TACSM Abstract

Vascular Insulin Resistance May Contribute to Health Disparities in People from the Rio Grande Valley

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ABSTRACT

Microvascular blood flow (MBF) increases postprandially in skeletal muscle in response to insulin to aid in myocyte glucose delivery. This MBF response is considered a measure of vascular insulin resistance and can be impaired with altered meal composition, obesity, type 2 diabetes mellitus (T2DM), and insulin resistance. Current studies indicate this MBF response to a mixed meal challenge (MMC) may identify vascular insulin resistance before typically-presenting serum biomarkers of insulin resistance, as it displays more sensitivity than when using an oral glucose challenge (OGC). However, it is unknown if healthy adults residing in the Rio Grande Valley (RGV), an area with a 3x higher prevalence of T2DM vs the national average, demonstrate impaired MBF responses similar to those seen in overt insulin resistance. **PURPOSE**: To determine microvascular responses in apparently healthy individuals of the RGV between OGC and MMC. **METHODS**: 17 healthy participants from the RGV (age 25±6 yrs, BMI 25±3 kg/m2, fat mass % 29±9%, and android fat % 31±10.4%) without hypertension, T2DM, or dyslipidemia were administered a MMC and OGC on two separate occasions. Forearm skeletal muscle MBF (measured as acoustic intensity/second (AI/s)) was recorded pre- and 1-hour postprandial via contrast-enhanced ultrasound (CEU). **RESULTS**: MMC pre- vs. post-prandial demonstrated a 0.59 fold reduction (1.6101 vs. 0.6548 AI/s, 95% CI [-.2871, 3.5073] and [0.887, 1.2209], respectively). OGC pre- vs. post-prandial MBF had a 0.18 fold reduction (1.6734 vs. 1.3693 AI/s, 95% CI [.3755, 2.9714] and [.4725, 2.2661], respectively). MBF in skeletal muscle demonstrated no significant difference between MMC and OGC groups (Mean square= 2.378, $F(1, 48) = .320$, $p = 0.574$). **CONCLUSION**: Unlike healthy Caucasians, apparently healthy residents of the RGV display impaired microvascular responses to MMC, similar to using an OGC, suggesting early vascular insulin resistance. As this population displays significant health disparities for chronic diseases such as T2DM, obesity, and Alzheimer's, it is plausible that early vascular insulin resistance noted in this population significantly contributes to the increased incidence of these chronic diseases. Additional research is needed to identify mechanisms explaining this population's etiology of impaired MBF responses and vascular insulin resistance.