Remissione del diabete mellito tipo 2 dopo chirurgia bariatrica

Francesco Saverio Papadia, MD, FACS, FEBS (SurgOnc)
Department of Surgical Sciences and Integrated Diagnostics (DISC)
University of Genoa

Disclosure Slide

Francesco Saverio Papadia dichiara di NON aver ricevuto negli ultimi due anni compensi o finanziamenti da Aziende Farmaceutiche e/o Diagnostiche

Dichiara altresì il proprio impegno ad astenersi, nell’ambito dell’evento, dal nominare, in qualsivoglia modo o forma, aziende farmaceutiche e/o denominazione commerciale e di non fare pubblicità di qualsiasi tipo relativamente a specifici prodotti di interesse sanitario (farmaci, strumenti, dispositivi medico-chirurgici, ecc.).

ANNALS OF SURGERY
Vol. 222, No. 3, 339–352

Who Would Have Thought It?

An Operation Proves to Be the Most Effective Therapy for Adult-Onset Diabetes Mellitus

Walter J. Pories, M.D., Melvin S. Swanson, Ph.D., Kenneth G. MacDonald, M.D., Stuart B. Long, B.S., Patricia G. Morris, B.S.N., Brenda M. Brown, M.R.A., Hisham A. Barakat, Ph.D., Richard A. deRamon, M.D., Gay Israel, Ed.D., Jeanette M. Dolezal, Ph.D., and Lynis Dohm, Ph.D.

From the Departments of Surgery and Biochemistry of the School of Medicine and the Human Performance Laboratory of East Carolina University, Greenville, North Carolina

Biliopancreatic diversion for obesity at eighteen years

Nicola Scopinaro, MD, Ezio Gianetta, MD, Gian Franco Adami, MD, Daniele Friedman, MD, Enrico Traverso, MD, Giuseppe M. Marinari, MD, Sonia Cuneo, MD, Bruno Vitale, MD, Fabrizio Ballari, MD, Maurizio Colombini, MD, Giorgio Baschieri, MD, *and* **Virgilio Bachi, MD,** *Genoa, Italy*

Background. *Surgical attempts to treat obesity began because of the discouraging results of conservative medical treatment, which successfully achieved initial weight loss but failed to maintain it. Gastric restrictive procedures, currently the most popular surgical methods for obesity therapy, have proved to be effective in initiating weight loss, but some concerns regarding their long-term efficacy in weight maintenance have arisen.*
Methods. *Of a total of 1968 obese patients who underwent biliopancreatic diversion since 1976, the last consecutive 1217 underwent the "ad hoc stomach" type of diversion with a 200 cm alimentary limb, a 50 cm common limb, and a gastric volume varying between 200 and 500 ml. Mean age was 37 years old (11 to 69 years), and mean excess weight was 117%. Maximum follow-up was 115 months with nearly 100% participation.*
Results. *In the last half of the series, operative mortality was 0.4% with no general complications and with early surgical complications of wound dehiscence and infection (total, 1.2%) and late complications of incisional hernia (8.7%) and intestinal obstruction (1.2%). Mean percent loss of initial excess weight (IEW) at 2, 4, 6, and 8 years was 78 ± 16, 75 ± 16, 78 ± 18, and 77 ± 16 in the patients with IEW up to 120% and 74 ± 12, 73 ± 13, 73 ± 12, and 72 ± 10 in those with IEW more than 120%. A group of 40 patients who underwent the original "half-half" biliopancreatic diversion maintained a mean 70% reduction of IEW during a 15-year follow-up period. Specific late complications included anemia (less than 5%), stomal ulcer (2.8%), protein malnutrition (7% with 1.7% requiring surgical revision by common limb elongation or by restoration). Clinical problems from bone demineralization were minimal in the short term and almost absent in the long term.*
Conclusions. *Biliopancreatic diversion is a very effective procedure but is potentially dangerous if used incorrectly. (SURGERY 1996;119:261-8.)*

From the Department of Surgery, University of Genoa School of Medicine, Genoa, Italy

