Supplementary Material

Title: Pre-intervention clinical determinants and measured β-cell function as predictors of type 2 diabetes remission one year after Roux-enY Gastric bypass surgery
Running title (less than 40 character): Determinants of diabetes remission after RYGB

Supplemental Table 1. Comparison of baseline subject characteristics according to diabetes remission status after RYGB.

Variables	All (n = 73)	F-REM (n = 32)	P-REM (n = 29)	N-REM (n = 12)	p
Female n (%)	59 (80.8)	26 (81.3)	27 (93.1)	5 (50.0) [†§]	0.01
White non-Hispanic n (%)	6 (8.2)	4 (12.5)	1 (3.5)	1 (8.3)	0.50
Hispanic n (%)	44 (60.3)	17 (53.1)	21 (72.4)	6 (50.0)	--
Black non-Hispanic n (%)	23 (31.5)	11 (34.4)	7 (24.1)	5 (41.7)	--
Age (years)	44.78 ± 9.23	42.5 ± 9.2	45.9 ± 9.18	48.17 ± 8.57	0.17
Weight (kg)	117.7 ± 17.43	119.6 ± 16.65	116.4 ± 16.58	115.7 ± 22.09	0.65
Height (meters)	1.64 ± 0.08	1.64 ± 0.07	1.63 ± 0.07	1.66 ± 0.13	0.77
BMI (kg/m²)	43.78 ± 5	44.46 ± 5.38	43.85 ± 4.81	41.8 ± 4.21	0.30
Fat Mass %	49.81 ± 7.26	50.46 ± 6.91	49.75 ± 7.12	48.18 ± 8.89	0.82
Waist Girth (cm)	126.5 ± 12.48	127.0 ± 11.71	126.2 ± 13.06	125.6 ± 14.13	0.86
Post-surgery Weight Loss (%)	0.26 ± 0.12	0.28 ± 0.13	0.25 ± 0.1	0.22 ± 0.13	0.26
SBP (mm Hg)	127.4 ± 17.42	130.7 ± 19.03	124.7 ± 17.47	125.1 ± 11.81	0.64
DBP (mm Hg)	76.77 ± 13.12	80 ± 13.8	72.92 ± 12.72	77.91 ± 10.78	0.19
HDL (mg/dL)	48.03 ± 12.35	47 ± 9.82	49.39 ± 14.27	47.5 ± 14.74	0.83
LDL (mg/dL)	108.8 ± 29.7	113.1 ± 28.01	107.2 ± 30.07	100.0 ± 34.43	0.35
Total Cholesterol (mg/dL)	190.6 ± 35.75	195.9 ± 35.76	189.0 ± 30.63	178.1 ± 47.96	0.33
Triglycerides (mg/dL)	170.4 ± 118.6	180.1 ± 152.5	165.3 ± 89.74	155.3 ± 63.86	0.98
HOMA-IR	10.95 ± 6.06	10.02 ± 5.58	11.07 ± 5.14	13.02 ± 8.82	0.49
ISI	5.34 ± 3.03	5.93 ± 2.89	5.31 ± 3.39	4.91 ± 2.8	0.23
Diabetes Duration (years)	4.42 ± 5.59	1.64 ± 1.81	5.19 ± 6.61 [*]	10.53 ± 4.8 [†§]	<0.001
Non-insulin DM medications n (%)	1.1 ± 0.96	0.78 ± 0.75	1.17 ± 0.76	1.75 ± 1.48	0.03
Insulin Use n (%)	9 (12.3)	0 (0.0)	4 (12.5) [*]	5 (15.6) [†]	<0.001
Total DM medications (n)	1.1 ± 0.96	0.78 ± 0.75	1.17 ± 0.76	1.75 ± 1.48 [†]	0.01
HbA1c%	7.08 ± 1.1	6.78 ± 0.95	7.07 ± 1.09	7.93 ± 1.11 [†§]	0.02
DiaRem	5.25 ± 4.91	3.34 ± 2.34	5.21 ± 5.01	10.42 ± 6.23 [†§]	0.001
Ad-DiaRem	6.88 ± 4.73	4.72 ± 3.05	7.28 ± 4.54	12.09 ± 5.2 [†§]	<0.001

Data are mean ± SD. The difference in means was tested by Kruskal-Wallis. The difference in frequencies was tested by Fisher's exact test. *Statistically significant difference P-REM vs F-REM, p-value of Tukey test <0.05; † statistically significant difference N-REM vs F-REM, p-value of Tukey test <0.05; § statistically significant difference N-REM vs P-REM, p-value of Tukey test <0.05; DM: type 2 diabetes; SBP: systolic blood pressure; DPB: diastolic blood pressure.

