T1-mapping cardiovascular magnetic resonance detects early myocardial and skeletal muscle remodelling in systemic sclerosis

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Systemic sclerosis (SSc) may induce cardiac fibrosis and systo-diastolic dysfunction

Cardiovascular magnetic resonance (CMR) can detect:

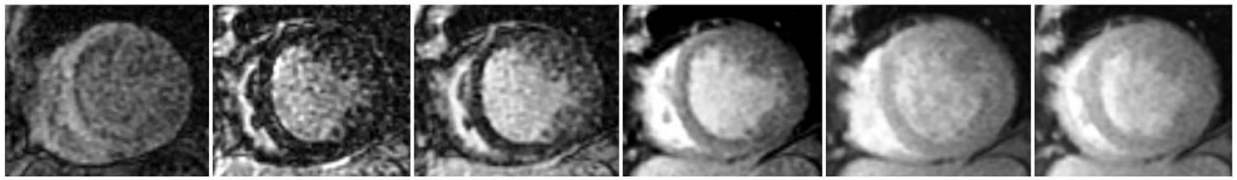
Biventricular volumes and function → cine imaging
Replacement fibrosis → **LGE**
Interstitial fibrosis (ECV expansion) → **T1 mapping**

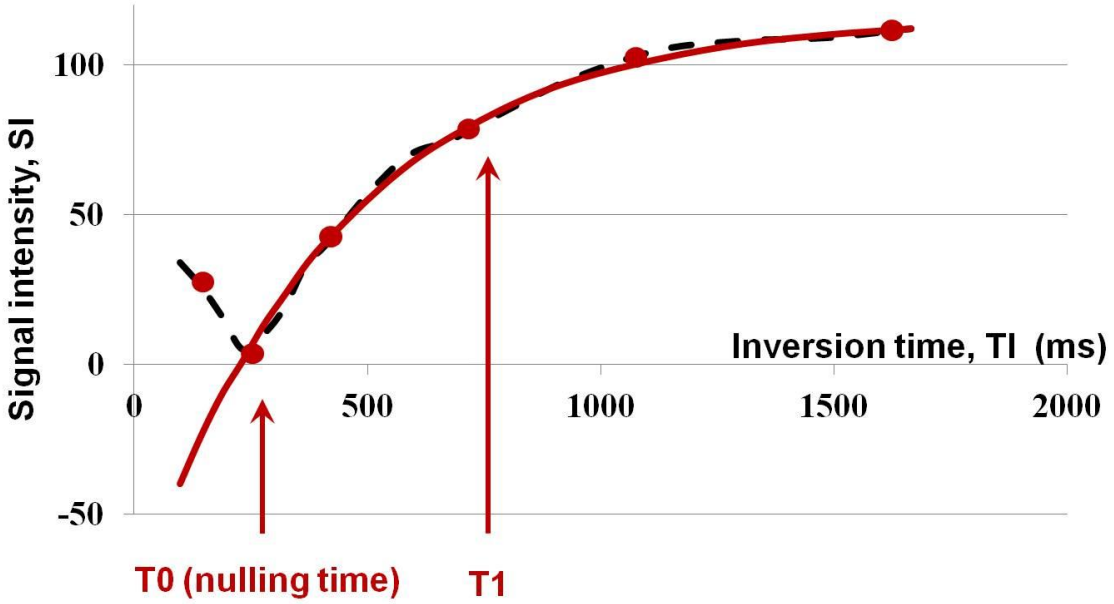
Aim of the study was to detect subclinical cardiac involvement in paucisymptomatic SSc patients without previous myocardial disease

METHODS

30 SSc patients (mean age 51±12 years, all women)
10 healthy controls (mean age 48±15 years, all women)

CMR LV, RV volumes and function
post-contrast LGE
pre-, post-contrast T1 mapping (before and 15 min after 0.2 mmol/Kg Gd)





Signal intensity curves were acquired in:

-myocardium (septum)

-bloodpool

-skeletal muscle (latissimus dorsi, pectoralis)

T1 mapping from MCine-IR (Milanesi et al, JMRI 2013)

