		
TAPSE (mm)	22.1 ±	23.3 ±	<0.0001	0.89 (0.81 - 0.97)	0.012		
sPAP (mmHg)	24.7 ±	22.3 ±	<0.0001	1.07 (1.04 - 1.1)	< 0.0001		
TAPSE/sPAP (mm/mmHg)	0.98 ± 0.96	1.1 ± 0.39	<0.0001	0.036 (0.009 - 0.141)	< 0.0001	0.03 (0.004 - 0.19)	< 0.0001
Pericardial effusion	57 (7.5%)	0 (0%)	<0.0001	1.10 (0.38 - 3.15)	0.85		