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Introduction

Excess body weight increases the risk of heart failure¹. Pathophysiologic changes in the cardiovascular system that predispose to cardiac failure in the obese include:

- (i) cardiac volume overload
- (ii) increased left ventricular (LV) mass, and
- (iii) abnormal diastolic function^{2,3}.

Subclinical LV diastolic dysfunction-correlates with the degree of obesity as assessed by body mass index (BMI)^{4,5}. Abdominal obesity, in particular, increases the risk of cardiovascular disease, even after adjusting for other CV risk factors⁶ and is also associated with vascular dysfunction⁷. The effect of an aggressive, rapid weight loss on cardiac and vascular and function in obese men remains to be determined.

Aims

Determine the effect of obesity and aggressive weight loss on:
Cardiac ventricular function.
Brachial artery flow mediated dilation.

Methods

Subjects

Forty-eight obese men
Age 43.3±9.9 yrs
BMI 36.8±4.3 kg/m²
Waist circumference 111.2± 12.6 cm.

Weight loss protocol

Induced using 3 sachets of KicStart (450 Kcal) (Pharmacy Solutions, Sydney), and one low energy density carbohydrate free meal (~400 Kcal) over 8 weeks. Participants were reviewed 2 weekly. Primary outcomes measures were assessed prior to commencement of the diet and at week 8.

Outcome measures

Ventricular structure and function:

Assessed by Magnetic Resonance (MR) Imaging. The MR images, were analysed using ImagePro Plus (Media Cybernetics). For LV volume analysis, the endocardial and epicardial contours were manually traced on both end-diastole and end-systole. To avoid subjectivity in contour tracing, we employed previously published criteria for the delineation of cardiac borders.⁹

Flow-mediated dilation (FMD) of the brachial artery.

Assessed by Magnetic Resonance Imaging. After 10 minutes rest, we measure brachial artery area by MRI, at baseline and 1 min after reactive hyperaemia induced by release of a forearm cuff inflated to 50 mmHg above systolic pressure for 5 minutes. MRI data acquisition is then repeated before and 3 minutes after a sublingual spray of nitroglycerin (NTG). The technique was validated against ultrasound in a series of preliminary studies.

Analysis

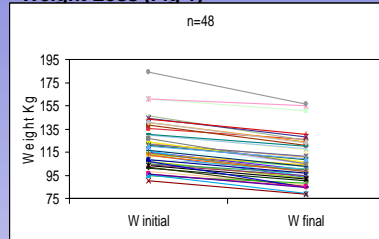
Data was analysed by ANOVA using SPSS v14.

Results

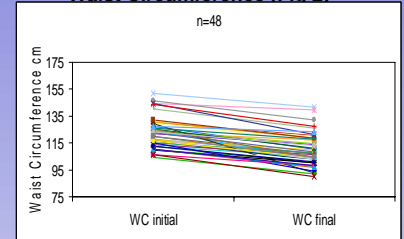
All men completed the study and lost weight (13.4 ± 4.7 kg, range 5.1-21.8kg, p<0.01). The reduction in waist circumference (mean ± SEM) was 12.6 ± 5.4 cm, (range 3.8 – 22.8 cm), P<0.01.

Over the 8 week weight loss period improvements in EF were seen from 51 ± 1% to 58 ± 1% (p<0.01) along with improvements in endothelial function with FMD increasing from 4.8 ± 0.3% to 9.4 ± 0.6% (p<0.01).

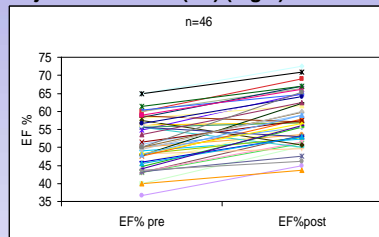
Weight Loss (Fig 1)



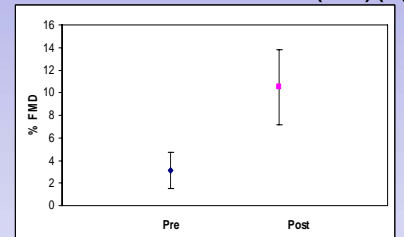
Waist Circumference (Fig 2)



Ejection fraction (EF) (Fig 3).



Flow Mediated Dilatation (FMD) (Fig 4).



Conclusion

Significant weight loss in obese males improves left ventricular systolic and endothelial function over 8 weeks. The mechanism appears to be independent of changes in blood pressure or metabolic state.

Acknowledgements:

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