Table II. Other beneficial effects of AHS BPD

	Minimum follow-up (mo)	*Disappeared (%)*	*Improved (%)*	*Unchanged (%)*	*Impaired (%)*
Pickwickian syndrome* (2%)	1	100	—	—	—
Somnolence† (5%)	1	100	—	—	—
Hypertension‡ (37%)	12	81	13	6	—
Fatty liver§ (48%)	24	87	9	4	—
Leg stasis‖ (27%)	12	45	39	16	—
Hypercholesterolemia¶ (53%)	1	100	—	—	—
Hypertriglyceridemia (32%)	12	95	5	—	—
Hyperglycemia (14%)	4	100	—	—	—
Diabetes mellitus (7%)	4	100	—	—	—
Diabetes mellitus requiring insulin (2%)	12	100	—	—	—
Hyperuricemia (18%)	4	94	—	3	3
Gout (2%)	4	100#	—	—	—

%, Percent of patients with condition.
*Somnolence with cyanosis, polycythemia, and hypercapnia.
†In absence of one or more of characteristics of Pickwickian syndrome.
‡Systolic ≥155, diastolic ≥95 mm Hg, or both.
§More than 10%.
‖Moderate or severe.
¶More than 200 mg/ml (17% more than 240 mg/ml).
#Serum uric acid normalized, no more clinical symptoms.

Specific Effects of Biliopancreatic Diversion on the Major Components of Metabolic Syndrome

A long-term follow-up study

Nicola Scopinaro, md
Giuseppe Maria Marinari, md
Giovanni Bruno Camerini, md
Francesco Saverio Papadia, md
Gian Franco Adami, md

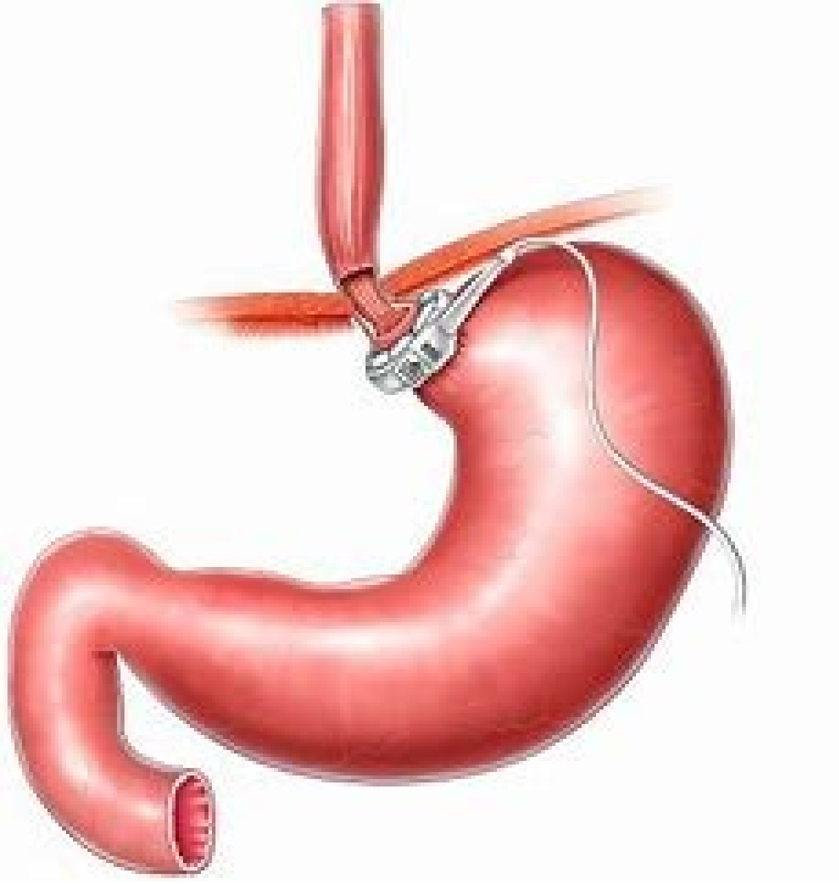
and glucose concentration often fall back into a normal range after resumption of food intake and long before a significant weight loss occurs, thus suggesting that the control of diabetes might be a specific

Table 1—*Diabetic obese patients: anthropometric and biochemical data prior to BPD and throughout the follow-up period*