Supplemental Table 2. Pre-surgery metabolic, hormonal, and β-cell function surrogates in individuals with various known diabetes remission status one-year post-RYGB.

Variables	All (n = 73)	F-REM (n = 32)	P-REM (n = 29)	N-REM (n = 12)	p
HOMA-B	198.9 ± 179.3	210.2 ± 183.2	200.6 ± 192.5	165.8 ± 142.1	0.40
OGTT Derived Metabolic and Hormonal Markers					
Glucose AUC (mmol/L·min^{-1}	11.17 ± 2.99	10.23 ± 2.67	11.37 ± 2.76	13.2 ± 3.48†	0.01
Insulin AUC (pmol/L·min)	28.67 ± 70.63	27.66 ± 95.85	33.29 ± 48.88	20.23 ± 23.22	0.07
Insulin iAUC (pmol/L·min^{-1})	-3.15 ± 64.57	-2.54 ± 85.93	0.86 ± 45.87	-14.44 ± 30.71	0.39
C-peptide AUC (nmol/L·min)	5.8 ± 2.76	6.92 ± 2.54	5.68 ± 2.3	3.21 ± 2.69†§	<0.001
C-peptide iAUC (nmol/L·min^{-1})	2.54 ± 1.55	3.04 ± 1.67	2.5 ± 1.27	1.34 ± 1.21†§	0.004
BCGS (pmol·kg^{-1}· min^{-1}· mmol/L^{-1})	0.56 ± 0.44	0.68 ± 0.41	0.54 ± 0.48	0.22 ± 0.18†	0.004
DI	0.07 ± 0.08	0.1 ± 0.1	0.06 ± 0.06	0.02 ± 0.02†	0.01
IGI	9.15 ± 15.34	11.43 ± 18.95	9.1 ± 13.42	3.4 ± 5.51	0.27
GLP-1 AUC (pmol/L·min^{-1})	18.19 ± 17.07	14.43 ± 11.63	21.16 ± 21.09	21.06 ± 17.87	0.50
GGI/IV Derived Metabolic and Hormonal Markers					
Insulin AUC (pmol/L·min^{-1})	56.19 ± 37.96	58.53 ± 33.85	60.88 ± 44.49	37.64 ± 26.59	0.06
Insulin iAUC (pmol/L·min^{-1})	26.51 ± 36.99	33.32 ± 26.74	29.85 ± 40.55	-1.17 ± 2.86†	0.01
C-peptide AUC (nmol/L·min^{-1})	3.77 ± 2.53	3.93 ± 2.1	4.03 ± 3.04	2.68 ± 2.19	0.15
C-peptide iAUC (nmol/L·min^{-1})	1.59 ± 1.69	1.71 ± 1.22	1.67 ± 2.31	1.06 ± 0.9	0.14
BCGS (pmol·kg^{-1}·min^{-1}· mmol/L^{-1})	0.35 ± 0.32	0.44 ± 0.3	0.31 ± 0.34	0.13 ± 0.09†	0.01
DI	0.05 ± 0.06	0.06 ± 0.07	0.04 ± 0.04	0.01 ± 0.01†	0.01

Data are mean ± SD. The difference in means was tested by Kruskal-Wallis. *Statistically significant difference P-REM vs F-REM, p-value of Tukey test <0.05; † statistically significant difference N-REM vs F-REM, p-value of Tukey test <0.05; § statistically significant difference N-REM vs P-REM, p-value of Tukey test <0.05

Supplemental Table 3. Comparison of selected baseline glucose/glucose derived measurements during either oral of IV challenge by cohort.

