

# Native T1 and T2 values by CMR in patients with systemic inflammatory conditions

Rocio Hinojar, MD, MRes<sup>1</sup>; Lucy Foote, BSc<sup>1</sup>; Eduardo Arroyo Ucar<sup>1</sup>, MD; Ning Binti Ngah, MD, MRes<sup>1</sup>, David D'Cruz<sup>2</sup>, MD; Bernhard Schnackenburg, PhD<sup>3</sup>; David Higgins, PhD<sup>3</sup>; Tobias Schaeffter, PhD<sup>1</sup>; Eike Nagel, MD, PhD<sup>1</sup>; Valentina O. Puntmann, MD, PhD<sup>1</sup>

<sup>1</sup>Cardiovascular Imaging Department, King's College London, London, UK

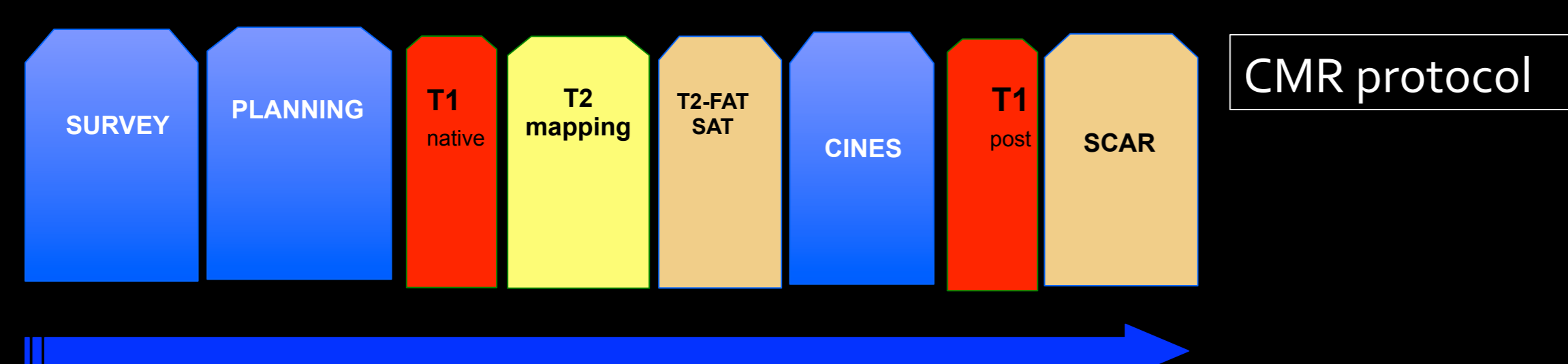
<sup>2</sup>Louise Coote Lupus Unit, St Thomas's Hospital, London, UK

<sup>3</sup>Philips Healthcare, United Kingdom

**OBJECTIVES:** Patients with systemic inflammatory diseases are at risk of heart failure due to sustained systemic inflammation leading to diffuse myocardial injury and left ventricular remodelling.

## METHODS:

- 79 patients with a clinical diagnosis of systemic inflammatory disease (systemic lupus erythematosus (SLE, n=46), rheumatoid arthritis (RA, n=17), systemic sclerosis (SS, n=9) and Wegener's granulomatosis (WG, n=7) underwent CMR study for routine assessment of oedema, function, and scar at 3-Tesla. 36 healthy subjects served as controls.



Because native T1 and T2 values are raised in the presence of diffuse fibrosis and oedema, T1 and T2 mapping by cardiovascular magnetic resonance (CMR) are emerging as potential tools to assess diffuse myocardial involvement. In this study, we examined native T1 and T2 values in patients with systemic inflammatory diseases.