	Prior to BPD	At 1 year	At 2 years	At 3 years	At 5 years	At 10 years
n	312	305	300	290	272	243
Body weight (kg)	135.4 ± 25.6	88.9 ± 20.9	84.3 ± 16.5	88.2 ± 18.3	85.8 ± 18.3	86.6 ± 18.5
BMI (kg/m^2)	50.1 ± 9.0	32.8 ± 7.4	31.1 ± 6.5	32.1 ± 7.0	31.6 ± 6.4	32.0 ± 6.7
GL (mg/dl)	178 ± 61	84 ± 15	85 ± 18	84 ± 14	86 ± 18	89 ± 24
TG (mg/dl)	220 ± 155	120 ± 55	124 ± 107	96 ± 61	83 ± 36	82 ± 35
CHOL (mg/dl)	222 ± 75	136 ± 34	133 ± 33	126 ± 32	126 ± 31	113 ± 29

Data are means ± SD. All postoperative versus preoperative values: $P < 0.01$. No significant differences between postoperative data. CHOL, total serum cholesterol concentration; GL, fasting serum glucose concentration; TG, serum triglyceride concentration.

La *«tempesta perfetta»*………



PRELIMINARY COMMUNICATION

Adjustable Gastric Banding and Conventional Therapy for Type 2 Diabetes

A Randomized Controlled Trial

John B. Dixon, MBBS, PhD
Paul E. O'Brien, MD
Julie Playfair, RN
Leon Chapman, MBBS
Linda M. Schachter, MBBS, PhD
Stewart Skinner, MBBS, PhD
Joseph Proietto, MBBS, PhD
Michael Bailey, PhD, MSc(stats)
Margaret Anderson, BHealthMan

Context Observational studies suggest that surgically induced loss of weight may be effective therapy for type 2 diabetes.

Objective To determine if surgically induced weight loss results in better glycemic control and less need for diabetes medications than conventional approaches to weight loss and diabetes control.

Design, Setting, and Participants Unblinded randomized controlled trial conducted from December 2002 through December 2006 at the University Obesity Research Center in Australia, with general community recruitment to established treatment programs. Participants were 60 obese patients (BMI >30 and <40) with recently diagnosed (<2 years) type 2 diabetes.

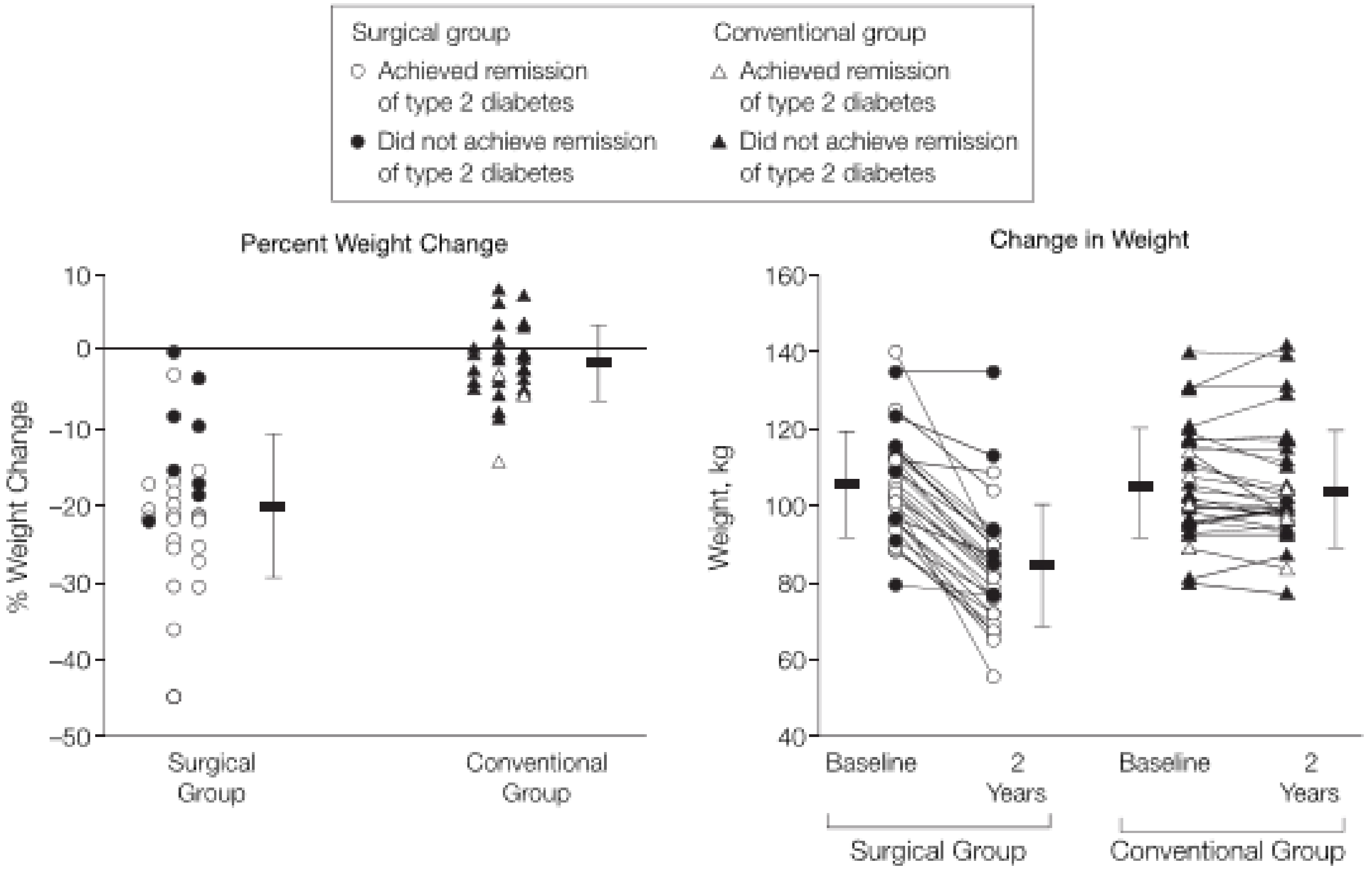
Interventions Conventional diabetes therapy with a focus on weight loss by lifestyle change vs laparoscopic adjustable gastric banding with conventional diabetes care.