Variables	All (n = 79)	Cohort 1 (n = 23)	Cohort 2 (n = 27)	Cohort 3 (n = 29)	p
OGTT derived					
Fasting Glucose (mmol/L)	7.72 ± 2.08	7.73 ± 2.4	7.37 ± 1.72	8.03 ± 2.15	0.44
Glucose AUC (mmol/L·min^{-1})	11.2 ± 2.95	10.75 ± 2.93	10.07 ± 2.41	$12.61 \pm 2.93^{\dagger\S}$	0.003
Peak Glucose (mmol/L)	12.62 ± 3.87	13.35 ± 3.25	$9.38 \pm 2.1^{*}$	$15.06 \pm 3.55^{\S}$	<0.001
ISR AUC (pmol/kg^{-1}/min^{-1})	894.8 ± 550.2	1181 ± 740.2	816.5 ± 389.1	763.1 ± 433.2	0.06
BCGS (pmol·kg^{-1}· min^{-1}· mmol/L^{-1})	0.59 ± 0.5	0.65 ± 0.6	0.71 ± 0.49	0.49 ± 0.44	0.20
GGI/IV clamp derived					
Fasting Glucose (mmol/L)	7.41 ± 1.87	7.7 ± 2.43	7.3 ± 1.87	7.26 ± 1.35	0.94
Glucose AUC (mmol/L·min^{-1})	11.15 ± 2.69	9.71 ± 2.59	10.8 ± 3.1	$12.56 \pm 1.55^{\dagger\S}$	<0.001
Peak Glucose (mmol/L)	16.24 ± 4.69	13.63 ± 3.32	13.2 ± 3.4	$20.79 \pm 2.43^{\dagger\S}$	<0.001
ISR AUC (pmol/kg^{-1}/min^{-1})	751.5 ± 443.2	1004 ± 481.6	881.8 ± 286.6	$526.0 \pm 367.7^{\dagger\S}$	<0.001
BCGS (pmol·kg^{-1}· min^{-1}· mmol/L^{-1})	0.37 ± 0.38	0.43 ± 0.51	0.43 ± 0.33	0.3 ± 0.31	0.31

Data are reported as mean ± SD, unless otherwise indicated. P-values derived from chi-square tests Fisher's Exact test or Kruskal-Wallis test for comparison across three different cohorts. *Statistically significant difference cohort 1 vs cohort 2, p-value of Tukey test <0.05; † statistically significant difference cohort 1 vs cohort 3, p-value of Tukey test <0.05; § statistically significant difference cohort 2 vs cohort 3, p-value of Tukey test <0.05. DM: type 2 diabetes; HOMA-IR: Homeostasis model assessment of insulin resistance.

Supplemental Table 4. Comparison of baseline subject characteristics according to the duration of follow up after RYGB. All cohort, followed from 3 months up to 7 years and individuals followed up to 2 years.

Variables	Timepoint of Follow up post RYGB	
	Latest (3 months up to 7 years) (n = 79)	YEAR 2 (n = 48)
Female n (%)	63 (79.7)	42 (87.5)
Male n (%)	16 (20.3)	6 (12.5)
White non-Hispanic n (%)	6 (7.6)	2 (4.2)
Hispanic n (%)	48 (60.8)	33 (68.8)
Black non-Hispanic n (%)	25 (31.6)	13 (27.0)
Age (years)	44.25 ± 9.29	44.85 ± 9.2
Weight (kg)	117.24 ± 17.24	113.68 ± 15.45
Post-surgery Weight Loss (%)	25.64 ± 11.89	26.56 ± 10.18
Height (m)	1.64 ± 0.08	1.61 ± 0.06
BMI (kg/m²)	43.63 ± 4.92	43.68 ± 4.49
Fat Mass %	49.84 ± 7.14	50.36 ± 7.34
Waist Girth (cm)	126.21 ± 12.36	124.08 ± 10.52
Total Cholesterol (mg/dL)	188.61 ± 37.23	192.47 ± 38.41
HDL (mg/dL)	47.32 ± 12.32	46.62 ± 11.6
LDL (mg/dL)	107.41 ± 29.94	108.75 ± 30.94
Triglycerides (mg/dL)	170.74 ± 117.08	187.7 ± 135.61
DM Duration (years)	4.43 ± 5.51	4.57 ± 5.69
Non-Insulin DM Medications (n)	1.13 ± 0.98	1.19 ± 1.07
Insulin Use n (%)	11 (13.9)	6 (12.5)
Total DM Medications (n)	1.27 ± 1.13	1.31 ± 1.17
HbA1c %	7.12 ± 1.1	7.09 ± 1.11
DiaRem Score	5.39 ± 4.98	5.35 ± 5.01
Ad-DiaRem Score	6.88 ± 4.7	7.15 ± 4.66
HOMA-IR	11.36 ± 6.29	11.47 ± 6.19
ISI	5.34 ± 3.03	5.23 ± 2.96

