"reversible ischaemia" (RI, n=94), "non-reversible ischaemia" (NRI, n=146), and "no ischaemia" (NoI, n=285). Follow up data was collected on all-cause-mortality, hospital admissions with acute coronary syndromes and admissions for revascularisation. A Kaplan-Meier survival analysis was done using the composite end point of admission with acute coronary syndrome or for revascularisation.

Using angiography as the reference standard in those that had concurrent angiograms (n=83) sensitivity and specificity was calculated. Where pressure wire studies (PWS) were undertaken (n=15) results were correlated with CMR reports.

Results 525 patients were included in the final analysis. Median follow-up of 15 months. A total of 46% had a perfusion defect on CMR. During the follow up, the distribution in composite outcomes in those with and those without defect was highly significant (p<0.0001) (see figure 1 and table 1).

83 patients had concurrent angiograms, CMR demonstrated 91.1% sensitivity, 77.8% specificity, 89.5% positive predictive value and 80.8% negative predictive value (see table 2). There was 100% correlation between CMR and PWS in those reported as having RI (n=5) and 80% correlation in those who had NoI (n=5). All cause mortality in the NoI group was 2.97% (8/269), and in the ischaemia groups was 4.66% (11/236), though there was no statistical significance our study was limited by the small number of deaths.

Conclusion There is good correlation between pressure wire studies and stress CMR, but our sample size is small, larger studies (such as MR-INFORM) are needed to accurately inform the role of CMR perfusion in investigating and managing coronary artery disease. Patients with a normal stress CMR scan appear to have excellent prognosis.

Abstract 109 Table 1

RI vs NoI	11.1 (5.8–21.9)
NRI vs NoI	3.3 (1.9–5.7)

Abstract 109 Table 2

CMR positive (n)	51	6
CMR negative (n)	5	21

110 LATE GADOLINIUM ENHANCEMENT IN PRIMARY DEGENERATIVE MITRAL REGURGITATION PREDICTS ADVERSE RIGHT VENTRICULAR REMODELLING AND EXERCISE INDUCED PULMONARY HYPERTENSION

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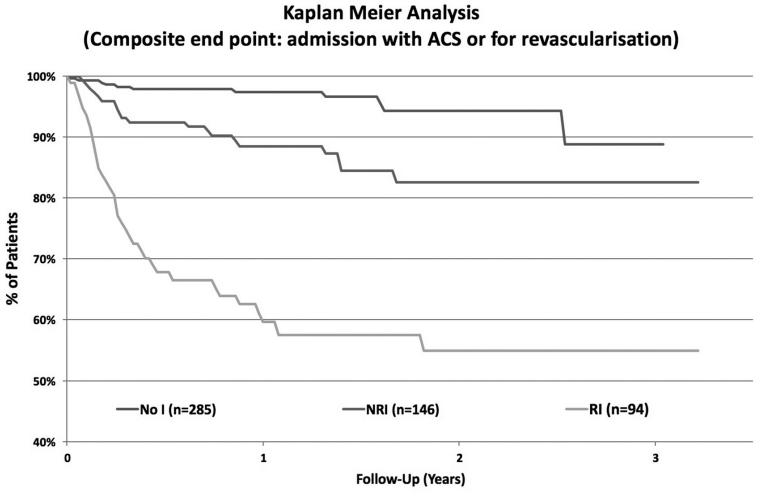
Introduction The optimal timing of surgery in asymptomatic severe primary mitral regurgitation (MR) continues to be challenging. Late gadolinium enhancement (LGE) on cardiac magnetic resonance imaging (CMR) is an established imaging biomarker of irreversible myocardial fibrosis within the ventricles that is associated with worse prognosis in a broad range of cardiovascular diseases. There are limited data on the role of LGE in primary MR.

Methods Patients with moderate or severe primary degenerative MR were prospectively recruited for multiparametric cardiac MRI (1.5 Tesla scanner Magnetom Avanto, Siemens) and cardiopulmonary exercise stress echocardiography (Epic, Phillips). All patients were asymptomatic without a Class 1 indication for surgery. Patients with coronary artery disease or significant aortic valve disease were excluded.

Results LGE was present in 18 (30%) out of 61 patients (table 1). This was isolated to the point of insertion of the right ventricle (RV) into the septum in 8 cases. In the remaining 10 cases, LGE was located in the base of the left ventricle (LV; figure 1) or the papillary muscle heads. The presence of LGE was significantly associated with more severe MR, RV dilatation and reduced RV ejection fraction but no difference in LV size (LVEDV 92±22 ml/m^2 vs 99±23 ml/m2), mass (64±16g/m^2 vs 67±10 g/m^2) or function (LVEF 71±8% vs 69±6%) was found. Functionally, this translated to the presence of ventilation-perfusion mismatch (VE/VCO2), a measure of exercise induced pulmonary hypertension. There was no difference in the maximum exercise capacity of patients according to presence of LGE.

