



ORAL PRESENTATION

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Cardiac steatosis is associated with excess body weight in otherwise healthy adults

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From 2011 SCMR/Euro CMR Joint Scientific Sessions
Nice, France. 3-6 February 2011

Background and aim

Obesity confers an enormous burden of cardiovascular morbidity and mortality worldwide. Lipotoxicity has been implicated as a potential common pathway in myocyte dysfunction and ultimately apoptosis. Fat deposition in the peritoneum, the liver and around vascular structures has been linked to metabolic syndrome and subsequent cardiomyopathy. Therefore this study sought to determine the relationship between excess body fat and intracardiac lipids as assessed by 3T proton spectroscopy in women.

Methods

27 healthy female volunteers with no comorbidities were recruited from the general public according to body mass index - 14 lean (BMI 21.3 ± 2.0 kg/m²), 5 overweight (BMI 27.7 ± 1.7 kg/m²) and 8 obese (BMI 40.5 ± 8.1 kg/m²). All participants were scanned on a 3 Tesla magnet (Siemens Tim Trio). A stack of short axis cine images was obtained to measure cardiac volumes and mass. Cardiac proton spectroscopy was performed using a breath-hold STEAM sequence with water suppression on a septal mid-ventricular voxel. A transverse image at the level of the L4 vertebra was used to measure visceral and subcutaneous adipose tissue. All patients fasted for 10 hours prior to their study, and to ensure adequate hydration status water intake was encouraged.

Results

The normal range for intracardiac lipids in lean women was 0.36% +/- 0.14 of the total water signal, similar to previously reported ranges (1, 2). Cardiac lipid content was higher in overweight (0.55% +/- 0.31) and obese

women (0.86% +/- 0.57; $p = 0.01$) compared to lean. Intracardiac lipid content correlated strongly with waist circumference, BMI and sagittal abdominal diameter (Fig 1). There was also a significant correlation between ICL and visceral adiposity (Fig 2) and total body fat ($r = 0.74$, $p < 0.001$). In this healthy population, there was no significant relationship between left ventricular ejection fraction and intracardiac lipids, but there was a

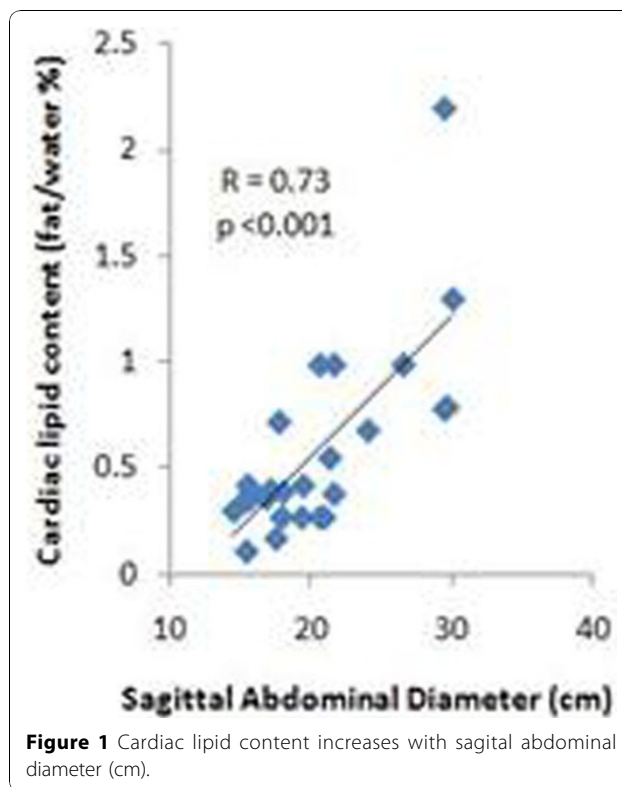


Figure 1 Cardiac lipid content increases with sagittal abdominal diameter (cm).

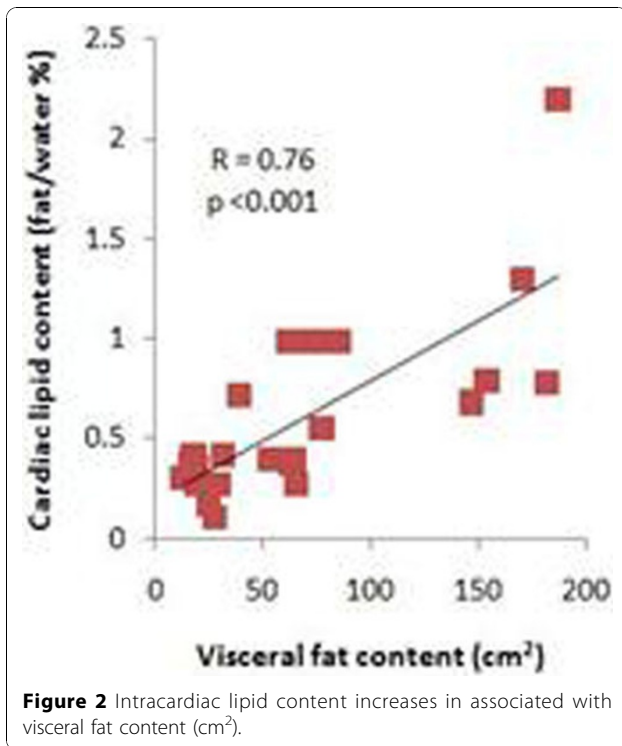


Figure 2 Intracardiac lipid content increases in associated with visceral fat content (cm²).

significant correlation of lipid content with cardiac mass ($r = 0.50$, $p = 0.01$).

Conclusions

Cardiac lipid content is increased in obese women even in the absence of diabetes and hyperlipidaemia. This

may reflect increased lipid deposition within myocytes, and/or altered lipid usage & metabolism.

Published: 2 February 2011

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doi:10.1186/1532-429X-13-S1-O82

Cite this article as: Banerjee *et al*: Cardiac steatosis is associated with excess body weight in otherwise healthy adults. *Journal of Cardiovascular Magnetic Resonance* 2011 **13**(Suppl 1):O82.

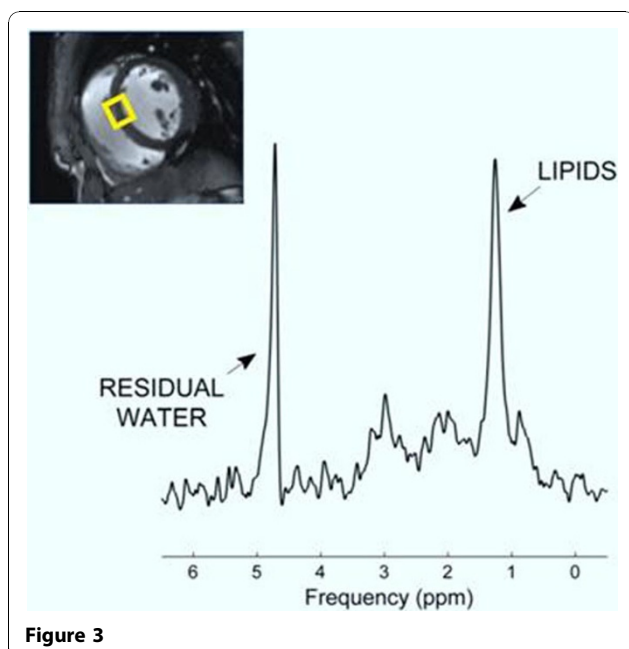


Figure 3

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