Main Outcome Measures Remission of type 2 diabetes (fasting glucose level <126 mg/dL [7.0 mmol/L] and glycated hemoglobin [HbA_{1c}] value <6.2% while taking no glycemic therapy). Secondary measures included weight and components of the metabolic syndrome. Analysis was by intention-to-treat.

Results Of the 60 patients enrolled, 55 (92%) completed the 2-year follow-up. Remission of type 2 diabetes was achieved by 22 (73%) in the surgical group and 4 (13%)

SIGNIFICANT SUSTAINED WEIGHT loss achieved using bariatric surgery has never been formally investigated as a treatment for type 2 diabetes in obese participants. Several observational studies suggest substantial benefit, but these have generally been restricted to severely obese

Figure 2. Percentage of Weight Loss Achieved Over the 2-Year Study Period (n=60) and Individual Weight Measures at Baseline and at 2 Years



Remission indicates those achieving remission of type 2 diabetes (see "Methods") at 2 years. Data markers with error bars indicate mean (SD).

Table 2. Primary and Secondary Outcomes at 2 Years[a]

Variable	Mean (SD) Surgery (n = 30)	Mean (SD) Conventional Therapy (n = 30)	Between-Group Difference, Mean (95% CI)	*P* Value
Primary Outcome, No. (%)				
Remission of diabetes, No. (%)	22 (73)	4 (13)	RR for surgical remission, 5.5 (2.2 to 14.0)	<.001
Secondary Outcomes				
Weight, kg	84.6 (15.8)	104.8 (15.3)		
Change, kg	−21.1 (10.5)	−1.5 (5.4)	−19.6 (−23.8 to −15.2)	<.001
Waist circumference, cm	95.8 (10.3)	112.7 (10.3)		
Change, cm	−17.9 (10.8)	−4.0 (9.1)	−13.9 (−19.0 to −8.7)	<.001
Waist to hip ratio	0.90 (0.06)	0.95 (0.08)		
Change	−0.06 (0.06)	−0.01 (0.06)	−0.05 (−0.07 to −0.007)	.02
Blood pressure, mm Hg				
Systolic	130.4 (19.0)	132.6 (17.7)		
Change	−6.0 (17.9)	−1.7 (14.2)	−4.3 (−13.6 to 5.1)	.37
Diastolic	85.4 (7.0)	83.1 (8.5)		
Change	−0.7 (11.1)	−0.9 (11.1)	0.2 (−5.4 to 6.0)	.92
HbA_{1c}, %	6.00 (0.82)	7.21 (1.39)		
Change	−1.81 (1.24)	−0.38 (1.26)	−1.43 (−2.1 to −0.80)	<.001
Plasma glucose, mg/dL	105.6 (30.3)	139.6 (38.1)		
Change	−51.2 (37.6)	−18.4 (41.2)	−32.8 (−53.1 to −12.3)	.002
Plasma insulin, μIU/mL	9.8 (4.7)	24.1 (13.6)		
Change	−12.4 (8.4)	1.0 (14.8)	−13.4 (−19.6 to −7.3)	<.001
HOMA IR[b]	1.90 (0.73)	3.50 (0.97)		
Change, %	−45.5 (19.0)	−3.3 (35.4)	−42.2 (−57 to −26.8)[c]	<.001
Total cholesterol, mg/dL	205.4 (46.6)	197.8 (59.3)		
Change	3.6 (51.6)	−0.4 (31.4)	4.0 (−18.8 to 26.0)	.72
Triglycerides, mg/dL	118.9 (79.7)	186.7 (127.2)		
Change	−71.7 (92.9)	−2.1 (120.6)	−69.6 (−125.3 to −13.6)	.02
HDL-C, mg/dL	59.7 (13.6)	50.7 (12.1)		
Change	12.6 (9.8)	2.6 (6.1)	10.0 (5.8 to 14.2)	<.001
Total cholesterol to HDL-C ratio	3.58 (1.00)	4.1 (1.4)		
Change	−0.82 (1.9)	−0.14 (1.04)	−0.68 (−1.24 to −0.14)	.02

