Results Echocardiographic global longitudinal strain (GLS) and extracellular volume (ECV) measured by CMR were the only variables able to independently stratify between the three groups of patients. ECV was the best technique for differentiation between hypertensive heart disease and HFpEF (AUC 0.88; GLS AUC 0.78, $p < 0.001$ for both). Using ECV, an optimal cut-off of 31.2% gave 100% sensitivity and 75% specificity. ECV was significantly higher and GLS was significantly reduced in subjects with reduced exercise capacity (lower peak VO_2 and higher VE/VCO_2).

Conclusions Both GLS and ECV are able to independently discriminate between hypertensive heart disease and HFpEF and identify patients with prognostically significant functional limitation. ECV is the best diagnostic discriminatory marker of HFpEF and could be used as a surrogate end-point for therapeutic studies.

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DEMONSTRATION OF CARDIAC AL AMYLOIDOSIS REGRESSION AFTER SUCCESSFUL CHEMOTHERAPY. A CMR STUDY

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Background Cardiac involvement in immunoglobulin light chain (AL) amyloidosis is the major determinant of survival; Cardiac response to chemotherapy is conventionally assessed by serum brain natriuretic peptide (NT-proBNP) and echocardiography, but neither quantify amyloid burden. The aim of this study was to evaluate cardiac AL amyloid serially using cardiovascular MR (CMR) including extracellular volume measurement (ECV), which is the site of the amyloid deposits. **Methods** 31 patients with cardiac AL amyloidosis who had chemotherapy were studied serially using ECG, echocardiography, ¹²³I-labelled serum amyloid P component (SAP) scintigraphy, NT-proBNP measurements and CMR with T1 mapping and ECV measurements (mean interval 20 ± 11 months). Nineteen patients achieved a complete or very good partial haematological response (CR $n=10$; VGPR $n=9$). Twelve patients attained a partial response (PR) or no response (NR).

Results At follow-up (mean 20 ± 11 months), the amyloid burden had decreased substantially in 6 of the 10 (60%) attaining a CR, 6 of the 9 (67%) in VGPR and 1 of the 8 (13%) in PR. Changes in the ECV consistent with regression of amyloid were concordant with the changes in native T1, reduction in amyloid volume and in 5 patients with changes in late gadolinium enhancement pattern (figure 1). Overall there was significant reduction in NT-proBNP concentration, LV mass, left atrial area and improvement in diastolic function in patients whose amyloid burden decreased. Regression of cardiac amyloid by CMR correlated with regression of amyloid in other organs measured by SAP scintigraphy.

Abstract 008 Figure 1 Top: four chamber SSFP cine images in disatole, corresponding late gadolinium enhancement (LGE) images and ECV mapping before and after chemotherapy in a patient who had regression of amyloid burden after chemotherapy. Bottom: four chamber SSFP cine images in disatole, corresponding LGE images and ECV mapping before and after chemotherapy in a patient who had progression of amyloid burden after chemotherapy.

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THE EFFECT OF CARDIAC MAGNETIC RESONANCE ON HUMAN CIRCULATING LEUKOCYTES

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Aims Investigators have proposed that cardiovascular magnetic resonance (CMR) should have restrictions similar to those of ionising imaging techniques due to proposed alterations to leukocytes. We aimed to investigate the acute effect of CMR on leukocyte DNA integrity and cell viability *in vitro*, and in a large cohort of patients *in vivo*.

Methods and results *In vitro* study: Peripheral blood mononuclear cells (PBMC) were isolated from healthy volunteers and assessed: 1) immediately following PBMC isolation, 2) after standing on the benchside as a temperature and time control, 3) after a standard CMR scan. Histone H2AX phosphorylation (γ -H2AX), an indicator of DNA damage, and leukocyte counts were quantified using flow cytometry. *In vivo* study: Blood samples were taken from 64 consecutive consenting patients immediately before and after a standard clinical scan. Samples were analysed for T cell count and γ -H2AX expression.

CMR scanning was associated with a significant increase in leukocyte γ -H2AX expression, indicating DNA damage occurs. We also observed a trend towards a significant decrease in absolute leukocyte numbers *in vitro* following CMR. CMR was not associated with a significant change in γ -H2AX