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Non Invasive Imaging (Echocardiography, Nuclear, PET, MR and CT)

DYNAMIC FRACTIONAL FLOW RESERVE MEASUREMENT: POTENTIAL IMPLICATIONS FOR DYNAMIC FIRST-PASS MYOCARDIAL PERFUSION IMAGING

Poster Contributions
Poster Hall B1
Monday, March 16, 2015, 9:45 a.m.-10:30 a.m.

Session Title: CMR Potpourri
Abstract Category: 18. Non Invasive Imaging: MR
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Background: It remains unclear how accurately Magnetic Resonance (MR) Myocardial Perfusion Imaging (MPI) recognises significant reduction in myocardial perfusion. As myocardial blood flow and Fractional Flow Reserve (FFR) are phasic we investigated high frequency sampled physiological measurements with reference to MR MPI.

Methods: Dynamic fractional flow reserve (dFFR) and rest trans-stenotic pressure ratios (dRTPR) were calculated at 5 ms intervals in 32 patients. Mean values at 125 - 245ms, 275 - 395ms and 425 -545 ms from the R-wave were calculated to simulate a three slice MR MPI sequence and also calculated to simulate a slice commencing at varying % intervals of the cardiac cycle.

Results: Figure 1 shows dynamic values from each simulated slice differ from conventional FFR ($p<0.05$). The difference between rest & stress values was most evident in diastolic simulated slice 3 ($p<0.05$) and particularly at low FFR. Measurements from a simulated slice commencing at 45 - 50% of the R-R interval were closest to conventional FFR values. Misregistration between fix timed rest & stress periods occurs by induced cycle length alteration with 5.6% total cycle length misregistration during simulated rest & stress diastolic slices.

Conclusion: Cardiac cycle variation in FFR likely complicates recognition & quantification of physiologically significant coronary disease. Comparison of rest and stress images is affected by cycle length changes. Control of sequence acquisition times may enhance diagnostic accuracy.

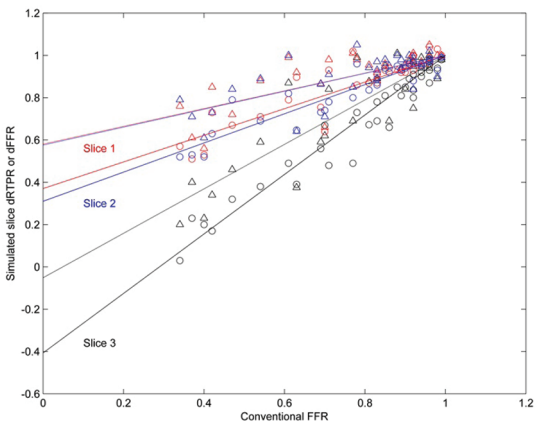

Figure 1.