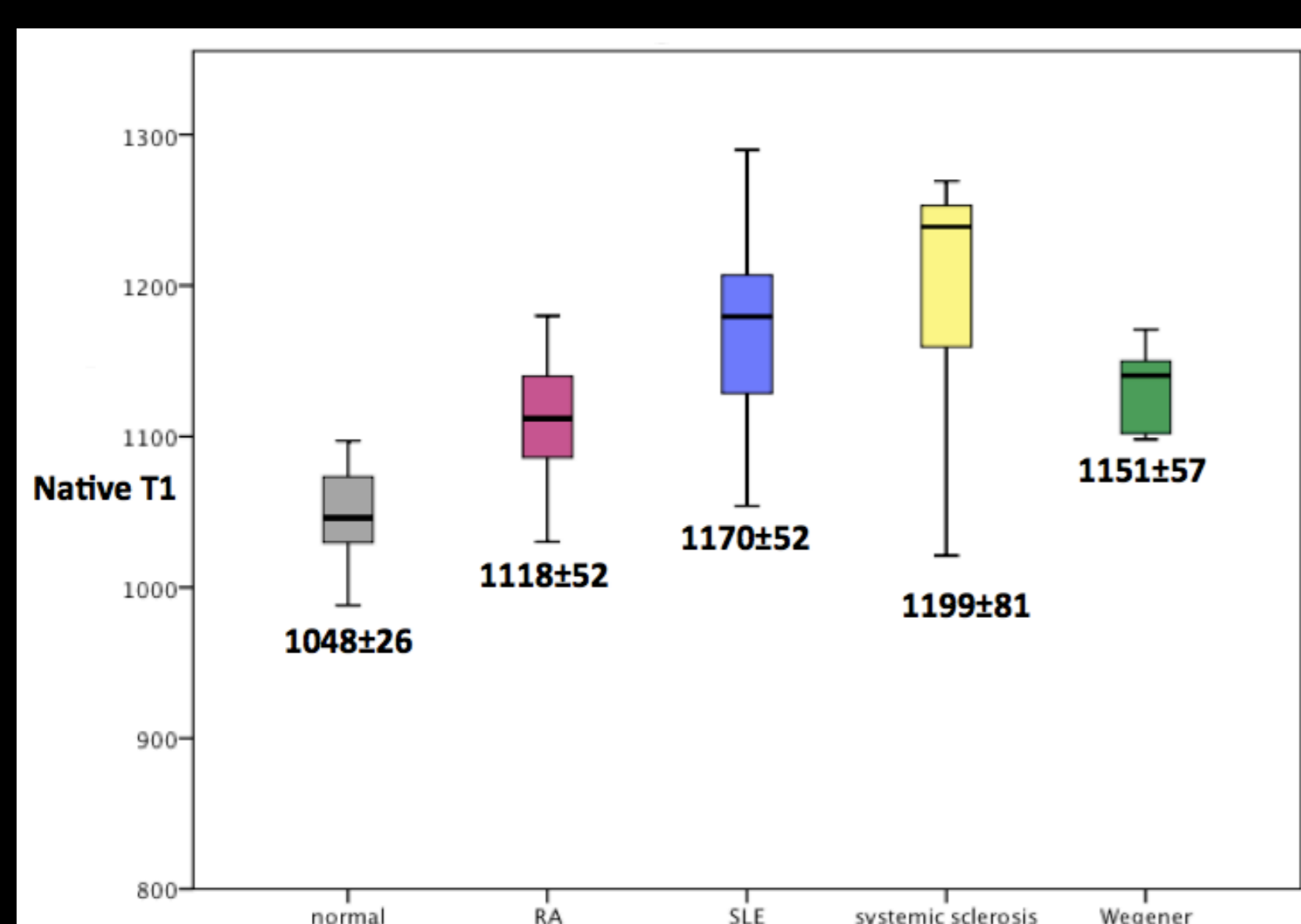
- Native T1 values were acquired using 3'3'5 MOLLI and measured conservatively within septal myocardium of midventricular short-axis slice (mSAX).
- T2 values were recorded from T2 maps based on GraSE sequence using equivalent cardiac geometry.



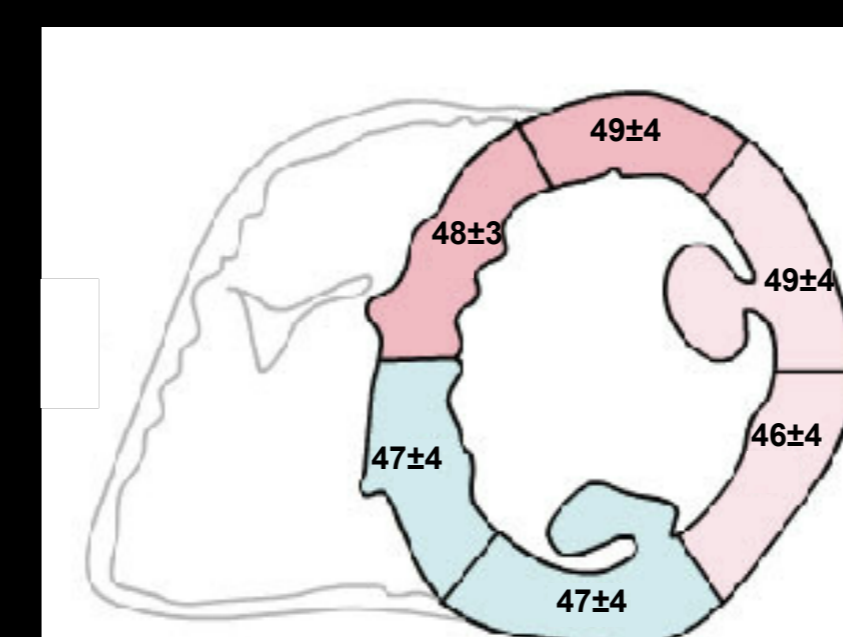
- We compared regional T2 values between patients and controls, and assessed associations with native T1 values

