

Modest decrease in adiposity is associated with improved arterial stiffness in children and adolescents with severe obesity

Authors

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Background/Introduction: Childhood obesity is associated with adult cardiovascular disease (CVD). Non-invasive, subclinical cardiovascular phenotypes (carotid elasticity, pulse wave velocity (PWV), and carotid intima-media thickness (cIMT)) predict later CVD and mortality. In youth with severe obesity, we aimed to investigate associations between i) increasing versus decreasing/maintaining the severity of obesity over time and ii) changes in adiposity measures and cardiovascular risk factors (CVRF) over time on subclinical cardiovascular phenotypes.

Methods: Participants with severe obesity (BMI>95th centile) had data collected at two visits for adiposity measures BMI, %>95th BMI-centile (ratio of individual's BMI divided by the age- and sex-matched 95th BMI-centile x 100%), waist circumference (WC), body fat percentage (%BF) and cardiovascular risk factors (systolic blood pressure (SBP), glycoprotein acetyls (GlycA, an inflammatory marker), and low-density lipoprotein cholesterol). Subclinical cardiovascular phenotypes were assessed at follow-up. Analysis was by fully adjusted linear regression.

Results: Data on 101 participants, aged (mean±SD) 10.2±3.5y, %>95th BMI-centile 135.3±19.2 at baseline and 15.7±3.7y, %>95th BMI-centile 131.5±26.4 at follow-up were analyzed. Decreasing or maintaining the %>95th BMI-centile was associated with increased carotid elasticity in females (-0.945%/10mmHg, *P*-value=0.002), and decreased PWV in males (-0.75m/s, *P*-value<0.001). Changes in adiposity measures (per 1-unit increase) were inversely associated with carotid elasticity (-0.020 to -0.063%/10mmHg, *P*-value<0.005), and positively associated with PWV (0.011 to 0.045m/s, *P*-value<0.005). Changes in GlycA (per 50mol-increase) were inversely associated with elasticity (0.162%/10mmHg, *P*=0.042), and in SBP (per 10mmHg-increase) positively associated with PWV (0.260m/s, *P*<0.001). Male sex was the only factor associated with cIMT (+39m, *P*-value=0.006).

Conclusion:

In youth with severe obesity, improving or maintaining the %>95th BMI-centile during adolescence is associated with decreased arterial stiffness. Changes in most adiposity measures, GlycA and SBP were associated with arterial stiffness.