Data are reported as mean $\pm$ SD, unless otherwise indicated. There was no statistical difference at baseline in these groups based on duration of follow up post RYGB. DM: type 2 diabetes; HOMA-IR: Homeostasis model assessment of insulin resistance.

Supplemental Table 5. Greater baseline β-cell glucose sensitivity after oral than after IV glucose challenge in individuals with severe obesity and type 2 diabetes according to duration of follow up after RYGB.

Timepoint of follow-up	Diabetes Remission Group	O-BCGS (pmol · kg-1 · min-1 · mmol/L−1)	IV-BCGS (pmol · kg-1 · min-1 · mmol/L−1)	p
Latest	All (n=79)	0.59 ± 0.5	0.37 ± 0.38	<0.001[***]
	F-REM (n=34)	0.71 ± 0.56	0.45 ± 0.41	<0.001[***]
	P-REM (n=31)	0.59 ± 0.47	0.38 ± 0.4	<0.001[***]
	N-REM (n=14)	0.26 ± 0.23	0.15 ± 0.11	0.07
Year 2	All (n = 48)	0.65 ± 0.55	0.4 ± 0.43	<0.001[***]
	F-REM (n=4)	0.83 ± 0.63	0.49 ± 0.48	<0.001[***]
	P-REM (n = 17)	0.56 ± 0.46	0.37 ± 0.41	<0.001[***]
	N-REM (n = 8)	0.29 ± 0.32	0.15 ± 0.15	0.31

Superscript to show significance with * for p<0.05, ** for p<0.01 and *** for p<0.001

Supplemental Table 6. Association between baseline clinical factors and BCGS measured during an oral and IV glucose challenges according to duration of follow up after RYGB.

	Timepoint							
	Latest				Year 2			
Variables	O-BCGS (R^2) n=63	p	IV-BCGS (R^2) n=60	p	O-BCGS (R^2) n= 41	p	IV-BCGS (R^2) n = 41	p
Age (years)	-0.02	0.32	-0.08	0.04[*]	-0.04	0.19	-0.11	0.04
BMI (kg/m²)	0.003	0.68	<0.001	0.94	-0.03	0.27	-0.01	0.67
Known DM Duration (yr)	-0.26	<0.001[***]	-0.16	0.002[**]	-0.34	<0.001[***]	-0.16	0.01
Insulin Use (n)	-0.3	<0.001[***]	-0.41	<0.001[***]	-0.41	<0.001[***]	-0.21	0.003[**]
Non-insulin DM medications (n)	-0.14	0.06	-0.04	0.33	-0.06	0.13	-0.01	0.63
Total DM medications	-0.18	<0.001[***]	-0.06	0.06	-0.17	0.01*	-0.05	0.18
HbA1c %	-0.38	<0.001[***]	-0.31	<0.001[***]	-0.63	<0.001[***]	-0.35	<0.001[***]
DiaRem	-0.42	<0.001[***]	-0.27	<0.001[***]	-0.58	<0.001[***]	-0.30	<0.001[***]
Ad-DiaRem	-0.35	<0.001[***]	-0.27	<0.001[***]	-0.50	<0.001[***]	-0.33	<0.001[***]

Both OGTT and IV BCGS log-transformed given non-normal data distribution. Superscript to show significance with * for p<0.05, ** for p<0.01 and *** for p<0.001; DM: type 2 diabetes.

