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Poster presentation

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Cardiac magnetic resonance image quality is surprisingly good in the obese: a study of 2759 consecutive subjects

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Introduction

The European CMR Registry documented in 11, 040 patients that CMR has diagnostic quality in 98% of patients and impacts patient management in a significant number of subjects (Bruder *et al*., in press). Image quality is compromised by patient obesity in most forms of non-invasive cardiac imaging (echocardiography, CT, or nuclear techniques), but the effect of obesity on CMR image quality has not been characterized. Wide bore MRI systems provide new capabilities for imaging large patients.

Purpose

To examine the relationship between CMR image quality and patient body size from a wide bore MRI scanner.

Methods

Cine MRI and delayed enhancement (DE) image quality was reviewed for patients imaged on a wide-bore Siemens Magnetom Espree 1.5 T MRI scanner at the NIH-Suburban Hospital MRI Center. The primary study endpoint was the number of studies considered excellent or good vs. fair, poor, or non-diagnostic quality as a function of body mass index (BMI). Secondary endpoints were similar analyses in males vs. females, and subjects with normal vs. decreased LVEF. The data was analyzed using Pearson chi-square testing.

Results

2759 consecutive CMR exams were performed during the study period (1017 female, 1742 male) including cine images in 2677 subjects and DE images in 2607 subjects. Only the 708 (27.1%) studies with visible infarction were included in analysis of DE image quality. 963 (34.9%) subjects were overweight (BMI 25-30) and 865 (31.4%) subjects were obese (BMI ≥ 30). 92.6% (2840/2677) of cine and 89.1% (631/708) of DE images were of good or

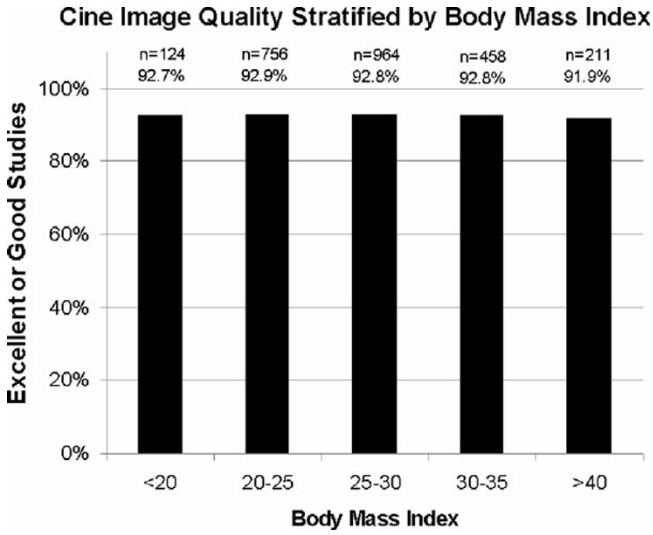

Figure 1

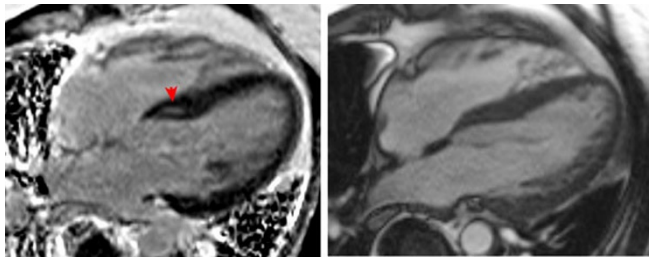

Figure 2
Good quality cine and DE images from a 410 pound male (BMI 47.4) scanned for cardiomyopathy work-up. Mid-wall basal septal DE on the four-chamber view (left) with corresponding end-diastolic cine (right).

excellent quality and there was no significant relationship between BMI and image quality in either technique (P = 0.885 for cine, P = 0.169 for DE). Decreased LVEF predicted lower image quality for both techniques (P < 0.001 for both). Sex had no effect on image quality in either technique (P = 0.955 for cine, P = 0.108 for DE), Figure 1, 2, 3.

Conclusion

CMR image quality is not compromised in large subjects imaged with a wide-bore cardiac capable MRI scanner. Reduced image quality in patients with lower LVEF likely relates to the compromised breath-holding abilities of patients in heart failure and arrhythmias. Thus, obesity should not be a reason not to consider CMR if appropriate equipment and expertise are available.

Figure 3
Wide-bore MRI scanner with patient weighing 404 pounds.