Abbreviations: CI, confidence interval; HbA_{1c}, glycated hemoglobin; HDL-C, high-density lipoprotein cholesterol; HOMA IR, insulin resistance by homeostatic model assessment; LDL-C, low-density lipoprotein cholesterol; RR, relative risk.

SI conversion factors: see Table 1 footnote.

[a] Mean (SD) percentage change for participants with baseline values carried forward for those who dropped out of the study. A comparison of the actual change from baseline is also presented. Data include all 60 participants with baseline data carried forward for missing data.

[b] An indirect measure of insulin resistance calculated from levels of fasting plasma glucose and fasting C-peptide.[26]

[c] $P < .05$ calculated using independent t test.

Diabetologia (2009) 52:1027–1030
DOI 10.1007/s00125-009-1333-8

SHORT COMMUNICATION

The effect of bilio-pancreatic diversion on type 2 diabetes in patients with BMI <35 kg/m^2

C. Chiellini · F. Rubino · M. Castagneto · G. Nanni · G. Mingrone

Table 1 Demographic and body composition data of the patients before and 1 month after BPD or diet, and 12 and 18 months after BPD only

Variable	Before BPD	After BPD			Before diet	After diet
		1 month	12 months	18 months		1 month
Age (years)	48±3				51±3	
Height (cm)	175.20±4.49				169.28±1.21	
BMI (kg/m^2)	30.94±1.05	30.00±0.80	25.37±0.01	25.07±0.01	29.98±1.70	29.18±1.78
p value		0.048	0.043	0.043		0.018
Weight (kg)	95.60±7.24	92.60±6.40	77.80±3.54	76.80±2.96	86.00±5.20	83.71±5.46
p value		0.046	0.042	0.040		0.017
Fat mass (kg)	35.00±3.40	33.52±3.14	25.58±1.16	24.67±1.77	29.24±3.10	28.73±3.12
p value		0.043	0.043	0.043		0.018
FFM (kg)	60.60±4.60	59.08±4.26	52.22±2.38	52.13±2.71	55.76±2.97	54.98±3.22
p value		0.039	0.049	0.049		0.018
HbA$_{1c}$ (%)	8.48±0.24	7.18±0.30	5.62±0.24	5.7±0.23	8.78±0.40	8.6±0.31
p value		0.039	0.043	0.042		0.042

Data are means±SEM

p values were determined by Wilcoxon signed-rank test before vs after BPD or diet

Effects of Biliopanceratic Diversion on Type 2 Diabetes in Patients With BMI 25 to 35

Nicola Scopinaro, MD, Giovanni F. Adami, MD*, Francesco S. Papadia, MD*, Giovanni Camerini, MD*, Flavia Carlini, MD*, Martin Fried, MD‡, Lucia Briatore, MD†, Gabriele D'Alessandro, MD*, Gabriella Andraghetti, MD†, and Renzo Cordera, MD†*

TABLE 1. Anthropometric, Biochemical and Functional Data of 30 Type 2 Diabetic Patients Before and After BPD

