

Spectral CT Analysis of Adipose Tissue Area for Predicting Long-term Remission of Type 2 Diabetes After Metabolic Bariatric Surgery

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Introduction

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Introduction

1. Several studies have demonstrated that subcutaneous adipose tissue (SAT) and visceral adipose tissue (VAT) are strongly associated with the development of type 2 diabetes mellitus (T2DM) in patients with obesity,
2. there is still a lack of research on its relationship with long-term remission of T2DM after metabolic bariatric surgery (MBS).
3. To investigate the relationship between preoperative SAT and VAT areas and long-term remission of T2DM after MBS.

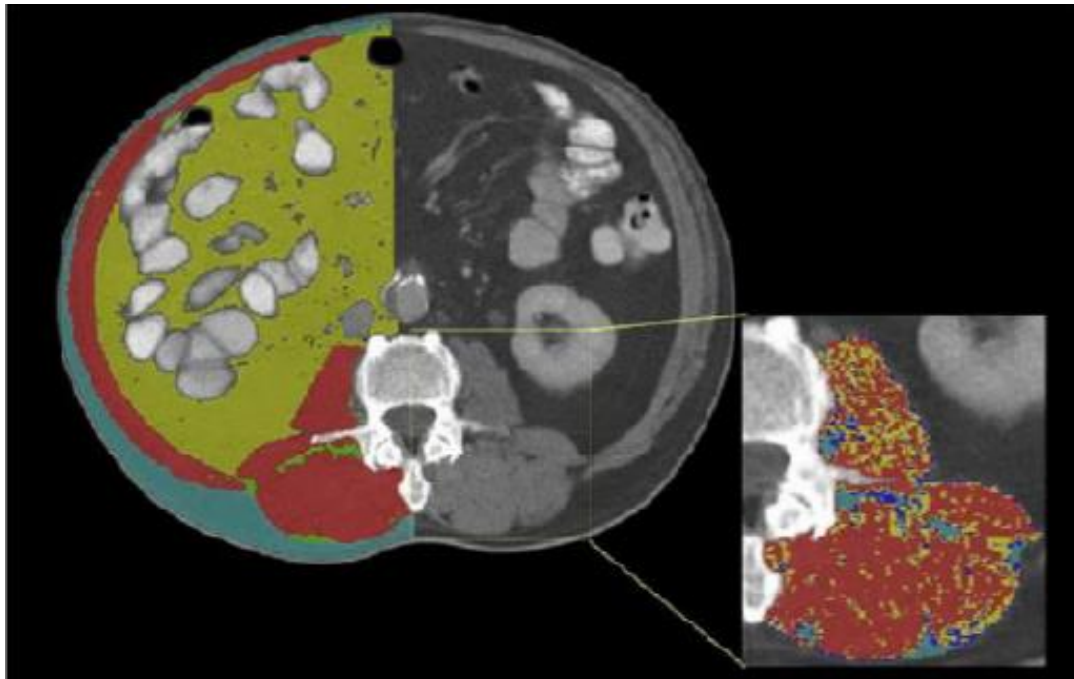
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Methods

1. We retrospectively collected preoperative and 5-year postoperative follow-up data from patients with obesity
2. Use CT measurement techniques (sliceOmatic, version 5.0) to obtain preoperative SAT and VAT areas at the umbilical level, which were correlated with remission of T2DM at 5 years postoperatively in univariate regression analysis
3. Those indicators that were significant in the univariate regression analysis were included in the multivariate regression analysis.

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Methods



骨骼肌 (SM) **红色** (-29, +150);
脂肪(adipose tissue, AT) 肌间脂肪 (IMAT) **绿色** (-190, -30)
皮下脂肪 (SAT) **蓝色** (-190, -30)
内脏脂肪 (VAT) **黄色** (-150, -50)

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Inclusion criteria

- (1) indications for bariatric surgery;
- (2) obesity, i.e., BMI ≥ 32.5 kg/m²;
- (3) overweight, i.e., BMI ≥ 27.5 kg/m², combined with metabolic diseases, such as hypertension, diabetes, dyslipidemia, sleep apnea syndrome, or polycystic ovarian syndrome;
- (4) T2DM diagnosed based on the Chinese Guidelines for Prevention and Treatment of Type 2 Diabetes Mellitus (2020 Edition
- (5) voluntary participation and informed consent for the study.

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Exclusion criteria

- (1) serious diseases of the heart, lung, liver, kidney, or circulation or mental illness;
- (2) previous gastrointestinal surgery;
- (3) age < 18 years or > 65 years;
- (4) malignancy;
- (5) gastrointestinal diseases, such as gastrointestinal bleeding and peptic ulcer;
- (6) pregnancy or lactation;
- (7) other diseases contraindicating surgery.

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T2DM remission standard

- Partial remission was defined as a prediabetic state lasting at least 1 year (glycated hemoglobin [HbA1c] < 6.5%; fasting blood glucose, 5.6–6.9 mmol/L).
- Complete remission was defined as complete recovery of normal glucose metabolism indicators for over 1 year (normal HbA1c < 6.0%; fasting blood glucose < 5.6 mmol/L).
- Long-term remission was defined as complete remission lasting at least 5 years.

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Results

- A total of 192 patients were enrolled in our study.
- The mean body mass index (BMI) was 40.60 (8.81) kg/m²
- the percentage of total weight loss (%TWL) was 28.88 (10.26)%.
- The 5-year postoperative complete and partial remission rates of T2DM were 42.2% and 32.8%, respectively.

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Results

- univariate regression analysis showed that
- age (OR=0.86, 95% CI: 0.83-0.90, $p<0.001$)
- BMI (OR=1.17, 95% CI: 1.10-1.25, $p<0.001$)
- duration of T2DM (OR=0.76, 95% CI:0.70-0.83, $p<0.001$)
- insulin use (OR=0.30, 95% CI:0.15-0.58, $p<0.001$)
- SAT area (OR=1.42, 95% CI: 1.14- 1.77, $p=0.002$), and VAT area (OR=0.21, 95% CI: 0.12-0.38, $p<0.001$) were predictors of long-term remission of T2DM after MBS.

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Results

- Multivariate regression analysis showed that age (OR=0.90, 95% CI: 0.85-0.96, $p=0.001$), BMI (OR=1.19, 95% CI: 1.08-1.33, $p<0.001$), duration of T2DM (OR=0.87, 95% CI: 0.77-0.99, $p<0.05$)
- SAT area (OR=1.54, 95% CI: 1.01-2.35, $p<0.05$), and VAT area (OR=0.19, 95% CI: 0.07-0.53, $p=0.001$) were independent risk factors predicting long-term remission of T2DM after MBS.

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Conclusion

- CT-measured adipose tissue area in patients with obesity combined with T2DM was significantly correlated with long-term remission of T2DM after MBS;
- SAT and VAT area were an independent risk factors predicting long-term remission of T2DM after MBS.

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Thank you!

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