Establishing the Local Reference Ranges of Myocardial Native T1 and T2 Mapping of Cardiac MRI in Healthy Adults: A Single Center Experience

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Introduction:

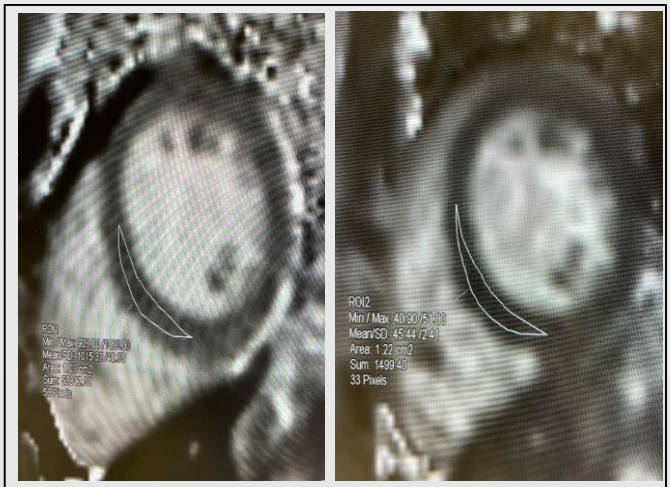
- Cardiac magnetic resonance (CMR) native T1 and T2 mapping techniques provide non-invasive assessment and quantification of myocardial tissue characteristics.
- Current international consensus recommends acquiring local native T1 and T2 mapping reference ranges and be benchmarked against published reported ranges.

Objective:

To establish the local reference ranges of myocardial native T1 and T2 mapping in 1.5T CMR of healthy adults in a single institution in Hong Kong and compare them with the published reported ranges.

Materials and Methods:

- Healthy adult volunteers were enrolled during March to May 2022 with CMR performed using the 1.5T Siemens Sola MRI scanner at our centre.
- Questionnaires were given to ensure volunteers had no chest/ COVID related symptoms.
- The CMR protocol included Modified Look-Locker Sequence (MOLLI) using a 5(3)3 scheme for native T1 mapping and T2-prepared balanced steady-state free precession (bSSFP) for T2 mapping. Cine images and LVEF calculations were performed to ensure normal results.
- The analysis of native T1 and T2 values was performed using Syngo.via with ROI placed at mid-ventricular septal myocardium and CVi42 with ROI placed at the complete mid-ventricular myocardium short axis slice respectively by five blinded cardiac radiologists.



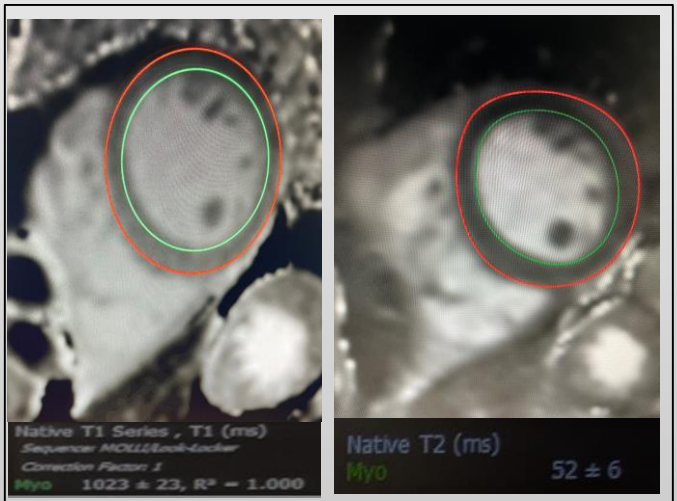
Left: native T1; Right: native T2 at mid-septum using Syngo.via

Results:

- 35 eligible adults were recruited with median age of 39 years old (range: 24-63).

Reference ranges	Native T1 (ms)	Native T2 (ms)
Syngo.via	1015±27	46.4±4.0
CVi42	996±58	51.1±5.6
Published reports	978±36 [1]	45.7±3.4 [2]

- The reference ranges using two different software vendors with different ROI were similar.
- The reference ranges at our centre were similar to those of the published reported ranges.



Left: native T1; Right: native T2 at mid-ventricle using CVi42

Conclusion:

The reference ranges of myocardial native T1 and T2 mapping at our centre were established, which were comparable to published reported range. They can be applied for myocardial tissue characterization in CMR of our centre.

References:
1. Iulia A. Popescu, et al. Standardization of T1-mapping in cardiovascular magnetic resonance using clustered structuring for benchmarking normal ranges, International Journal of Cardiology, Volume 326, 2021, Pages 220-225.
2. Wiesmueller M, et al. Cardiac T2 mapping: robustness and homogeneity of standardized in-line analysis. J Cardiovasc Magn Reson. 2020 May 28;22(1):39.