Supplemental Table 7. Univariate and multivariate multinomial logistic regression analysis for prediction of post-RYGB diabetes remission status with complete remission group (F-REM) as reference according to duration of follow up after RYGB.

	Timepoint							
	LATEST (n = 79)				YEAR 2 (n = 48)			
	P-REM vs F-REM		N-REM vs F-REM		P-REM vs F-REM		N-REM vs F-REM	
Univariate analysis:								
O-BCGS	0.63 (0.21-1.87)	0.4	0.007 (0.0 – 0.38)	0.02*	0.41 (0.10 – 1.60)	0.20	0.02 (0.00 – 1.52)	0.08
IV-BCGS	0.65 (0.15 – 2.73)	0.55	0.002 (0.0 – 0.88)	0.05*	0.86 (0.19 – 3.88)	0.85	0.01 (0.00 – 5.47)	0.14
O-DI	<0.001(0.0 – 36.6)	0.32	0.02 (0.0 – 0.69)	0.05*	0.02 (0.00 – 73.87)	0.33	0.00 (0.00 – 11407.1)	0.17
IV-DI	0.09 (0.0 – 1546)	0.62	<0.001 (0.0 – 1214)	0.1	0.75 (0.00 – 23616)	0.96	0.00 (0.00 – 1.88e9)	0.24
HOMA-B	1.00 (0.99 – 1.00)	0.33	1.00 (0.99 – 1.00)	0.63	1.00 (1.00 – 1.00)	0.51	1.00 (0.99 – 1.00)	0.41
Early IGI	1.00 (0.98 – 1.02)	0.93	0.92 (0.82 – 1.03)	0.13	1.00 (0.97 – 1.02)	0.78	0.92 (0.79 – 1.08)	0.31
HOMA-IR	1.05 (0.97 – 1.14)	0.29	1.06 (0.95 – 1.17)	0.23	1.00 (0.90 – 1.11)	0.99	1.05 (0.93 – 1.20)	0.43
ISI	1.01 (0.84 – 1.20)	0.95	1.12 (0.92 – 1.36)	0.25	1.07 (0.86 – 1.34)	0.53	1.12 (0.84 – 1.49)	0.42
DiaRem	1.19 (1.02 – 1.39)	0.03*	1.40 (1.17 – 1.67)	<0.001***	1.17 (0.97 – 1.42)	0.10	1.40 (1.12 – 1.76)	0.004**
Ad-DiaRem	1.19 (1.02 – 1.38)	0.02*	1.47 (1.22– 1.78)	<0.001***	1.13 (0.95 1.33)	0.16	1.39 (1.11 – 1.75)	0.004**
Multivariate analysis:								
	OR (95% CI)	p	OR (95% CI)	P	OR (95% CI)	p	OR (95% CI)	p
DiaRem + O-BCGS constant	1.20 (0.99 – 1.45)	0.06	1.39 (1.11 – 1.74)	0.004**	1.09 (0.88 – 1.34)	0.44	1.37 (1.02 – 1.85)	0.04*
DiaRem + IV-BCGS constant	1.20 (0.98 – 1.45)	0.07	1.38 (1.10 – 1.74)	0.006**	1.16 (0.94 – 1.44)	0.16	1.40 (1.06 – 1.86)	0.02*
DiaRem + O-DI constant	1.19 (0.99 – 1.42)	0.06	1.41 (1.13 – 1.76)	0.003**	1.11 (0.91 – 1.35)	0.29	1.40 (1.07 – 1.82)	0.01*
DiaRem + IV-DI constant	1.19 (0.99 – 1.42)	0.07	1.40 (1.12 – 1.74)	0.003**	1.15 (0.94 – 1.39)	0.17	1.40 (1.07 – 1.83)	0.01*
DiaRem + HOMA-B constant	1.22 (1.02 – 1.46)	0.03*	1.45 (1.18 – 1.77)	<0.001***	1.19 (0.95 – 1.50)	0.11	1.49 (1.13 – 1.96)	<0.001***
DiaRem + early IGI constant	1.21 (1.02 – 1.43)	0.03*	1.39 (1.15 – 1.67)	<0.001***	1.18 (0.98 – 1.03)	0.11	1.40 (1.09 – 1.78)	0.01*
DiaRem + HOMA-IR constant	1.18 (1.01 – 1.39)	0.04*	1.40 (1.17 – 1.68)	<0.001***	1.18 (0.97 – 1.44)	0.10	1.42 (1.12 – 1.82)	<0.001***