## RESULTS:

- Patients showed impaired global LV systolic function compared to controls (control vs. SLE vs. RA vs. SS vs. WG, %=62±5 vs. 54±12 vs. 60±8 vs. 53±8 vs. 56, p=0.02).
- There were no differences in LV volumes and LV mass between controls and patients' group.
- Patients showed LGE (SLE: n=19 (41%); RA: n=2 (12%); SS:n=5(56%); WG: n=4 (57%), which was of non-ischaeamic pattern in presentation.
- Oedema ratio was raised in all systemic inflammatory conditions compared to controls.

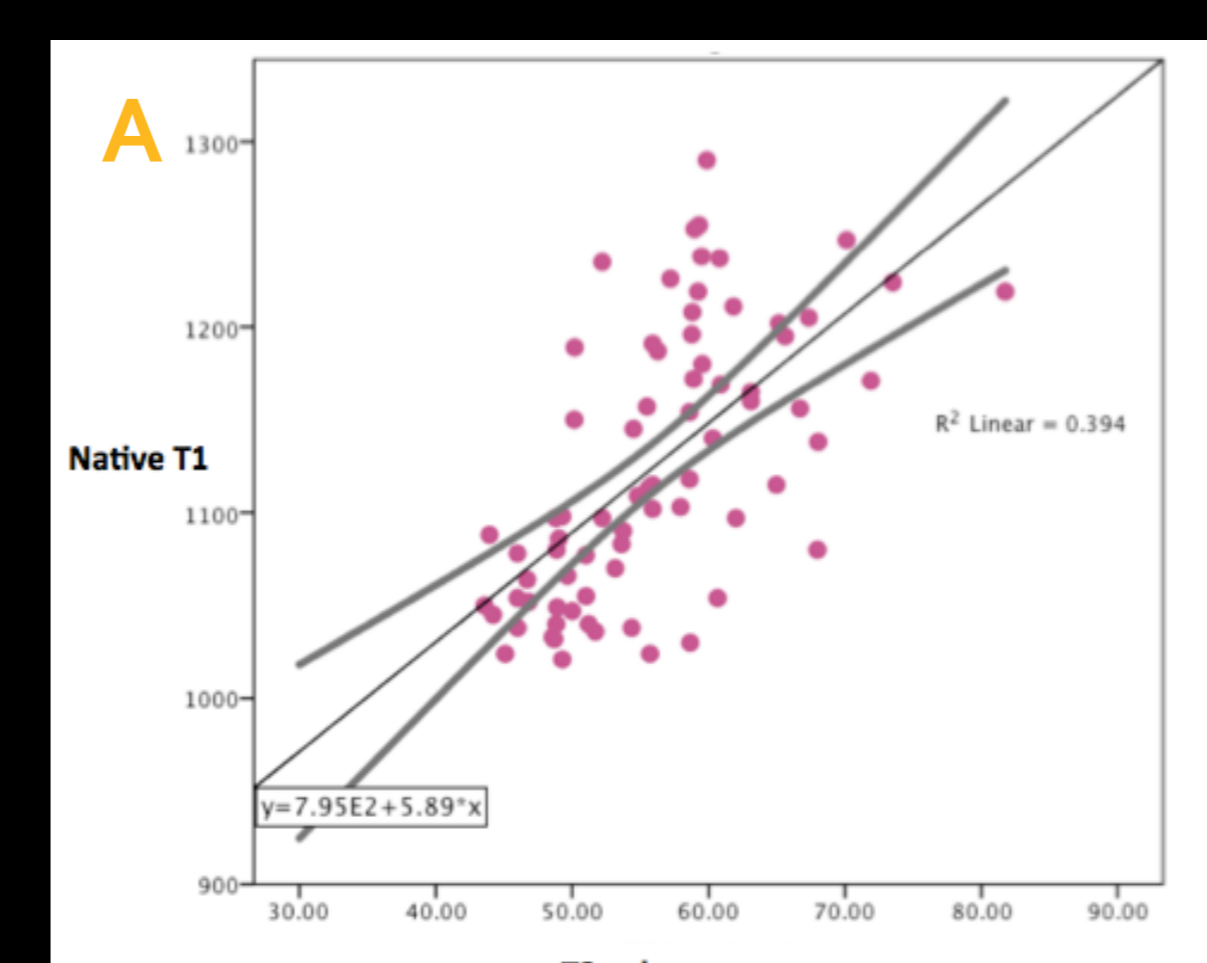


Native T1 values were significantly raised in patients compared to controls (p<0.0001)

