

Cutaneous microvascular endothelium dependent vasodilation is impaired in young obese subjects

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ABSTRACT

Microvascular dysfunction is thought to contribute to increased blood pressure and decreased insulin sensitivity seen in obesity. The purpose of this study was to assess endothelium dependent and independent microvascular function in young, otherwise healthy obese individuals. Subjects were all free of known disease and included 6 young obese and 5 young normal weight individuals (age: 24 ± 2.2 vs 25 ± 1.18 years $P > 0.05$; BMI: 34.96 ± 1.89 vs 22.24 ± 0.84 kg/m², $P < 0.001$). Microvascular function was assessed using laser Doppler flowmetry to measure skin blood flow responses to methacholine (MCh) and sodium nitroprusside (SNP) infusions through microdialysis membranes. Dose response curves were constructed to determine the effective concentration of MCh and SNP that elicits 50% of maximal conductance (EC_{50}). Young obese subjects had significantly blunted EC_{50} responses to MCh infusion (-3.173 ± 0.526 vs -4.875 ± 0.199 log molar concentration of MCh, $P = 0.023$) demonstrating impaired endothelial dependent vasodilation. In contrast, obese and normal weight subjects showed no difference in endothelial independent vasodilation as indicated by SNP EC_{50} (-2.667 ± 0.258 vs -3.336 ± 0.72 log molar concentration of SNP, $P = 0.410$). Our results support the hypothesis that impaired endothelium dependent vasodilation is present in obesity prior to the development of obesity related disease.