	OR (95% CI)	p	OR (95% CI)	p	OR (95% CI)	p	OR (95% CI)	p
DiaRem + ISI constant	1.19 (1.01 – 1.39)	0.03	1.43 (1.19 – 1.72)	<0.001[*][**]	1.17 (0.97 – 1.42)	0.11	1.43 (1.13 – 1.82)	0.003[**]
Ad-DiaRem + O-BCGS constant	1.16 (0.98 – 1.37)	0.08	1.44 (1.12 – 1.83)	<0.001[*][**]	1.05 (0.86 – 1.28)	0.65	1.36 (0.98 – 1.89)	0.07
Ad-DiaRem + IV-BCGS constant	1.17 (0.99 – 1.39)	0.07	1.42 (1.11 – 1.80)	<0.001[*][**]	1.14 (0.92 – 1.40)	0.23	1.41 (1.04 – 1.91)	0.03[*]
Ad-DiaRem + O-DI constant	1.16 (0.99 – 1.36)	0.07	1.47 (1.16 – 1.87)	0.001[**]	1.08 (0.90 – 1.29)	0.43	1.42 (1.05 – 1.92)	0.02[*]
Ad-DiaRem + IV-DI constant	1.16 (0.99 – 1.36)	0.07	1.44 (1.13 – 1.82)	0.003[**]	1.12 (0.92 – 1.35)	0.24	1.42 (1.05 – 1.91)	0.02[*]
Ad-DiaRem + HOMA-B constant	1.21 (1.03 – 1.43)	0.02[*]	1.53 (1.24 – 1.88)	<0.001[*][**]	1.14 (0.96 – 1.36)	0.15	1.45 (1.12 – 1.87)	<0.001[*][**]
Ad-DiaRem + early IGI constant	1.22 (1.04 – 1.43)	0.02[*]	1.48 (1.21 – 1.82)	<0.001[*][**]	1.13 (0.95 – 1.36)	0.17	1.38 (1.08 – 1.77)	0.01[*]
Ad-DiaRem + HOMA-IR constant	1.20 (1.03 – 1.40)	<0.001[*][**]	1.49 (1.23 – 1.82)	0.02[*]	1.13 (0.95 – 1.33)	0.16	1.40 (1.10 – 1.78)	0.01[*]
Ad-DiaRem + ISI constant	1.17 (1.01 – 1.36)	0.04	1.47 (1.21 – 1.78)	<0.001[*][**]	1.12 (0.95 – 1.32)	0.18	1.41 (1.12 – 1.78)	0.004

Multivariate multinomial logistic regression model using either validated diabetes remission score (DiaRem and Ad-DiaRem scores) alone, or a validated diabetes remission score with a single surrogate for β-cell function (OBCGS, IVBCGS, HOMA-B, OGTT-DI, IV-DI, and early IGI) or insulin resistance (HOMA-IR) held constant. OR odds ratio, CI confidence interval. Superscript to show significance with * for p<0.05, ** for p<0.01 and *** for p<0.001. BCGS: β-cell glucose sensitivity; DI: disposition index; HOMA-IR: Homeostatic Model Assessment for Insulin Resistance; ISI: Insulin sensitivity index. HOMA-B: Homeostatic Model Assessment for β-cell function; IGI: insulinogenic index.

Supplemental Table 8. Comparison of baseline subject characteristics according to diabetes remission status after RYGB according to duration of follow up after RYGB.

