

Poster presentation

Further refining stress perfusion imaging: the initial clinical impact of a 32 channel surface coil

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Introduction

Adenosine stress cardiac magnetic resonance (CMR) is widely accepted as a safe, reliable and reproducible investigation to identify areas of inducible ischaemia. Optimal images depend on sequence parameters, including a large field of view (FOV) coverage, a high signal to noise ratio (SNR) and minimal artefact. 32-channel surface coils may provide a higher SNR over a larger FOV compared to standard 5-channel coils.

Purpose

We therefore examined if the use of a 32-channel coil led to a significant improvement in observed image quality.

Methods

50 perfusion scans were performed using a Philips Achieva CV 1.5 T MRI scanner (Philips Medical Systems), using either a 5 or 32-channel coil (25 patients each) using standardised protocols. First-pass perfusion-imaging was performed using a 0.05 mmol/kg gadolinium bolus during induced stress (adenosine at 140 mcg/Kg/min for 3 minutes). 3 short axis slices were acquired per cardiac cycle using a single-shot prospectively-gated balanced TFE sequence (TR 2.5 ms TE 1.3 ms, flip-angle 50° and voxel size of 2.8 × 2.8 × 10 mm). The cine images were optimised using dedicated software (Philips) and reviewed by two blinded CMR specialists in a randomised and anonymised sequence. Each video was scored on a scale of 1-5 (1 Non diagnostic, 2 Poor, 3 Adequate, 4 Good, 5 Excellent). The scores for each coil were com-

pared using the Mann-Whitney test. Observer scores were compared using Bland-Altman analysis. Phantom studies were performed using identical acquisition parameters with acceleration factors of 2, 2.3, 2.5, 2.7 and 3. Mean signal and standard deviation were measured; from this, the SNR was calculated and compared for each coil using a Students t-test.

Results

There was a significant improvement in image quality score using the 32-channel coil compared to the 5-channel coil for observer 1 (mean score 4.1 ± 0.7 vs. 3.5 ± 1 p = 0.04), observer 2 (mean score 3.4 ± 0.7 vs. 3.0 ± 0.6 p = 0.02) and with both observers' scores combined (mean score 3.8 ± 0.7 vs. 3.2 ± 0.9 p = 0.002). The mean difference in scores was 0.6 ± 1.7. The SNR was higher for the 32-channel coil (mean SNR 203 ± 20 vs. 159 ± 12 p = 0.003). The mean patient age was 62 ± 11 years and 50% of patients were male. The cohorts were matched for age, gender and peak heart rate during stress.

Conclusion

The 32-channel coil produces significantly higher quality images and a higher SNR than the 5-channel coil in routine stress CMR.