The iBEAT MRI protocol: Prognostic Imaging Biomarkers for Diabetic Kidney Disease

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iBEAT-MRI Setup. iBEAT will collect multiparametric MRI in 5 sites at 3T scanners of 2 vendors. A reference protocol was developed by the coordinating centre (Leeds), validated on the ISMRM/NIST phantom and healthy volunteers, and translated to the other sites. Studies will be uploaded to a central database in XNAT. Quality control (<48hrs) and MRI post-processing will be performed centrally (Leeds).

iBEAT-MRI sequences. All sites will run a core protocol (+/- 1hr) with 2 localisers, whole-abdomen T2w and T1w-DIXON, multi-echo multi-slice T2* of pancreas and liver, high-resolution T1w-MRI for cortical volumetry, multi-slice renal T1-mapping, T2-mapping, T2*-mapping, magnetization transfer, ASL, tractography DTI, DCE-MRI and post-contrast DIXON. Additional sequences such as IVIM and phase contrast will be run in substudies.

iBEAT-MRI biomarkers. Primary biomarkers: Visceral Fat Volume (ml); Pancreatic Fat Fraction (%) and T2* (ms); Liver Fat Fraction (%) and T2* (ms); Renal Sinus Fat Volume (ml), Renal Pelvic volume (ml); Renal Cortical and Medullary Volume (ml) / T1 (ms) / T2 (ms) / T2* (ms) / ADC (mm^2/s) / FA (%) / MTR (%) / blood flow (ml/min/100g) / vascular and tubular volumes (%). Secondary biomarkers: combinations such as GFR density (ml/min/g), renal artery blood flow (ml/min), and heterogeneity markers.

We will present details of the iBEAT MRI protocol and show preliminary results on the ISMRM/NIST phantom and healthy volunteers (Figure 1).

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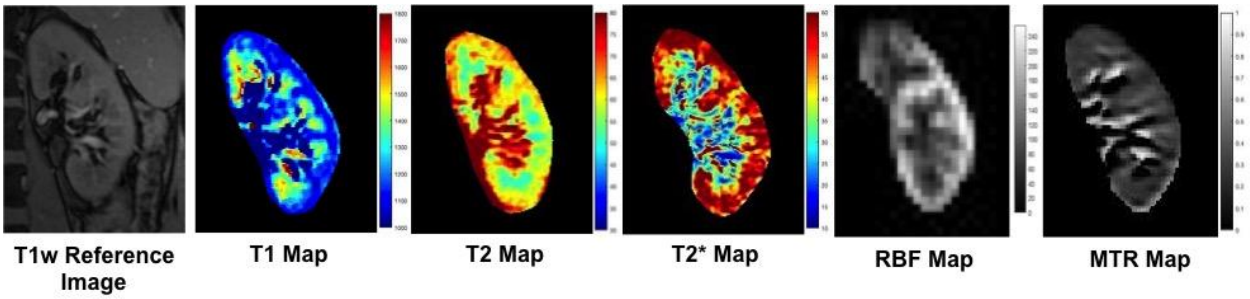

Figure 1: Example quantitative MRI maps in a healthy volunteer.