	Timepoint									
	Latest					Year 2				
Variables	All (n = 79)	F-REM (n = 34)	P-REM (n = 31)	N-REM (n = 14)	P	All (n = 48)	F-REM (n = 22)	P-REM (n = 19)	N-REM (n = 7)	F-REM
Female n (%)	63 (79.7)	30 (88.2%)	25 (80.6)	8 (57.1)	0.05	42 (87.5)	20 (90.9)	17 (89.5)	5 (71.4)	0.38
Caucasian n (%)	6 (7.6)	4 (13.3)	1 (3.2)	1 (7.1)	0.61	2 (4.2)	1 (4.5)	1 (5.3)	0 (0.0)	0.46
Hispanic n (%)	48 (60.8)	18 (52.9)	23 (74.2)	7 (50)		33 (68.8)	13 (59.1)	15 (78.9)	5 (71.4)	
African American n (%)	25 (31.6)	12 (35.3)	7 (22.6)	6 (42.9)		13 (27.1)	8 (36.4)	3 (15.8)	2 (28.6)	
Age (years)	44.25 ± 9.29	43.62 ± 8.72	43.29 ± 10.2	47.93 ± 8.19	0.26	44.85 ± 9.2	45.27 ± 8.47	43 ± 10.12	48.57 ± 8.79	0.49
Weight (kg)	117.24 ± 17.24	118.03 ± 16.7	117.81 ± 16.06	114.08 ± 21.62	0.89	113.68 ± 15.45	116.87 ± 14.98	112.7 ± 14.29	106.31 ± 19.19	0.27
Height (meters)	1.64 ± 0.08	1.62 ± 0.07	1.64 ± 0.07	1.65 ± 0.12	0.66	1.61 ± 0.06	1.61 ± 0.06	1.62 ± 0.06	1.59 ± 0.07	0.47
BMI (kg/m²)	43.63 ± 4.92	44.62 ± 5.55	43.46 ± 4.24	41.62 ± 4.32	0.21	43.68 ± 4.49	45.13 ± 4.62	42.6 ± 3.68	42.03 ± 5.31	0.13
Fat Mass %	49.84 ± 7.14	50.24 ± 6.27	49.54 ± 7.41	49.6 ± 8.88	0.94	50.36 ± 7.34	50.85 ± 6.07	49.12 ± 7.98	52.25 ± 9.24	0.54
Waist Girth (cm)	126.2 ± 12.4	126.9 ± 12.6	125.96 ± 117.1	125.23 ± 14.1	0.88	124.08 ± 10.52	126.07 ± 10.40	122.66 ± 10.11	122.33 ± 12.51	0.68
Post-surgery Weight Loss (%)	25.7 ± 11.9	28.6 ± 11.9	23.4 ± 11.1	22.81 ± 12.8	0.08	0.27 ± 0.1	0.31 ± 0.09	0.23 ± 0.1*	0.2 ± 0.11	0.01
SBP (mm Hg)	127.18 ± 17.18	127.66 ± 18.27	127.66 ± 18.75	125.08 ± 10.81	0.71	125.3 ± 19.1	127.44 ± 19.82	125.32 ± 21.2	118.83 ± 6.55	0.68
DBP (mm Hg)	76.84 ± 12.77	77.74 ± 13.28	75.37 ± 13.61	78.38 ± 9.91	0.56	77.21 ± 14.38	79 ± 14.53	75.89 ± 15.55	76.33 ± 11.45	0.85
HDL (mg/dL)	47.32 ± 12.32	47.03 ± 9.84	48.63 ± 13.91	44.83 ± 14.71	0.66	46.62 ± 11.6	48.71 ± 10.28	43.05 ± 10.48	50 ± 16.78	0.20

