

After Bariatric Surgery CT Scans Linked Vitamin D Levels to Fat within Muscles

A recent study found that higher postoperative vitamin D concentrations were associated with less fat infiltration within certain muscles and lower visceral fat in adults with obesity after [bariatric surgery](#). Among patients whose vitamin D concentrations increased, changes in vitamin D were not significantly associated with changes in fat and muscle measurements after correction for multiple comparisons. The researchers also explored the predictive value of preoperative vitamin D for postoperative body composition.



Study

The current prospective study enrolled 113 adults with obesity scheduled for bariatric surgery at Beijing Friendship Hospital between January 2022 and December 2023. All participants were prescribed standardized supplementation with vitamin D 2000 IU/day and calcium citrate 600 mg/day after surgery, along with guidance on [healthy lifestyle](#) and diet. Clinical evaluations, laboratory tests, and quantitative computed tomography (QCT) scans were performed before surgery and at the one-year follow-up.

Relevant data, including age, gender, BMI, surgical details, and blood tests measuring 25-hydroxyvitamin D (25(OH)D), [glucose control](#), and lipids, were collected. Participants were stratified postoperatively into vitamin D deficient (≤ 30 ng/mL) and normal (> 30 ng/mL) groups based on 25(OH)D levels, using the study's chosen threshold.

Body composition was assessed using QCT at the L2 vertebra, which measured total, visceral, and subcutaneous fat areas; erector spinae and psoas major muscle areas; and fat infiltration within these [muscles](#). The analysis included absolute tissue areas, height-adjusted fat indices, and muscle fat fractions normalized to muscle size. Radiologists' measurements showed good reproducibility.

Exclusion criteria were metabolic bone disease, medications affecting bone metabolism, severe mental illness, and [spinal abnormalities](#).

Findings

A total of 113 patients with obesity (81% female, mean age 33.4 years) underwent bariatric surgery, with a 1-year follow-up. Most underwent sleeve [gastrectomy](#) (85 patients), with the remainder undergoing other bariatric procedures.

After one year, the median body weight fell by 29 kg, [body mass index](#) (BMI) decreased by 10.2 kg/m², HbA1c and triglycerides declined, and serum calcium, vitamin D, and high-density lipoprotein cholesterol (HDL-C) increased. Total cholesterol and low-density lipoprotein cholesterol (LDL-C) remained largely unchanged. QCT also showed reductions in erector spinae and psoas major muscle areas, indicating skeletal muscle loss alongside fat loss. Median 25(OH)D rose from approximately 12 to 21 ng/mL, but most patients remained below the study's cutoff.

Patients were categorized based on postoperative vitamin D status: 82 were classified as deficient and 31 as normal. The deficient group had a median 25(OH)D level of approximately 16 ng/mL, compared to 44 ng/mL in the normal group. Patients with vitamin D deficiency had greater fat infiltration in the erector spinae and psoas major muscles and higher [visceral fat](#) measurements. No significant differences were observed between groups in HbA1c, serum calcium, triglycerides, HDL-C, LDL-C, or other muscle and fat parameters.

At one year, higher postoperative vitamin D levels were associated with lower muscle fat infiltration and less visceral adiposity in bariatric surgery patients. Among 86 patients whose vitamin D concentrations increased after [surgery](#), changes in vitamin D were not significantly associated with changes in clinical, fat, or muscle measurements after correction for multiple comparisons.

A sensitivity analysis of patients who underwent sleeve gastrectomy supported these findings, showing that vitamin D deficiency was associated with greater muscle fat infiltration and higher residual visceral fat at follow-up. After adjusting for age, sex, baseline BMI, and surgical procedure, preoperative vitamin D levels were not significantly associated with postoperative [body composition](#).

Conclusion

Bariatric surgery can lead to significant weight loss, lower BMI, and improvements in several [metabolic indicators](#), but skeletal muscle area also declined in this cohort. Using the study's threshold, vitamin D deficiency remained common one year after surgery and was associated with more fat within muscles and around internal organs. The findings support monitoring vitamin D and body composition after surgery, but do not establish that raising vitamin D concentrations improves these outcomes.

The study has several limitations. The study was conducted at a single center, had a relatively small sample size, and included different types of bariatric procedures. The researchers collected data only before surgery and at one year after, so it is unclear how vitamin D and body composition may change at other times. Adherence to vitamin D supplementation was not closely tracked, so the high rate of deficiency after surgery could reflect missed doses and biological factors. The study was observational, and its postoperative correlations were not adjusted for clinical confounding factors. [Parathyroid hormone levels](#) were not available, limiting the interpretation of vitamin D and calcium metabolism. Although imaging protocols were standardized and independently reviewed, measurement errors may still occur.

Future research should include more patients from multiple centers, with follow-up at several time points. Better tracking of vitamin D supplementation and more detailed metabolic and [imaging studies](#) could help clarify the role of vitamin D in body composition changes and long-term outcomes after bariatric surgery.

Source:

<https://www.news-medical.net/news/20261027/CT-scans-linked-vitamin-D-levels-to-fat-within-muscles-after-bariatric-surgery.aspx>