	Baseline	1 month	4 months	8 months	12 months
Body weight (kg)	84.8 ± 11.1	74.3 ± 9.9*	71.6 ± 9.3*†	71.2 ± 9.9*†	70.7 ± 10.2*†
BMI (kg/m^2)	30.6 ± 2.9	26.7 ± 2.7*	25.7 ± 1.9*†	25.6 ± 2.4*†	25.3 ± 2.3*†
Waist (cm)	104± 9	92 ± 9*	91 ± 7*	89 ± 9*	85 ± 9*†‡
High waist (number and percentage)	25 (83)	17 (57)*	11 (37)*†	10 (33)*†	8 (27)*†
Fasting plasma glucose (mg/dL)	220 ± 69	165 ± 63*	147 ± 48*	152 ± 43*	149 ± 41*†
HbA_{1c} (%)	9.3 ± 1.5	7.3 ± 1.1*	6.8 ± 1.1*†	6.4 ± 1.1*†‡	6.5 ± 0.8*†
$HbA_{1c} \leq 7.0\%$ (number and percentage)	0 (0)	12 (40)*	22 (73)*†	24 (80)*†	25 (83)*†
$HbA_{1c} \leq 6.5\%$[16] (number and percentage)	0 (0)	7 (23)*	18 (60)*†	19 (63)*†	19 (63)*†
$HbA_{1c} \leq 6.0\%$ (number and percentage)	0 (0)	5 (16)*	8 (27)*	15 (50)*†‡	14(47)*†
HOMA-IR	9.1 ± 7.1	2.9 ± 3.1*	3.0 ± 2.7*	2.7 ± 1.8*	2.9.± 2.5*
AIR (μIU/mL) (n. cases/increased vs. preop.)	1.2±2.9 (25)	3.4±4.8 (16/11)	5.1±5.6§(18/13)		4.2±4.4§ (25/19)
Hypertension (number and percentage)	18 (60)	13 (43)	9 (30)	5 (17)	6 (20)
Serum triglycerides (mg/dL)	198 ± 226	180 ± 189	207 ± 136	215 ± 94†	204 ± 109
Hypertriglyceridemia (number and percentage)	10 (33)	11 (37)	16 (53)	20 (67)*	18 (60)*
Total cholesterol (mg/dL)	190 ± 48	125 ± 45*	148 ± 35*	148 ± 39*	147 ± 32*
Hypercholesterolemia (number and percentage)	14 (47)	0 (0)*	0 (0)*	0 (0)*	0 (0)*
HDL cholesterol (mg/dL)	47 ± 11	33 ± 8*	37 ± 7*†	40 ± 7*†‡	44 ± 10*†‡

*$P < 0.05$ versus preop.; †$P < 0.05$ versus 1 months; ‡$P < 0.05$ versus 4 months; §$P < 0.01$ versus preop.

TABLE 2. Anthropometric and Biochemical Data of 38 Type 2 Diabetic Patients on Standard-of-Care Treatment (O Oral Antidiabetics/I Insulin)

	Baseline	1 year
Body weight (kg)	86.3 ± 10.1	86.1 ± 10
BMI (kg/m^2)	30.2 ± 3.5	30.2± 3.6
Waist (cm)	105 ± 11	106 ± 11
Fasting glucose (mg/dl)	171 ± 38	151 ± 28*
HbA_{1c} (%)	8.3 ± 0.8	7.7 ± 0.7*
Triglycerides (mg/dl)	190 ± 63	178 ± 47
Total cholesterol (mg/dl)	189 ± 29	203 ± 36
HDL cholesterol (mg/dl)	48.3 ± 8.7	49.1 ± 7.9
Antidiabetic therapy	33 O / I7 I	33 O / 18 I
Therapy increased		26 (68%)

*$P < 0.01$ versus enrollment.

OBES SURG (2011) 21:880–888
DOI 10.1007/s11695-011-0407-0

CLINICAL RESEARCH

The Effects of Biliopancreatic Diversion on Type 2 Diabetes Mellitus in Patients with Mild Obesity (BMI 30–35 kg/m^2) and Simple Overweight (BMI 25–30 kg/m^2): A Prospective Controlled Study

Nicola Scopinaro · Giovanni F. Adami · Francesco S. Papadia · Giovanni Camerini · Flavia Carlini · Lucia Briatore · Gabriele D'Alessandro · Corrado Parodi · Andrea Weiss · Gabriella Andraghetti · Mariafrancesca Catalano · Renzo Cordera

