Imaging changes of the male breast following bariatric surgery: a retrospective study

Pengpeng Wang, Baoyin Liu, Hua Meng, China-Japan Friendship Hospital

Bariatric surgery has been shown to have a positive and long-lasting effect on the treatment of severe obesity. Studies have shown that male patients with gynecomastia require additional surgical intervention to enhance their body image satisfaction following massive weight loss resulting from bariatric surgery[1]. However, no research has examined the impact of bariatric surgery-induced fat redistribution and alterations on the breast glands of male patients. This study aimed to assess the changes in breast imaging in male patients following bariatric surgery.

[1]Barone M, et al. Aesthetic plastic surgery. 2018; 42(6):1506-18.

Table 1 Patient baseline characteristics

	Patients (N=36)	Gynecomastia (N=21)	Controls (N=15)
Age (years)	38.25±9.25	37.43±8.24	39.4±10.69
Height (cm)	176.64±6.59	177.57±6.75	175.33±6.35
Weight (kg)	129.01±34.93	130.78±32.69	126.53±38.9
BMI (kg/m^2)	40.96±9.37	41.21±8.91	40.61±10.28
Waist circumference (cm)	129.43±20.68	130.74±20.08	127.6±22.08
Surgery type			
SG	28 (77.78)	16 (76.19)	12 (80.00)
RYGB	8 (22.22)	5 (23.81)	3 (20.00)
Smoking	21 (58.33)	16 (76.19)	5 (33.33)
Alcohol	17 (47.22)	12 (57.14)	5 (33.33)
Hypertension	21 (58.33)	11 (52.38)	10 (66.67)
Diabetes	26 (72.22)	14 (66.67)	12 (80.00)

BMI: body mass index; SG: sleeve gastrectomy; RYGB: Roux-en-Y gastric bypass.

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36 male patients who had undergone bariatric surgery were enrolled in the study. The BODY-Q questionnaire was administered to evaluate postoperative patient-reported outcomes.

Results showed that bariatric surgery resulted in significant decreases in BMI, and weight, and marked improvements in blood pressure, blood glucose, and blood lipids (all $P<0.05$).

Figure A male patient who underwent sleeve gastrectomy is preparing to undergo correction surgery for severe gynecomastia.

Table 2 Changes in clinical and laboratory parameters after bariatric surgery

	Before Surgery	After Surgery	P value	N
Weight (kg)	129.01±34.93	93.52±27.06	<0.001	36
BMI (kg/m^2)	40.96±9.37	29.7±7.45	<0.001	36
Waist circumference (cm)	129.43±20.68	102.81±18.69	<0.001	36
SBP (mmHg)	138.42±15.77	127.72±19.68	0.008	36
DBP (mmHg)	89.22±13.46	80.5±10.71	0.002	36
Hemoglobin (g/L)	154.43±10.4	138.49±14.32	<0.001	35
Glucose (mmol/L)	7.36±2.57	4.84±1	<0.001	36
Insulin (μIU/mL)	21.71±14.15	7.67±5.42	<0.001	34
C-Peptide (ng/mL)	4.07±2.11	2.05±0.87	<0.001	34
HbA1c (%)	7.66±2.1	5.47±0.53	<0.001	36
Cholesterol (mmol/L)	4.78±1.09	4.08±0.83	<0.001	35
Triglyceride (mmol/L)	2.6±2.89	0.95±0.41	<0.001	35
HDL-cholesterol (mmol/L)	1.13±0.69	1.36±1.4	0.022	35
LDL-cholesterol (mmol/L)	2.64±0.69	2.18±0.77	0.002	35

BMI: body mass index; SBP: systolic blood pressure; DBP: diastolic blood pressure.

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Gynecomastia was identified in 21 out of 36 patients following CT imaging assessment.

After surgery, the breast axial diameter and the breast density increased significantly in the gynecomastia group or all patients. Following surgical intervention, the breast vertical diameter and subcutaneous tissue thickness decreased significantly, whereas the breast vertical percentage increased significantly in both groups.

Figure CT scan of a male patient (2022.1-2023.4).

Table 3 Imaging changes of the breast in all patients following bariatric surgery

	Before Surgery	After Surgery	P value	N
Left breast axial diameter (mm)	17.68±8.18	21.11±8.98	<0.001	36
Left breast vertical diameter (mm)	15.68±8.86	11.21±5.75	<0.001	36
Left subcutaneous tissue thickness (mm)	36.18±14.51	22.06±12.67	<0.001	36
Left breast vertical percentage (%)	44.8±17.95	55.64±17.51	<0.001	36
Left breast density (Hu)	-9.8±36.52	8.92±29.65	<0.001	36
Right breast axial diameter (mm)	18.41±9.58	20.82±9.68	<0.001	36
Right breast vertical diameter (mm)	14.28±7.77	10.7±5.19	<0.001	36
Right subcutaneous tissue thickness (mm)	35.21±14.63	21.42±12.14	<0.001	36
Right breast vertical percentage (%)	42.81±16.31	55.36±16.71	<0.001	36
Right breast density (Hu)	-4.39±34.46	10.17±28.36	<0.001	36

