

SUPPLEMENTARY DATA

PET/CT protocol and imaging analysis

All patients underwent routine FDG PET/CT scans with either Discovery STe or Discovery 600 PET/CT systems (GE Healthcare, Milwaukee, WI, USA). All patients fasted for at least 6 hours, and glucose levels in peripheral blood were confirmed to be ≤ 126 mg/dL in all patients before FDG injection. Approximately 5.5 MBq/kg of FDG was administered intravenously 1 hour before image acquisition. After the initial low-dose CT (30 mA, 130 kVp), standard PET imaging was performed from the neck to the proximal thigh with an acquisition time of 3 min/bed in three-dimensional mode. Images were then reconstructed using the ordered subset expectation maximization (2 iterations, 20 subsets).

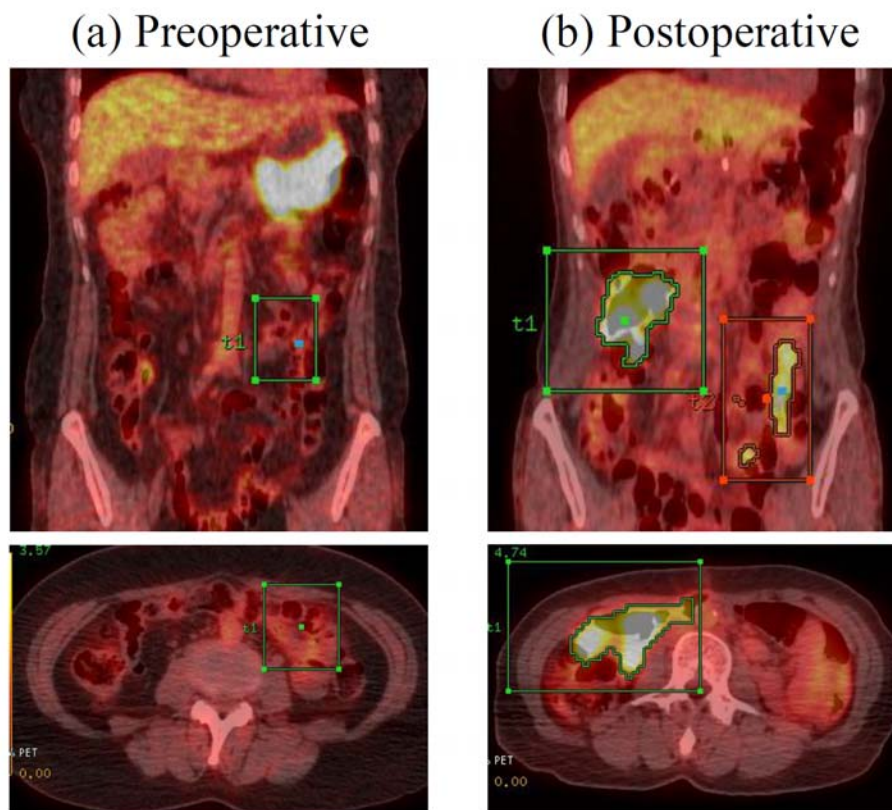
Images were reviewed on a GE AW 4.0 workstation (GE Healthcare, Milwaukee, WI, USA) by two experienced nuclear medicine specialists (A.C., 12 years of experience; N.L., 6 years of experience) blinded to clinical information. Multiple volumes of interest were drawn on each metabolically active lesion (SUV threshold 2.5) in the small bowel. The metabolic volume (MTV, cm^3) was defined as total lesion volume of voxels above a threshold SUV of 2.5 within the volume of interest. For lesions with a SUV of less than 2.5, MTV was set as 0.0 cm^3 . The mean SUV (SUV_{mean}) of each lesion was recorded, and total lesion glycolysis (TLG) was obtained by multiplying SUV_{mean} and MTV. Finally, global MTV and TLG were calculated by summing all corresponding values, recorded in Table 1. A representative image of TLG methodology is shown in Supplementary Figure 1. This process was performed for both baseline and postoperative FDG PET/CT data.

Abdominal fat analysis

Abdominal subcutaneous and visceral adipose tissue (ASAT and AVAT, respectively) were measured on the non-contrast enhanced CT scans acquired during PET/CT using a workstation (Volume Analysis, Advantage Workstation 4.0, GE Healthcare). Adipose tissue was defined as attenuation ranging from -50 to -200 HU, as reported in previous studies.(1; 2) Total abdominal fat volume (ASAT + AVAT) were measured on axial images at the umbilicus level using an ROI with this HU threshold to include the subcutaneous and visceral adipose tissue. On the same axial image, an additional ROI was drawn on the visceral fat portions using the same HU threshold to determine the AVAT. ASAT was calculated as total abdominal fat volume minus AVAT.

