

Meeting abstract

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105 Weight loss reverses aortic distensibility changes in subjects with severe uncomplicated obesity. a one year follow up study

Oliver J Rider*, Jane M Francis, Mohammed K Ali, Clare Jackson, Monique Robinson, Matthew D Robson and Stefan Neubauer

Address: University of Oxford, Oxford, UK

* Corresponding author

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Objective

Obesity has been linked to reduced aortic elastic function but studies of central aortic distensibility in obesity are limited. Our hypothesis was that aortic distensibility changes in severe obesity are at least partially reversible over one year following significant weight loss.

Methods

Fifty subjects (37 uncomplicated obese BMI 38.4 ± 7.2 , 14 normal weight BMI 21.9 ± 1.8), all with no identifiable cardiac risk factors, underwent MR imaging of the aorta at 1.5 T. Aortic distensibility was assessed at three levels; the ascending (Ao) and proximal descending aorta (PDA) at the level of the pulmonary artery and the abdominal aorta (AA) The abdominal cine images were piloted perpendicular to the orientation of the abdominal aorta. All subjects were recruited on the basis of no identifiable cardiac risk factors. There were no significant differences in fasting glucose (5.2 ± 0.6 vs 4.9 ± 0.4 mmol/L, $p = 0.10$), cholesterol (5.0 ± 0.8 vs 5.3 ± 0.9 mmol/L, $p = 0.27$), systolic blood pressure (122 ± 13 vs 115 ± 10 mmHg, $p = 0.10$) or diastolic blood pressure (76 ± 8 vs 73 ± 8 mmHg, $p = 0.09$) between obese and normal weight subjects, with all measurements remaining in the normal range.

Results

Obesity was associated with a significant decrease in aortic distensibility at all three levels of the aorta (Ao 4.3 ± 1.7 vs 5.9 ± 2.0 mm/Hg⁻¹ $\times 10^{-3}$; $p < 0.01$, PDA 4.11 ± 1.3 vs 6.2 ± 1.3 ; $p < 0.001$, DDA 5.21 ± 1.7 vs 8.8 ± 2.7 ; $p <$

0.001). More distal aortic regions were associated with relatively larger reductions in aortic distensibility compared to more proximal regions. After a one year period of weight loss, there was a significant increase in aortic distensibility in the abdominal aorta (6.9 ± 2.6 vs 4.9 ± 1.6 ; $p < 0.001$), while aortic distensibility improvements in proximal sections did not reach statistical significance (Ao 4.6 ± 2.8 vs 3.9 ± 1.6 ; $p = 0.24$, PDA 4.8 ± 2.0 vs 4.4 ± 1.3 ; $p = 0.42$). Figure 1.

Conclusion

Using regional MRI measurements of the aorta, significant reductions in regional mechanical function have been shown in obese individuals in the absence of hypertension, hypercholesterolaemia or diabetes when compared to lean age, sex matched controls. The pattern of this reduction shows a relatively greater reduction in compliance and distensibility in more distal (proximal descending and abdominal) segments of the aorta as opposed to the more proximal segment (ascending aorta). Thus, in uncomplicated obesity, aortic elastic properties are improved after one year of weight loss. Distal aortic elastic function appears to be more sensitive to changes in BMI than more proximal regions.

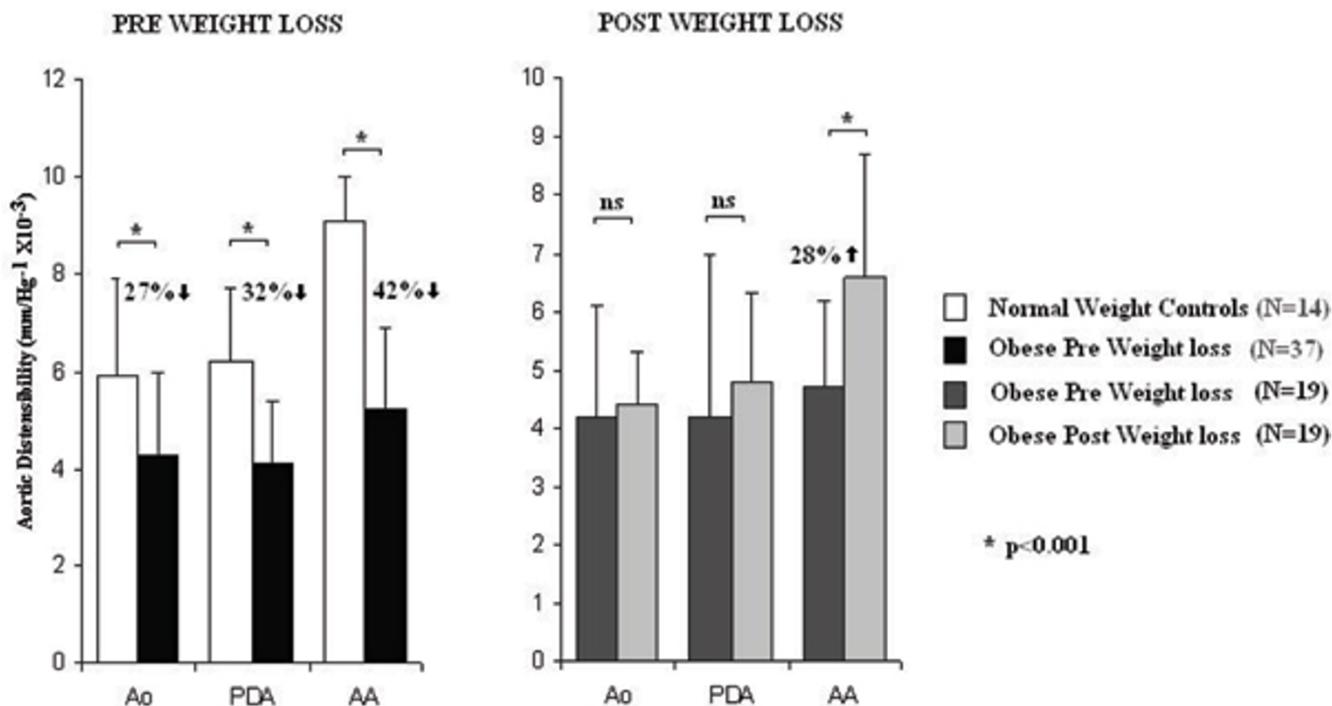


Figure 1
In the setting of uncomplicated obesity, aortic elastic properties are improved after one year of weight loss.

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