Published online: 4 May 2011

Table 1 Mean ± SD of body weight, body mass index (BMI), waist circumference (WC), fasting serum glucose (FSG), glycated hemoglobin (HbA1c), HOMA-IR, serum triglyceride, total and HDL cholesterol in 15 type 2 diabetic patients with BMI 30.0–34.9 undergoing biliopancreatic diversion

	Preop.	1 month	4 months	8 months	12 months	24 months
Body weight (kg)	89.2±10.7	78.2±9.9*	73.2±9.1*,**	72.4±10.4*	71.1±10.4*,**	73.7±10.5*,**,*****
BMI (kg/m^2)	33.1±1.5	29.1±2.4*	27.2±1.6*,**	26.9±2.3*,**	26.4±2.4*,**	27.4±2.3*,**,*****
WC (cm)	110±9	96±10*	94±8*	93±11*	88±9*,***	93±9*,**,*****
n. and % of patients with abnormal WC	14 (93%)	9 (60%)*	7 (47%)*	7 (47%)*	5 (33%)*,**	4 (27%)*,**
FSG (mg/dL)	234±76	154±49*	129±32*,**	133±39*,**	131±32*,**	134±41*
HbA1c (%)	9.5±1.6	7.3±1.1*	6.3±0.8*,**	5.9±1.1*,**	5.9±0.6*,**	5.9±0.9*,**
n. and % of patients with HbA1c ≤ 7%	0 (0%)	8 (53%)*	13 (87%)*,**	13 (87%)*,**	15 (100%)*,**	12 (80%)*
n. and % of patients with HbA1c ≤ 6.5%	0 (0%)	3 (20%)	10 (67%)*,**	11 (73%)*,**	11 (73%)*,**	10 (67%)*,**
n. and % of patients with HbA1c ≤ 6%	0 (0%)	2 (12%)	6 (40%)*	10 (67%)*,**	10 (67%)*,**	10 (67%)*
HOMA-IR	10.7±5.8	3.1±3.5*	3.1 ±1.1*	2.9±2.5*	2.5±1.5*	2.7±1.6
AIR (μIU/mL) (n. cases/increased vs. preop.)	1.11±3.17 (13)	3.37±3.91 (9/6)	7.63±5.79 (8/7)*		5.79±4.89 (13/11)*	6.95±3.19 (10/8)*
n. and % of patients with arterial hypertension	13 (87%)	9 (60%)	7 (47%)	3 (20%)*	4 (27%)*	5 (33%)*
serum triglyceride (mg/dL)	254±310	223±258	174±85	208±123	181±123	177±82
n. and % of patients with hypertriglyceridemia	7 (47%)	8 (53%)	8 (53%)	9 (60%)	8 (53%)	10 (67%)
serum total cholesterol (mg/dL)	190±44	134±35.4*	138±33.8*	146±35.5*	153±35*	156±28*,**,***
n. and % of patients with hypercholesterolemia	6 (43%)	0 (0%)*	0 (0%)*	0 (0%)*	0 (0%)*	0 (0%)*
Serum HDL cholesterol (mg/dL)	45±9.7	37±8.8*	36±6.6*	39±6.9	47±10.4**,***,****	47±10.1**,***,****

Absolute number and percentage of patients with abnormally high WC value, HbA1c values ≤7.0%, ≤6.5%, and ≤6.0%, hypertriglyceridemia, hypercholesterolemia, and arterial hypertension

*p<0.05 vs. preop.; **p<0.05 vs. 1 months; ***p<0.05 vs. 4 months; ****p<0.05 vs. 8 months; *****p<0.05 vs. 12 months

Table 2 Mean ± SD of body weight, body mass index (BMI), waist circumference (WC), fasting serum glucose (FSG), glycated hemoglobin (HbA1c), HOMA-IR, serum triglyceride, total and HDL cholesterol in 15 type 2 diabetic patients with BMI 25.0–29.9 undergoing biliopancreatic diversion

