

Abstract

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Loss of total and visceral adipose tissue mass predicts decreases in oxidative stress after weight-loss surgery.

Gletsu-Miller N, Hansen JM, Jones DP, Go YM, Torres WE, Ziegler TR, Lin E.

Department of Surgery, Emory University School of Medicine, Atlanta, Georgia, USA.

BACKGROUND: It is not known whether there are mechanisms linking adipose tissue mass and increased oxidative stress in obesity.

OBJECTIVE: This study investigated associations between decreasing general and abdominal fat depots and oxidative stress during weight loss.

METHODS: Subjects were severely obese women who were measured serially at baseline and at 1, 6 (n = 30), and 24 months (n = 18) after bariatric surgery. Total fat mass (FAT) and volumes of visceral (VAT) and subcutaneous abdominal adipose tissue (SAT) were related to plasma concentrations of derivatives of reactive oxidative metabolites (dROMS), a measure of lipid peroxides and oxidative stress.

RESULTS: After intervention, BMI significantly decreased, from 47.7 +/- 0.8 kg/m² to 43.3 +/- 0.8 kg/m² (1 month), 35.2 +/- 0.8 kg/m² (6 months), and 30.2 +/- 1.2 kg/m² (24 months). Plasma dROMS also significantly decreased over time. At baseline, VAT (r = 0.46), FAT (r = 0.42), and BMI (r = 0.37) correlated with 6-month decreases in dROMS. Similarly, at 1 month, VAT (r = 0.43) and FAT (r = 0.41) correlated with 6-month decreases in dROMS. Multiple regression analysis showed that relationships between VAT and dROMS were significant after adjusting for FAT mass. Increased plasma dROMS at baseline were correlated with decreased concentrations of high-density lipoprotein (HDL) at 1 and 6 months after surgery (r = -0.38 and -0.42).

CONCLUSIONS: This study found longitudinal associations between general, and more specifically intra-abdominal adiposity, and systemic lipid peroxides, suggesting that adipose tissue mass contributes to oxidative stress.

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