

POSTER PRESENTATION

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Biomarker validation of cardiac magnetic resonance analysis of regional myocardial fibrosis in ischaemic heart disease

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Background

Late gadolinium enhancement (LGE) with CMR is commonly assumed to represent myocardial fibrosis; however, comparative human histological data are limited, and there is no consensus on the most accurate

method for LGE quantitation. We evaluated the relationship between CMR assessment of regional fibrosis and infarct size assessment using serial biomarkers after ST segment elevation myocardial infarction (STEMI).

Spearman's rho: Biomarkers and LGE mass										
	n	Visual	FWHM	2SD	3SD	4SD	5SD	6SD	8SD	10SD
Peak CK	96	.771	0.707	.741	.781	.807	.819	.816	.798	.788
Peak Tnl	88	.804	0.715	.730	.777	.819	.830	.834	.828	.821
AUC CK	95	.705	0.670	.688	.727	.746	.758	.755	.737	.729
AUC Tnl	87	.818	0.773	.756	.804	.845	.853	.852	.842	.838

All correlation coefficients are significant at the level <0.001.

Figure 1 Correlation between infarct size assessment using biomarkers and CMR-LGE.

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Methods

Ninety-five patients treated for STEMI (59 ± 10 years, 85% male) underwent CMR six months after infarction. Fibrosis was quantified by CMR-LGE using visual and automated thresholds, and compared with the rise in serum biomarkers.

Results

Quantification methods had a strong influence on the infarct size assessment with CMR-LGE. Significant correlations were observed between LGE and biomarkers across a range of signal intensity thresholds (range: 2-10 standard deviations [SD] above reference myocardium), however there was a wide range with respect to estimation of total LGE size (from 6.8 ± 7.7 to 32.1 ± 11.3 grams) and a smaller variation in the correlation with peak troponin level (R-values ranging from 0.715 to 0.834). The strongest correlation was observed at thresholds of 5 and 6 SD ($R = 0.830$, $P < 0.001$ and $R = 0.834$, $P < 0.001$).

Conclusions

There is a wide variation for the correlation between CMR-LGE quantification of infarct size and biomarker release following STEMI at a range of automated thresholds, with the strongest correlations at 5SD and 6SD thresholds.

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