

Associations between adipocyte diameter and liver steatosis in men and women with severe obesity

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Background: To date, no clinical screening tool exists to identify patients with preclinical obesity who are at high risk of developing clinical obesity. Adipose tissue dysfunction which is often reflected by adipocyte hypertrophy has been shown to be a significant predictor of cardiometabolic diseases. In severe obesity, the association between adipocyte diameter and liver fat accumulation (i.e., liver steatosis) has yet to be clarified.

Objective: This cross-sectional study aimed to examine the association between adipocyte diameter and liver steatosis in a sample of patients with severe obesity.

Methods: This study included 148 individuals with severe obesity scheduled for bariatric surgery. Biopsy samples were obtained during surgery and included omental and subcutaneous adipose tissues as well as liver tissue from which FCS and liver steatosis were evaluated. Correlation analyses were used to test the relationship of omental and subcutaneous FCS with liver steatosis.

Results: Participants (75.7% women) were 37.7 ± 8.8 years old, had an average body mass index of 48.7 ± 7.6 kg/m². Average liver steatosis was 30.9% (from 0% to 95%). Omental FCS was significantly smaller than subcutaneous FCS ($65.5 \pm 9.6 \mu\text{m}$ vs. $74.8 \pm 9.0 \mu\text{m}$, respectively, $p < 0.0001$). Omental ($\rho = 0.30$, $p < 0.001$), not subcutaneous FCS ($\rho = 0.11$, $p = 0.176$) was significantly associated with liver steatosis severity.

Conclusion: In severe obesity, higher omental, not subcutaneous FCS, was significantly associated with a higher percentage of liver fat accumulation. This finding combined with the invasive nature of liver biopsy supports an ongoing study conducted to clarify the clinical utility of transient elastography, a non-invasive tool for preclinical obesity screening.

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