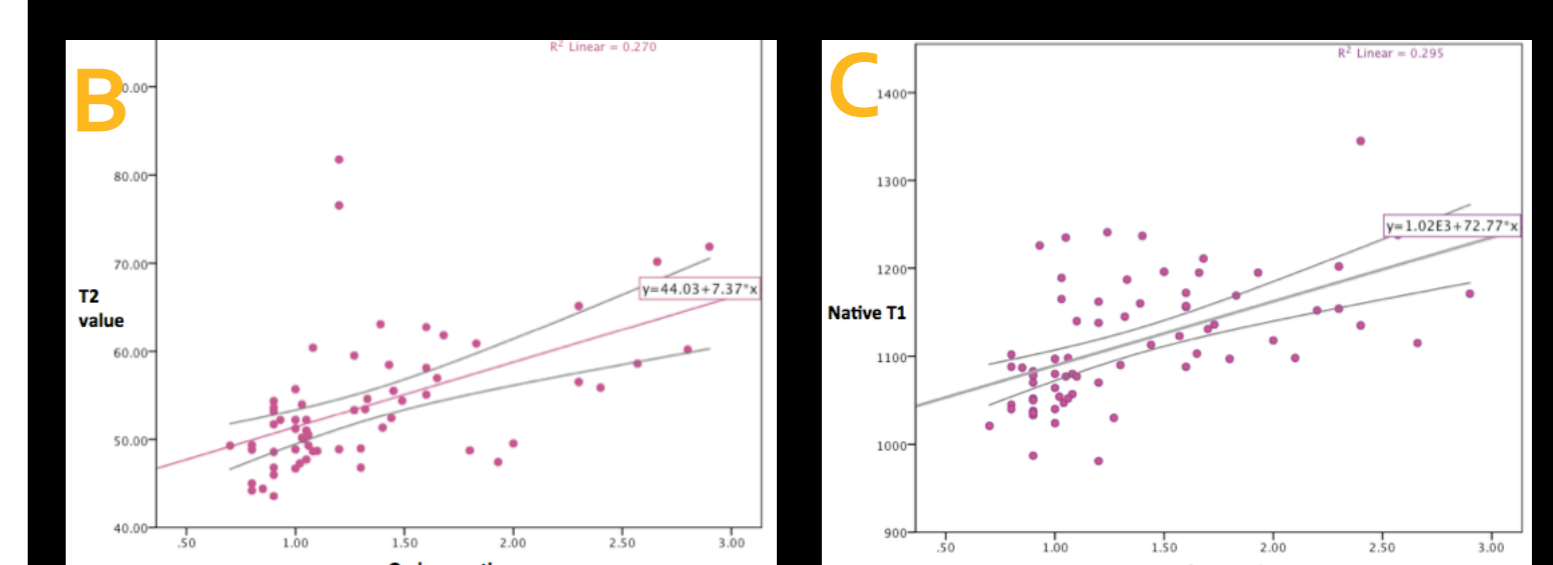


There were no significant regional variations in T2 values between the segments of the mSAX slice in controls with concordant SD between the segments.

- Patients showed raised native T2 values (native T2 (msec, average of all segments per mSAX): 48±3 vs. 58±7 vs. 54±5 vs. 53±3 vs. 57±8, p<0.001).
- Patients also showed regional differences in T2 values (range of native T2 values within mSAX, maximum vs. minimum (msec): SLE: 61±6 vs 54±8; RA: 58±6 vs. 49±3, SS: 59±3 vs 51±3, p<0.01).



A. There was a linear relationship between native T1 and average T2 (r=0.63, p<0.001).



B and C. Quantitative native T1 and T2 values were concordant with oedema ratio (r=0.56 and r=0.52 respectively, p<0.001) and the presence of LGE (r=0.28 and r=0.34 respectively, p<0.01).

## CONCLUSION:

We demonstrate that native T1 and T2 values are increased in patients with systemic inflammation compared to controls. We also demonstrate that T2 values have regional differences in the presence of diffuse involvement.

Native T1 and T2 values may serve as an early marker of myocardial injury due to diffuse fibrosis and low grade of oedema.

### ACKNOWLEDGEMENT

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