

Determinants of Carotid Intima-Media Thickness in Severe Obesity: The Role of Adiposity and Atherogenic Lipid Profile

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Introduction. Severe obesity is associated with increased cardiovascular risk and may promote early vascular remodeling before clinically manifest atherosclerotic disease. Body mass index (BMI) does not fully reflect adiposity, while percentage body fat (PBF), atherogenic lipid parameters, and carotid intima-media thickness (CIMT) may provide complementary information. This study aimed to investigate associations between adiposity, lipid parameters, and CIMT in adults with severe obesity.

Methods. This pilot cross-sectional study included 29 adults with severe obesity and complete anthropometric, biochemical, and carotid ultrasound data. BMI and PBF were assessed alongside fasting total cholesterol (TC), low-density lipoprotein cholesterol (LDL-C), high-density lipoprotein cholesterol (HDL-C), and triglycerides (TG). Bilateral common carotid CIMT was measured using B-mode ultrasonography, and carotid plaque was recorded. Associations were evaluated through correlation analyses and exploratory multivariable linear regression including age, BMI, PBF, and LDL-C.

Results. Mean age was 43.0 ± 11.1 years, and 65.5% were women. Mean BMI was 39.9 ± 5.3 kg/m², PBF $41.8 \pm 7.5\%$, and CIMT 0.665 ± 0.144 mm. CIMT correlated significantly with age ($\rho=0.592$; $p<0.001$), TC ($\rho=0.472$; $p=0.010$), LDL-C ($\rho=0.488$; $p=0.007$), and TG ($\rho=0.410$; $p=0.027$), but not BMI ($\rho=0.168$; $p=0.384$) or PBF ($\rho=-0.054$; $p=0.781$). Carotid plaque was present in five participants (17.2%), who exhibited greater CIMT than those without plaque (0.854 ± 0.098 vs 0.625 ± 0.119 mm; $p=0.003$). Age and LDL-C remained significantly associated with CIMT in multivariable analysis.

Discussion. Subclinical carotid vascular changes in severe obesity were more closely associated with age and atherogenic lipid burden than with BMI or PBF. These findings suggest that carotid ultrasonography may complement traditional risk assessment and support prevention-oriented cardiovascular stratification. Larger studies are needed to confirm these preliminary observations.

Keywords: Severe Obesity, Carotid Intima-Media Thickness, Adiposity, LDL Cholesterol, Carotid Plaque

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