LDL (mg/dL)	107.41 ± 29.94	113.4 ± 25.87	106 ± 31.85	94.83 ± 33.4	0.13	108.75 ± 30.94	114.24 ± 27.18	105.78 ± 32.44	100.71 ± 38.71	0.41
Total Cholesterol (mg/dL)	188.61 ± 37.23	195.33 ± 34.95	189.57 ± 31.95	167.75 ± 49.66	0.09	192.47 ± 38.41	201.9 ± 35.58	186 ± 33.45	181.71 ± 56.17	0.31
Triglycerides (mg/dL)	170.74 ±117.08	175.45 ±149.47	177.37 ± 92.99	143.46 ± 65.05	0.55	187.7 ± 135.61	196.29 ± 176.05	190.53 ± 98.73	154.29 ± 82.84	0.73
HOMA-IR	11.36 ± 6.29	10.25 ± 5.47	12.13 ± 6.09	12.28 ± 8.33	0.44	11.47 ± 6.19	11.15 ± 5.94	11.13 ± 5.16	13.33 ± 9.57	0.91
Diabetes Duration (years)	4.43 ± 5.51	1.54 ± 1.78*	5.21 ± 6.36§	9.99 ± 5.06†	<0.001	4.57 ± 5.69	2 ± 2.38	5.62 ± 7.1	9.44 ± 4.88 †	0.001
Non-insulin DM medications n (%)	1.13 ± 0.98	0.74 ± 0.71	1.19 ± 0.75	1.93 ± 1.44 †	0.003	1.19 ± 1.07	0.68 ± 0.72	1.37 ± 0.83	2.29 ± 1.6 †	0.004
Insulin Use n (%)	11 (13.9)	0 (0)	5 (16.1)	6 (42.9) †	<0.001	6 (12.5)	0 (0.0)	3 (15.8)	3 (42.9)	0.01
Total DM medications (n)	1.27 ± 1.13	0.74 ± 0.71*	1.35 ± 0.88	2.36 ± 1.60†	<0.001	1.31 ± 1.17	0.68 ± 0.72*	1.53 ± 0.96	2.71 ± 1.5 †	<0.001
HbA1c%	7.12 ± 1.10	6.79 ± 0.97	7.14 ± 1.13	7.86 ± 1.04†	0.009	7.09 ± 1.11	6.8 ± 0.99	7.04 ± 1.05	8.09 ± 1.23†	0.05
DiaRem	5.39 ± 4.98	3.24 ± 2.35	5.48 ± 5.08	10.43 ± 6†§	<0.001	5.35 ± 5.01	3.36 ± 2.32	5.47 ± 5.45	11.29 ± 5.77†§	0.004
Ad-DiaRem	6.88 ± 4.70	4.76 ± 3.1	7.06 ± 4.48	12 ± 4.86†§	<0.01	7.15 ± 4.66	5.45 ± 3.04	7.26 ± 5.19	12.14 ± 4.18†	0.01

Data are mean ± SD. The difference in means was tested by Kruskal-Wallis. The difference in frequencies was tested by Fisher's exact test. *Statistically significant difference P-REM vs F-REM, p-value of Tukey test <0.05; † statistically significant difference N-REM vs F-REM, p-value of Tukey test <0.05; § statistically significant difference N-REM vs P-REM, p-value of Tukey test <0.05; DM: type 2 diabetes; SBP: systolic blood pressure; DPB: diastolic blood pressure.

Supplemental Table 9. The diagnostic measures for the 4 univariate and multivariate multinomial logistic regression analysis for prediction of post-RYGB diabetes remission status with complete remission group (F-REM) as reference.

			Model		
		Ad-DiaRem	Ad-DiaRem + HOMA-B constant	Ad-DiaRem + early IGI constant	Ad-DiaRem + HOMA-IR constant
	Accuracy (95% CI)	0.68 (0.47, 0.85)	0.67 (0.45, 0.84)	0.63 (0.41, 0.81)	0.67 (0.45, 0.84)
FREM	Sensitivity	0.92	0.91	0.91	0.91
NREM		0.25	0.25	0.00	0.25
PREM		0.56	0.56	0.56	0.56
FREM	Specificity	0.69	0.69	0.69	0.69
NREM		1.00	1.00	1.00	1.00
PREM		0.75	0.73	0.67	0.73
FREM	PPV	0.73	0.71	0.71	0.71
NREM		1.00	1.00	N/A	1.00
PREM		0.56	0.56	0.50	0.56
FREM	NPV	0.90	0.90	0.90	0.71
NREM		0.88	0.87	0.83	1.00
PREM		0.75	0.73	0.71	0.56

Diagnostic measurements were determined by dividing dataset into train and test subsets (65%/35%). Multinomial logistic regression models were trained on the 'train' subset of the data and evaluated on the 'test' smaller subset of unseen data. Accuracy is calculated by dividing the number of correct predictions by the total number of the test dataset.