VALIDATION OF FAST T2-GRASE MAPPING OF THE HEART: MAGNETIC RESONANCE AND HISTOLOGICAL STUDY IN A PIG MODEL OF ISCHEMIA/REPERFUSION

Poster Contributions
Poster Hall B1
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Background: Quantitative measurements of T2 relaxation times by performing turbo-spin echo (TSE) based T2 mapping has been recently shown as a potential tool for the accurate detection and quantification of myocardial edema. However, it is time-consuming and there are no data validating this technique against pathological reference standard. The purpose of the present work is to provide an in vivo validation of a fast T2-GRASE mapping of the myocardium against T2-TSE mapping and histology which could be easily integrated in daily protocols.

Methods: Closed-chest 40min Ischemia/Reperfusion was performed in 20 pigs, which were sacrificed at 120 minutes (n=5), 24 hours (n=5), day 4 (n=5) and 7 days (n=5) after reperfusion for the quantification of myocardial water content. Cardiac magnetic resonance (CMR) study including T2-TSE and T2-GRASE mapping were performed at baseline and every follow-up until sacrifice (i.e. animals sacrificed at day7 underwent baseline, 120min, 24h, day4 and day7 CMR). Five additional pigs were sacrificed after baseline CMR study and served as controls. Regions of interest were placed at infarcted and remote areas for T2 relaxation time quantification at every CMR study.

Results: Myocardial T2 relaxation measurements performed with T2-TSE mapping and T2-GRASE mapping showed an almost perfect correlation (R2= 0.97) with no significant systemic error. T2 relaxation values obtained with both T2 mapping sequences showed a similar good correlation with water content (pathological reference standard): R2= 0.76 and R2= 0.72 for T2-TSE and T2-GRASE mapping, respectively.

Conclusion: This is the first validation of the fast T2-GRASE to quantify edema after myocardial infarction. Fast T2-GRASE cardiac mapping values were strongly correlated with post-infarction myocardial water content. Given its shorter time of acquisition time and accuracy in quantifying T2 relaxation times, this sequence can overcome current CMR reference standards.