Abstract 016 Figure 1 T1 and T2* in healthy volunteers normalised to baseline values.

Abstract 016 Figure 2 a. T1 and T2* in infarcted myocardium (acute MI patients) standardised to myocardium of healthy controls. b. T1 and T2* in remote myocardium (acute MI patients) standardised to myocardium of healthy controls.

017 COMBINED HEART LUNG MRI PROTOCOL FOR SIMULTANEOUS INTERROGATION OF HEART AND LUNG STRUCTURE

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Introduction Many conditions considered to be primary lung diseases are independently associated with adverse cardiovascular outcome. Systemic inflammation and subsequent fibrosis are hypothesised mechanisms. However, beyond the mechanical impact on right heart, characterisation of myocardial involvement in lung disease remains limited.

We present a combined heart-lung MRI protocol which allows simultaneous interrogation of heart and lung structure and function.

Methods Protocol (1.5T Siemens Avanto) includes steady state free precession (SSFP) cine imaging of the heart (standard long and short axis views), followed by inspiration and expiration cine lung imaging (sagittal planes). T2 prepared SSFP and T1 MOLLIE images are acquired in standard cardiac planes and left and right lungs.

Dynamic contrast enhanced MRI (DCE-MRI) sequences are performed using free breathing 2D saturation-recovery FLASH dynamic acquisitions in four planes (two LV short axis slices, left and right lung sagittal slices) with temporal resolution equal to 50% of patient's heart rate. Three boluses of gadolinium contrast (dotarem) are administered: 0.005 mmol/kg, followed by 2 min of dynamic acquisitions; 0.05 mmol/kg followed by 6 min of dynamics; final dose of 0.1 mmol/kg.

Finally, late enhancement imaging and post-contrast T1 mapping are performed. Overall each scan protocol lasted for approximately 60 min.

Abstract 17 Figure 1 LV arterial input function (AIF); LD – low dose dotarem (0.005mmol/kg), HD – high dose dotarem (0.05 mmol/kg) Part A: Before merging of the curves. Part B: After merging of the curves.

Abstract 017 Figure 2 Myocardial extracellular volume map.

Abstract 017 Figure 3 Lung extracellular volume map.

Results Parametric mapping and LGE imaging provides direct tissue characterisation.

Myocardial and lung contrast agent kinetics are modelled from the DCE images in matlab (Extended Kety Model) to determine heart and lung capillary permeability (Ktrans), extracellular volume (ECV) and plasma volume fraction (vp). Regions of interest are drawn in the LV and RV cavities to obtain arterial input functions (AIF). The low dose AIF is multiplied by a factor of ten and the first pass peak is combined with the high dose AIF curve in order to correct for saturation effects (Figure 1).

Examples of ECV maps are shown in Figure 2 and 3.

Conclusions This combined heart lung protocol is an efficient and comprehensive imaging tool for simultaneous myocardial

and pulmonary assessment. It has a potential to help elucidate complex links between pulmonary and myocardial pathologies, and is a model for other dual organ parametric MR imaging.

018 DT-CMR IMAGING OF DERANGED MICROSTRUCTURE IN SITUS INVERSUS TOTALIS

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Background Diffusion tensor cardiovascular magnetic resonance (DT-CMR) is a non-invasive technique that has been