Table 4 Imaging changes of the breast in patients with gynecomastia following bariatric surgery

	Before Surgery	After Surgery	P value	N
Left breast axial diameter (mm)	23.4±4.48	27.55±5	<0.001	21
Left breast vertical diameter (mm)	19.59±8.92	13.61±5.97	<0.001	21
Left subcutaneous tissue thickness (mm)	37.37±14.06	21.9±10.38	<0.001	21
Left breast vertical percentage (%)	53.63±15.11	64.91±13.09	<0.001	21
Left breast density (Hu)	10.27±27.62	25.89±19.72	<0.001	21
Right breast axial diameter (mm)	24.8±6.87	27.45±6.72	0.009	21
Right breast vertical diameter (mm)	17.71±7.59	12.6±5.45	<0.001	21
Right subcutaneous tissue thickness (mm)	36.61±14.55	21.49±10.31	<0.001	21
Right breast vertical percentage (%)	50.28±12.39	62.05±14.18	<0.001	21
Right breast density (Hu)	13.16±26.79	24.04±21.47	0.002	21

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A total of 24 patients completed the BODY-Q questionnaire, with 13 patients diagnosed with gynecomastia and 11 patients belonging to the control group. There was no statistically significant difference between the gynecomastia and control groups in terms of abdomen, body, chest, nipples, scars, skin, appearance distress, body image, psychological function, and sexual function scores.

Table 5 BODY-Q scores among patients after bariatric surgery

	Controls N=11	Gynecomastia N=13	P value
Abdomen	52.73±25.38	58.31±22.49	0.574
Body	51.91±22.92	59.69±21.31	0.691
Chest	45.45±27.24	55.31±24.86	0.364
Nipples	62.18±28.52	61.77±22.24	0.969
Scars	81.64±20.39	95.54±11.94	0.093
Skin	82.36±26.41	75.85±23.87	0.459
Appearance Distress	44±31.6	41.69±34.28	0.531
Body Image	64±28.73	58.62±20.18	0.596
Psychological Function	72.27±25.44	75±20.62	0.865
Sexual Function[a]	59.56±12.14	62.27±17.51	0.698
Social Function	73±17.89	74.31±21.48	0.865

[a] The cases in Sexual Function were N=9 for the control group and N=11 for the gynecomastia group respectively.

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The postoperative breast axial and vertical diameter in the gynecomastia group as well as subcutaneous tissue thickness, vertical percentage, and breast density in the control group were primarily associated with multiple BODY-Q scale scores.

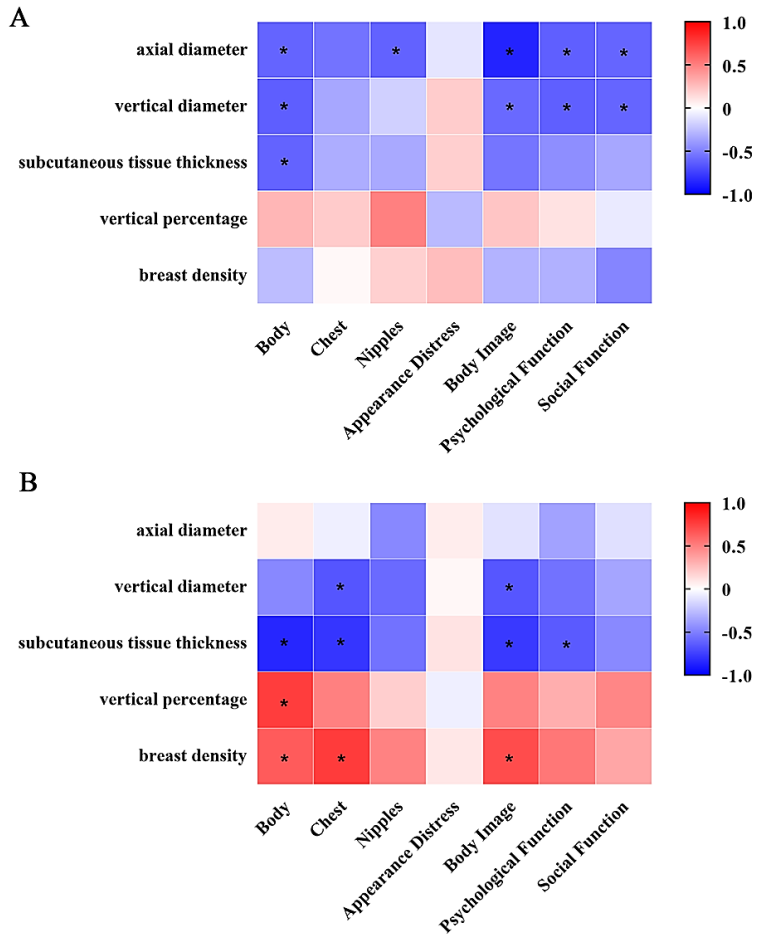

Figure Heat map of bivariate correlation analysis between scale scores and the mean value of postoperative imaging parameters. (A) gynecomastia group; (B) control group. *: $P<0.05$.

CONFLICT OF INTEREST DISCLOSURE

I have no potential conflict of interest to report.