SUPPLEMENTARY DATA

Supplementary Figure 1. Representative figure of total lesion glycolysis (TLG) methodology in a 50-year-old female patient who underwent Roux-en-Ygastrostomy for advanced gastric cancer. (a) Preoperative coronal and axial PET/CT fusion images shows no significant small bowel uptake. A volume of interest (VOI) was drawn on the small bowel using a SUV threshold of 2.5, resulting in a preoperative TLG of 0. (b) Postoperative FDG PET/CT showing newly developed small bowel activity. Right side bowel VOI showed total lesion glycolysis (TLG) of 406.6 and left side bowel VOI showed TLG of 72.7. Patient TLG was recorded as 479.3. Clinically, patient fasting glucose level decreased from 115mg/dL to 82mg/dL, and body weight reduced from 23.6 to 22.4 kg.



SUPPLEMENTARY DATA

Supplementary Table 1. Clinical characteristics of patients according to preoperative body mass index and changes of postoperative fasting glucose

	BMI<23 kg/m ²			BMI≥23 kg/m ²		
	Decrement of fasting glucose		P Value	Decrement of fasting glucose		P Value
	Group 1	Group 2		Group 1	Group 2	
Number of patients	30	103		31	75	
Age	55 (46~60)	58 (44~69)	0.320	56 (50~63)	57 (48~64)	0.870
Gender (F/M)	18/12	42/61	0.063	12/19	17/58	0.092
Pre-op Weight (Kg)	56 (52~61)	56 (50~60)	0.747	68 (60~75)	69 (64~73)	0.967
Δ Weight (Kg)	-4 (-7~-2)	-3 (-6~0)	0.090	-9 (-12~-3)	-6 (-11~-2)	0.550
Pre-op Body mass index (kg/m ²)	22.0 (19.8~22.5)	20.8 (19.6~21.8)	0.054	25.6 (24.1~27)	24.7 (23.9~26.1)	0.067
Δ Body mass index (kg/m ²)	-1.2 (-2.8~-0.6)	-1.1 (-2.1~0.2)	0.167	-3.2 (-4.7~-1.1)	-2.2 (-3.6~-0.8)	0.316
Pre-op Fasting glucose (mg/dL)	100 (93~108)	93 (85~97)	<0.001	105 (102~110)	91 (86~98)	<0.001
Δ Fasting glucose (mg/dL)	-15 (-20~-13)	1 (-4~12)	<0.001	-15 (-22~-13)	4 (-1~12)	<0.001
Pre-op Total Cholesterol (mg/dL)	179 (155~213)	171 (152~189)	0.260	191 (170~228)	177 (152~204)	0.046
Δ Total Cholesterol (mg/dL)	7 (-32~24)	-2 (-21~21)	0.730	-24 (-43~8)	-7 (-25~13)	0.309
Follow up duration of PET/CT	16.9 (9~24.8)	12.7 (9.9~35.5)	0.861	12.1 (11.7~29.8)	12.1 (10.1~24.4)	0.605
Surgical methods			0.020			0.012
Billroth I	6	44		3	28	
Billroth II	12	19		11	14	
Roux-en-Y	12	40		17	33	
SUVmax						
Preoperative	2.9 (2.1~4.3)	2.8 (0~3.5)	0.071	3.1 (2.8~3.6)	3.0 (2.2~3.8)	0.209
Postoperative	4.5 (3.7~6.0)	4.0 (3.1~5.1)	0.029	4.8 (3.7~7.3)	4.7 (3.3~6.7)	0.410
MTV						
Pre-operative	0.5 (0~10.8)	0 (0~8.1)	0.379	1.9 (0.3~13.3)	1.1 (0~5.3)	0.176
Postoperative	15.1 (5.5~30.0)	8.3 (1.6~30.8)	0.088	27.5 (7.2~116.0)	13.5 (3.6~48.0)	0.040
TLG						
Pre-operative	1.3 (0~31.1)	0.1 (0~22.7)	0.429	5.0 (0.8~38)	2.9 (0~14.9)	0.192
Postoperative	44.8 (16.2~92.5)	20.6 (4.5~94.9)	0.062	86.3 (22.1~353.1)	39.8 (11.0~156.3)	0.048
Pre-op Total Body fat (cm ³)	20.1 (13.6~25)	16.1 (11.6~22)	0.148	29.9 (23.5~33.8)	25.4 (21.3~29.2)	0.007
Δ Total Body fat (cm ³)	-7.6 (-13.8~-3.2)	-6.7 (-10.4~-2.1)	0.219	-11.8 (-17.7~-10)	-10.0 (-14.1~-5.6)	0.008
Pre-op Visceral Body fat (cm ³)	6 (3.8~8.5)	5 (3.5~7.6)	0.341	10.9 (8.1~14.1)	9.4 (7.3~11.9)	0.088
Δ Visceral Body fat (cm ³)	-3.3 (-4.9~-1.1)	-2 (-3.8~-0.9)	0.107	-6.7 (-8.1~-4.7)	-4.8 (-6.5~-2.8)	0.003
Pre-op Subcutaneous Body fat (cm ³)	12.6 (7.2~17.4)	10.4 (6.9~14.2)	0.154	18.5 (14.1~21.6)	15.1 (12.2~18.5)	0.056
Δ Subcutaneous Body fat (cm ³)	-4.8 (-7.3~-1.2)	-4.2 (-7.1~-0.7)	0.568	-6.8 (-10.4~-2.3)	-5.3 (-8~-2)	0.065

