Fat mass paradox and carotid intima-media thickness progression: A longitudinal study from childhood through young adulthood

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Abstract
Background: The obesity or body mass index (BMI) paradox has been reported in adults where obesity was associated with decreased cardiovascular morbidity and mortality. However, longitudinal evidence from childhood in relation to markers of subclinical atherosclerotic cardiovascular disease in early adulthood is lacking.

Objective: To examine the cumulative effect of fat mass from ages 9–24 years on changes in carotid intima-media thickness (cIMT) from 17–24 years.

Methods: We included 3863 participants (56% females) from the Avon Longitudinal Study of Parents and Children, England, UK. Total and trunk fat mass were measured by dual-energy Xray absorptiometry at 9, 17, and 24 years while cIMT was measured by ultrasound at 17 and 24 years. We categorized fat mass in tertiles of low (reference), moderate, and high. Participants at ages 24 years were grouped according to BMI class: normal-weight (<24.99 kg/m2) and overweight/obesity (>24.99 kg/m2). We conducted linear mixed-effect model analyses per BMI class, adjusting for age, sex, cardiometabolic, and lifestyle factors.

Results: Altogether, 19.6% and 37.2% were overweight/obese at ages 17 and 24 years, respectively. Among normal-weight participants, a 15-year cumulative high exposure to total fat mass effect estimate -0.011 mm [(-0.022 to -0.0003); p=0.044] and trunk fat mass -0.013 mm [(-0.024 to -0.002); p=0.027] were inversely associated with the 7-year increase in cIMT. Total or trunk fat mass was not associated with cIMT among overweight/obese participants.

Conclusion: Cumulative high exposure to fat mass from childhood may attenuate cIMT progression in normal-weight young adults, suggesting a ‘fat mass paradox’.

Keywords: Obesity paradox, atherosclerosis, adolescence, preventive cardiology

Abbreviations: BMI- Body Mass Index; cIMT- Carotid intima-media thickness.

Funding and Conflicts of Interest
The authors have no conflict of interest.

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