No differences in native T1 of the renal cortex between Fabry patients and healthy volunteers in clinically acquired native T1 maps by cardiovascular magnetic resonance imaging

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Purpose

To evaluate if clinically acquired native T1 maps using CMR can be used to detect sphingolipid accumulation in the kidneys in FD patients.

Methods

FD patients (n=18, 41 ± 10 years, 44 % male) and healthy volunteers (n=41, 26±5 years, 49 % male) were retrospectively enrolled. Native T1 maps were acquired with a 1.5 T scanner (Magnetom Aera) using a modified look locker inversion recovery (MOLLI) sequence with a 5s(3s)3s sampling scheme. The native T1 maps were analyzed using Segment (Medviso AB). Native T1 values were measured by manually delineating regions of interest (ROI), conservatively placed with a minimum gap of 1 pixel between adjacent structures, in the renal cortex, renal medulla, myocardium, spleen, blood, and liver, Figure 1.

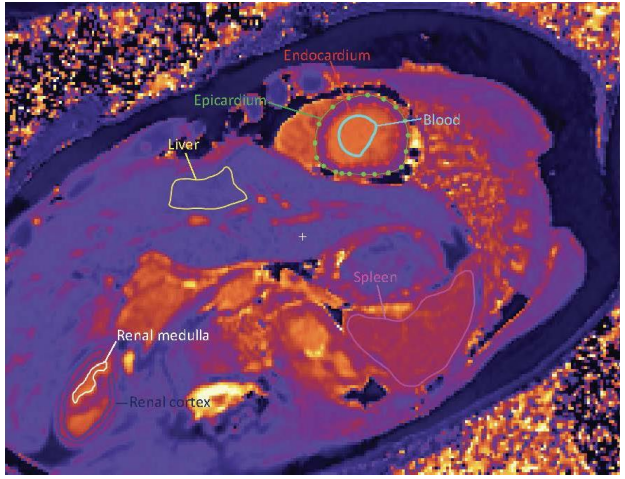

Figure 1. Measurement of native T1 values (ms) in a healthy volunteer using drawn regions of interest (ROI) for renal cortex, renal medulla, spleen, liver, blood and heart. Blue ROI = renal cortex, white ROI = renal medulla, pink ROI = spleen, yellow ROI = liver, green/red ROI = heart, light blue ROI = blood.

Results

There were no differences in native T1 values between the patients and the healthy volunteers in the renal cortex (1034±88 vs 1038±51 ms, p=0.89), Figure 2, blood (1632±123 vs 1600±104 ms, p=0.94), spleen (1143±45 vs 1134±77 ms, p=0.64) or liver (569±49 vs 576±45 ms, p=0.57), and this did not change when analyzed with regards to sex. Native T1 values were lower in the myocardium of the patients compared to the healthy volunteers (937±53 vs 1019±35 ms, p=0.01), and higher in the renal medulla (1635±144 vs 1523±70 ms, p=0.01), Figure 3.

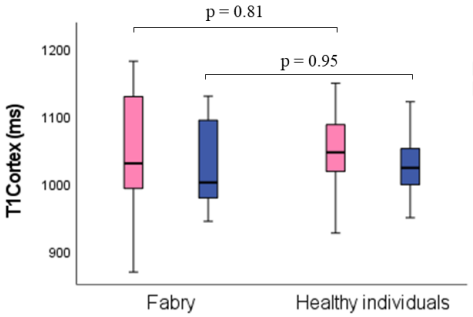

Figure 2. Range of the native T1 values (ms) in the renal cortex of the healthy volunteers and FD patients. P-values denotes t-tests or Mann-Whitney U-tests as appropriate.

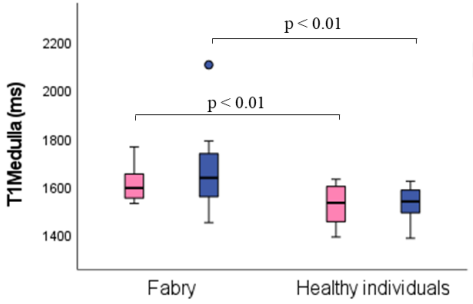

Figure 3. Range of the native T1 values (ms) in the renal medulla of the healthy volunteers and FD patients. P-values denotes t-tests or Mann-Whitney U-tests as appropriate.

Conclusions

Compared to healthy volunteers, patients with FD and myocardial involvement have no differences in native T1 of the renal cortex. FD patients have higher native T1 in the renal medulla, which cannot be explained by differences in blood native T1. The findings suggest that clinically acquired native T1 maps cannot be used to detect sphingolipid accumulation in the renal cortex in FD patients.

Declaration of interest Dr Nickander has received minor speaking compensation from Sanofi Genzyme AB. The remaining authors declare no competing interest