Conclusion We demonstrate LGE of the LV myocardium to be present in 30% of patients with asymptomatic moderate-severe primary degenerative MR, and represents an early marker of



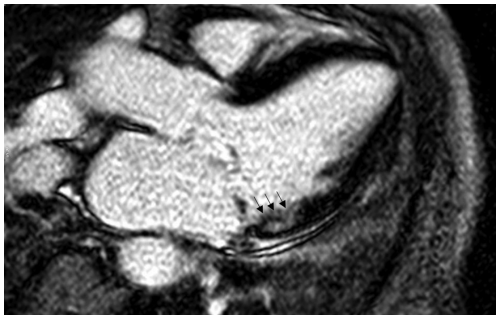
Abstract 109 Figure 1

changes within the RV that are associated with adverse surgical outcomes and poorer prognosis following mitral valve surgery. Future studies are needed to confirm whether LGE is a new imaging biomarker that can be used to risk stratify severe asymptomatic MR patients for surgery.

Abstract 110 Table 1 Features of patients with and without gadolinium enhancement

Late gadolinium enhancement	Number of patients	MR fraction (%)	Systolic RV volume (ml/m^2)	RV ejection fraction (%)	Peak VO_2(ml/kg/min)	VE/VCO_2
None	43	32±12	28.5±7.7	61±8	24.6±6.9	31.1 ±5.0
RV insertion gadolinium	8	46±17*	31.4±7.6*	55±6*	23.1±8.7	33.2 ±3.2*
LV myocardial gadolinium	10	42±19*	35.1±11.1*	55±8*	23.0±5.9	36.7 ±6.9*

*denotes statistical significance of P0.05 compared to non-gadolinium cohort on Independent samples 2 tailed T-Test



Abstract 110 Figure 1 Late gadolinium enhancement of the basal inferolateral LV

111 NEW NORMAL RANGES AND SUPERIOR REPRODUCIBILITY OF 3D MYOCARDIAL STRAIN ON CARDIOVASCULAR MAGNETIC RESONANCE-FEATURE TRACKING

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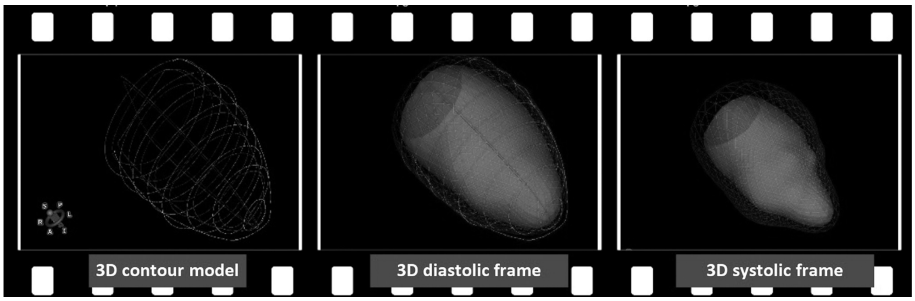
Background Myocardial deformation can be key to clinical decision. 2D feature-tracking of cardiovascular magnetic resonance (CMR-FT) imaging is user-friendly but has poor reproducibility, particularly for radial strain. 3D CMR-FT may improve repeatability by reducing through-plane artefact. The aim of this study was to provide normal ranges for 3D CMR-FT and compare its reproducibility to older generation 2D CMR-FT.

Method 56 asymptomatic, healthy subjects (43.7±12.9 year, 52% male) undertook CMR (1.5 Tesla scanner Magnetom Avanto, Siemens, Erlangen, Germany). 3D FT-CMT was generated using the SSFP HLA, VLA and short axis cine images (Figure 1). A single observer (BL) analysed the CMR studies using 2D and 3D CMR-FT (Circle cvi$^{42®}$ version 5.3) and after 4 weeks, re-analysed blinded scans for intra-observer variability. Inter-observer variability was generated by separate tracking by a second blinded observer (AS) in a randomly generated subset of 15 subjects. Agreement was tested by calculating mean bias and 95% limits of agreement (confidence intervals) from Bland–Altman analyses, coefficient of variation, and inter-class correlation coefficient (ICC).

Results There is modest agreement between all measures of 2D and 3D peak strain analysis (ICC=0.44 to 0.58). Mean global circumferential strain (GCS) on 3D analysis is −16.8 ±2.5, compared to 2D GCS of −20.2±3.31 and −20.6 ±3.4 at the base and mid-ventricular level respectively. Mean

Abstract 111 Table 1 Intra- and inter-observer reproducibility for 2D and 3D CMR-FT

Variability	Mean 3D bias±SD	Mean 2D bias±SD	T-Test on 2D vs 3D bias	3D intraclass correlation coefficient (95% CI)	2D intraclass correlation coefficient (95% CI)
GLS Intra-observer	1.73±1.43	1.85±1.52	p=0.70	0.64 (0.38 to 0.79)	0.67 (0.50 to 0.79)
GLS Inter-observer	1.11±1.48	1.58±1.91	**p=0.25**	0.53 (0.04 to 0.82)	0.62 (0.19 to 0.85)
GCS Intra-observer	1.10±1.10	1.87±1.74	**p<0.01**	0.81 (0.67 to 0.89)	0.75 (0.61 to 0.85)
GCS Inter-observer	1.02±1.22	2.08±2.28	**p=0.03**	0.79 (0.79 to 0.88)	0.56 (0.04 to 0.83)
GRS Intra-observer	6.66±8.06	8.90±9.71	**p=0.10**	0.63 (0.44 to 0.77)	0.61 (0.42 to 0.75)
GRS Inter-observer	6.13±7.48	10.78±12.67	**p=0.04**	0.67 (0.27 to 0.87)	0.35 (-0.09 to 0.71)



Abstract 111 Figure 1 Generation of 3D CMR-FT model through HLA, VLA and short axis contours