Data are presented as median (interquartile range). Wilcoxon signed rank test or chi-squared test for bivariate factors. Group 1 includes patients with decreased fasting glucose above 10 mg/dL and Group 2 are the others.

SUPPLEMENTARY DATA

Supplementary Table 2. Changes of metabolic parameters with newly developed FDG uptake in bowel

	Increased bowel uptake		P Value*
	TLG \geq 42	No bowel uptake TLG<42	
Number of patients	115 (48.1%)	124 (51.9%)	
Age	56 (48~64)	57 (45~65)	0.885
Gender (F/M)	48:67	41:83	0.166
Follow-up duration † (months)	12.9 (11.7~35.6)	12.1 (8.8~24.3)	0.058
Pathologic diagnosis			0.611
Early gastric cancer	30 (45.5%)	36 (54.5%)	
Advanced gastric cancer	85 (49.1%)	88 (50.9%)	
Surgical methods			0.003
Billroth I	32 (39.5%)	49 (60.5%)	
Billroth II	21 (37.5%)	35 (62.5%)	
Roux-en-Y	62 (60.8%)	40 (39.2%)	
Pre-op Weight (Kg)	62 (56~71)	60 (54~66.1)	0.028
Δ weight	-5 (-9.3~-2)	-4 (-7~-1)	0.021
Pre-op Body mass index (kg/m ²)	23.3 (21.6~25.2)	22.1 (20.2~23.9)	<0.001
Δ BMI	-1.6 (-3.3~-0.4)	-1.2 (-2.6~-0.3)	0.021
Pre-op Fasting glucose (mg/dL)	96 (89~104)	93 (86~100)	0.016
Δ Fasting glucose	-5 (-13~5)	1.5 (-5.8~12)	<0.001
Pre-op Total Cholesterol (mg/dL)	180 (156~209)	174 (152~199.5)	0.175
Δ Total Cholesterol	-9 (-32~9)	-2 (-22~19)	0.048
Pre-op Bowel uptake			
SUVmax	3 (2.4~3.7)	2.8 (0~3.6)	0.028
MTV	1.6 (0~9)	0.2 (0~6.9)	0.031
TLG	4.2 (0~25.8)	0.5 (0~18.8)	0.032
Pre-op Total Body Fat (cm ³)	23.2 (16.7~28.8)	20.8 (13.9~25.5)	0.034
Δ Total body fat (cm ³)	-9.7 (-14.6~-5.1)	-7.7 (-12.5~-3.5)	0.032
Pre-op Visceral Body Fat (cm ³)	8.6 (4.9~10.3)	6.7 (4.1~9.4)	0.036
Δ Visceral body fat (cm ³)	-4.3 (-6.6~-2.1)	-2.9 (-5.3~-1.3)	0.002
Pre-op Subcutaneous Body Fat (cm ³)	14.1 (10.8~17.5)	12.2 (9~17.2)	0.091
Δ Subcutaneous body fat (cm ³)	-5.1 (-7.9~-1.9)	-4.4 (-7.8~-0.9)	0.229

*Wilcoxon signed rank test or chi-squared test for bivariate factors.

† Follow up duration: postoperative PET/CT - operation

Δ variable: preoperative variable – postoperative variable (minus values indicate decrease in values after surgery)

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Supplementary Table 3. Additional benefit of bowel uptake in predicting decrement of fasting glucose after surgery

		Decrement of fasting glucose		<i>P</i> Value*
		Group 1	Group 2	
Billroth I				0.296
	No bowel uptake (TLG<42)	4	45	
	bowel uptake (TLG≥42)	5	27	
Billroth II				0.183
	No bowel uptake (TLG<42)	12	23	
	bowel uptake (TLG≥42)	11	10	
Roux-en-Y				0.004
	No bowel uptake (TLG<42)	5	35	
	bowel uptake (TLG≥42)	24	38	

*chi-squared or Fisher's Exact Test

REFERENCES

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2. Yoshizumi T, Nakamura T, Yamane M, Islam AH, Menju M, Yamasaki K, Arai T, Kotani K, Funahashi T, Yamashita S, Matsuzawa Y: Abdominal fat: standardized technique for measurement at CT. *Radiology* 1999;211:283-286