RESULTS

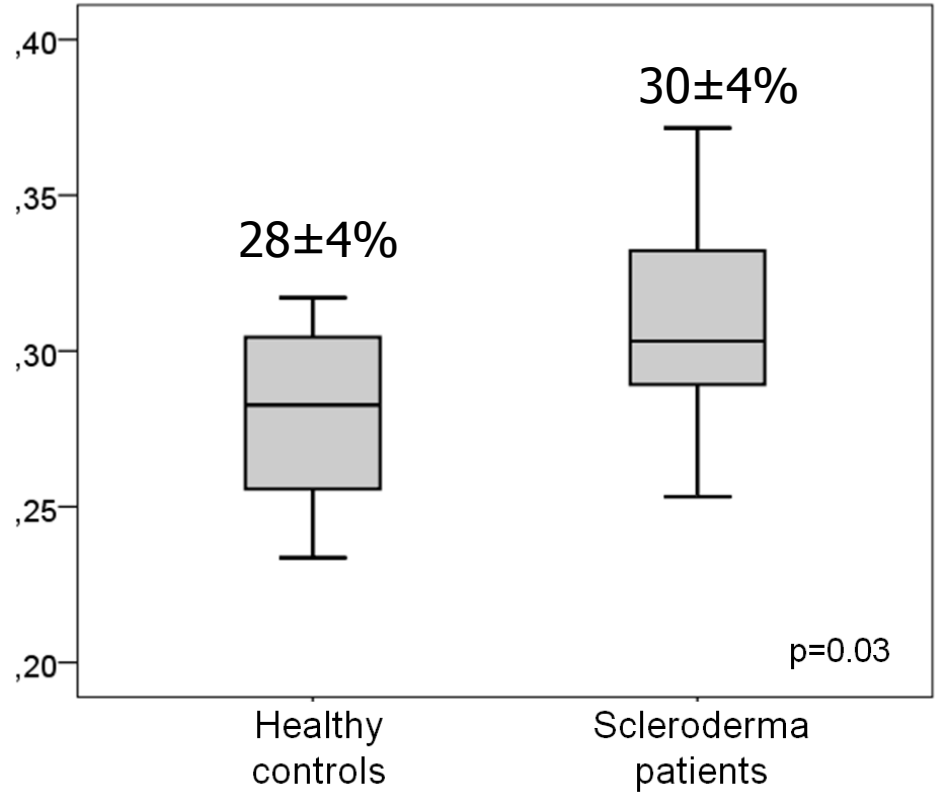
Limited/diffuse cutaneous form (%)	28/2 (93/7)
NYHA class I/II (%)	17/13 (57/43)
Modified **Rodnan skin score** 0/1/2/≥3 (%)	20/0/2/8 (67/0/6/27)
Plasma creatinine, mg/dl	0.69 (0.61 – 0.83)
Doppler estimated pulmonary artery systolic pressure, mmHg	25 (22 – 28)
Diastolic function (%) normal/impaired relaxation/pseudonormal/restrictive	23/6/1/0 (77/20/3/0)

	Patients (n=30, women)	**Controls** (n=10, women)
LV end-diastolic volume (ml/m2)	70±15	74±9
LV ejection fraction (%)	69±7	66±5
LV mass (g/m2)	59±10	58±15
RV end-diastolic volume (ml/m2)	70±14	71±10
RV ejection fraction (%)	65±7	67±7

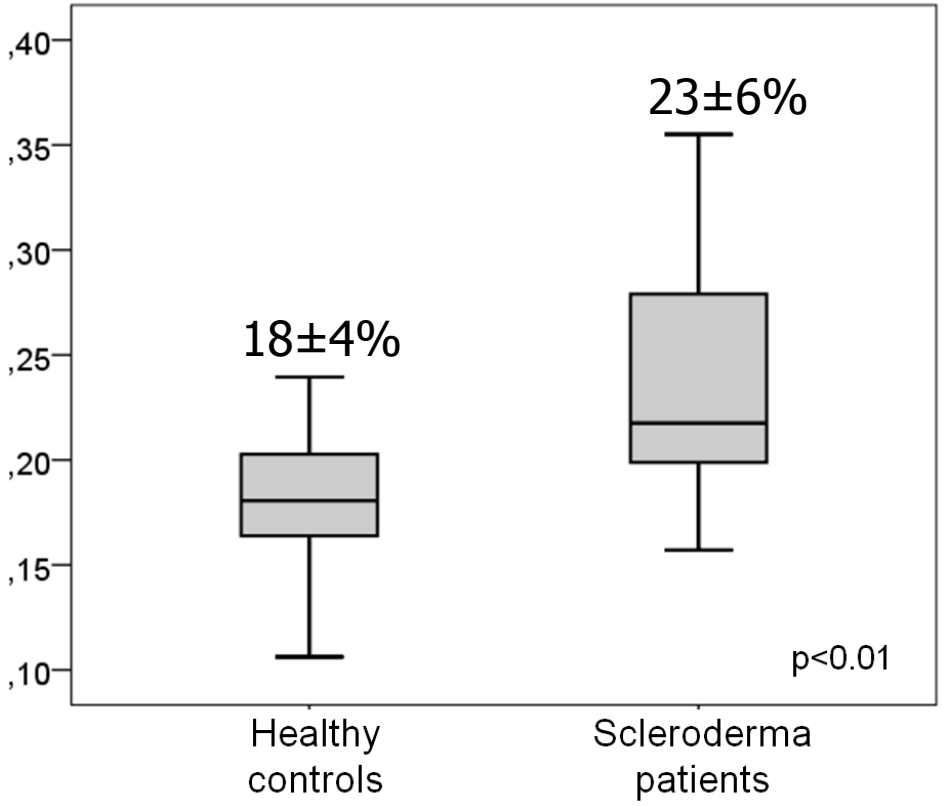
RESULTS

Myocardial LGE was present in 7 patients (23%). Myocardial ECV and skeletal muscle ECV were significantly increased in SSc patients, even in those without LGE.

Myocardial ECV

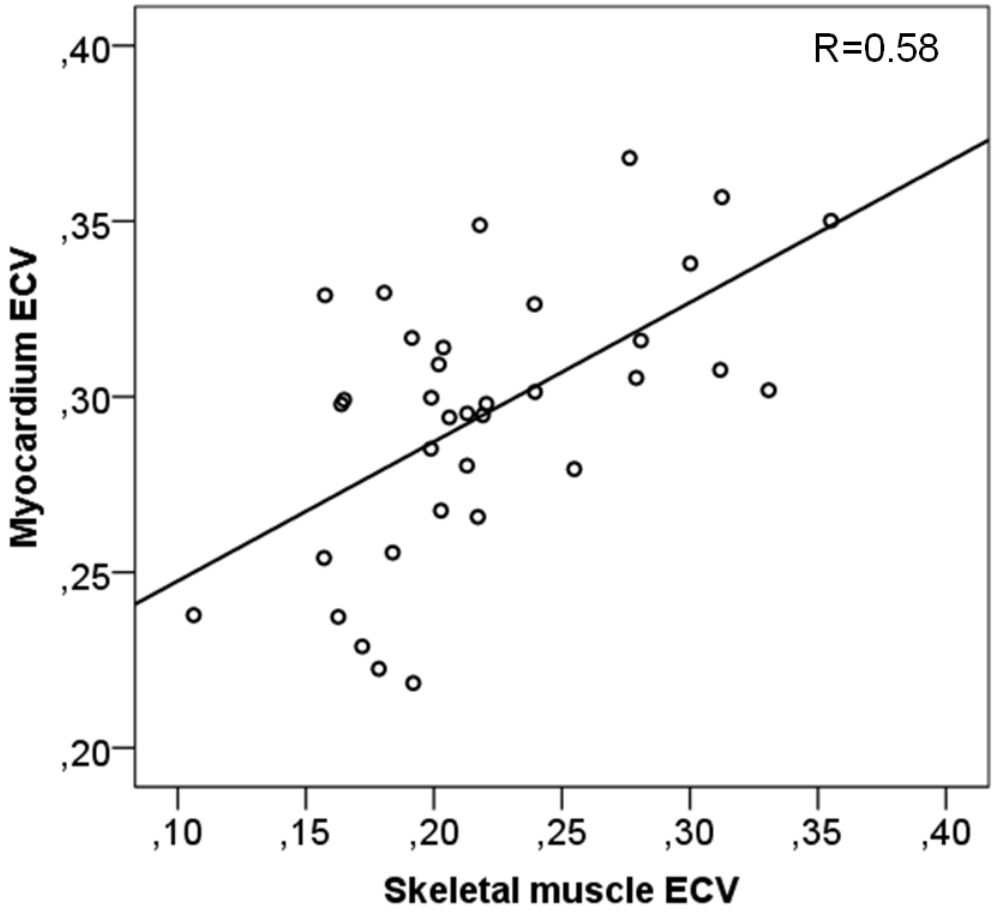


Skeletal muscle ECV



RESULTS

Myocardial ECV showed no significant correlations with clinical data, biventricular volumes, systolic or diastolic function. Myocardial ECV showed a significant correlation with skeletal muscle ECV ($p<0.001$).



CONCLUSION

Early interstitial remodelling occurring from the very **early stages** of the disease, likely due to interstitial fibrosis/ oedema/ inflammation

Differently from two recent articles (Ntusi et al, JCMR 2014; Thuny et al, Radiology 2014), we used a different **scanner** (GE vs. Siemens) and **sequence** (cine-inversion recovery vs. modified-Look-Locker sequence), a different **population** (asymptomatic vs. symptomatic) and expanded the analysis to **skeletal muscles**

SSc is characterized by interstitial remodelling of the **myocardium** and **skeletal** muscles, even in the very early stages, as detected by an increased ECV at CMR