	Preop.	1 month	4 months	8 months	12 months	24 months
Body weight (kg)	80.4±10	70.4±8.7*	70.0±9.5*	70.0±8.2*	70.3±9.2*	70.9±9.6*
BMI (kg/m^2)	28.1±1.4	24.3±0.9*	24.2±1.0*	24.3±1.3*	24.2±1.6*	24.6±1.8*
WC (cm)	98.0±6.2	88.0±5.4*	88.0±4.1*	85.0±5.7*	82.0±8.3*	85.0±6*
n. and % of patients with abnormal WC	11 (73%)	8 (53%)	4 (27%)*	3 (20%)*	3 (20%)*	1 (7%)*
FSG (mg/dL)	206±62	176±75*	165±58*	171±42*	167±48*	154±41*
HbA1c (%)	9.1±1.3	7.3±1.2*	7.3±1.3*	6.9±1.1*,**,***	7.1±1.1*,**	6.9±1.1*,**,***
n. and % of patients with HbA1c ≤ 7%	0 (0%)	4 (27%)	9 (60%)*	11 (73%)*	10 (67%)*,**	9 (60%)*
n. and % of patients with HbA1c ≤ 6.5%	0 (0%)	4 (27%)	8 (53%)*	8 (53%)*	8 (53%)*	7 (47%)*
n. and % of patients with HbA1c ≤ 6%	0 (0%)	3 (20%)	2 (13%)	5 (33%)*	4 (27%)	4 (27%)
HOMA-IR	7.5±5.4	2.7±1.6*	2.9±3.1*	2.5±0.8*	2.8±3.9*	2.3±2.4*
AIR (μUI/mL) (n. cases/increased vs. preop.)	1.27±2.68 (12)	3.47±6.05 (7/5)	3.02±4.71 (10/6)		2.57±3.18 (12/8)	5.02±4.87 (9/6)*
n. and % of patients with arterial hypertension	5 (33%)	4 (27%)	2 (13%)	2 (13%)	2 (13%)	3 (20%)
serum triglycerides (mg/dL)	142±38	137±52	240±170*,**	222±85*,**	227±104*,**	225±116*,**
n. and % of patients with hypertriglyceridemia	3 (20%)	3 (20%)	8 (53%)*,**	11 (73%)*,**	10 (67%)*,**	11 (73%)*,**
serum total cholesterol (mg/dL)	190±52	116±31*	158±40*	150±29*	141±36*	146±29*,**
n. and % of patients with hypercholesterolemia	8 (53%)	0 (0%)*	0 (0%)*	0 (0%)*	0 (0%)*	0 (0%)*
serum HDL cholesterol (mg/dL)	49±13.6	29 ±8.1*	38±7.2*	41±6*	41±16*	38±7.3*,**

Absolute number and percentage of patients with abnormally high WC value, HbA1c values ≤7.0%, ≤6.5%, and ≤6.0%, hypertriglyceridemia, hypercholesterolemia and arterial hypertension

*$p<0.05$ vs. preop.; **$p<0.05$ vs. 1 months; ***$p<0.05$ vs. 4 months

Table 3 Anthropometric and biochemical data of 38 type 2 diabetic patients on standard-of-care treatment

	Obese patients (n=20)			Overweight patients (n=18)		
	baseline	1 year	2 years (19 p.)	baseline	1 year	2 years
Body weight (kg)	90.1±10.3	90.2±10.2	90.1±10.9	82.1±8.3	81.6±7.9	81.4±8.3
BMI (kg/m^2)	32.9±1.8	33.0±1.8	33.1±2.1	27.1±2.1	27.0±2.2	26.9±2.0
WC (cm)	112±6	112±8	111±4	99±12	100±13	101±0
FSG (mg/dL)	182±33	157±29*	155±22*	159±39	145±27*	149±16*
HbA_{1c} (%)	8.4±07	7.8±0.8*	7.6±0.4*	8.1±0.8	7.6±0.5*	7.4±0.3*
Serum triglycerides(mg/dL)	206±73	194±54	175±37*	173±45	161±30	143±25*
Serum total cholesterol (mg/dL)	196±27	206±45	198±33	181±30	200±16	192±15
HDL cholesterol (mg/dL)	48.8±6.9	49.5±5.8	48.8±4.7	47.7±10.6	48.8±9.9	49.2±9.4
Antidiabetic therapy	17 O/8 I	17 O/9 I	16 O/10 I	16 O/9 I	16 O/9 I	16 O/11 I
Therapy increased		16 (80%)	8 (42%)		10 (56%)	8 (44%)
Antihyperlipemic therapy	10 (50%)	11 (55%)	15 (79%)	13 (72%)	14 (78%)	15 (83%)

O oral antidiabetics, *I* insulin

*p<0.01 vs enrollment

The NEW ENGLAND JOURNAL of MEDICINE

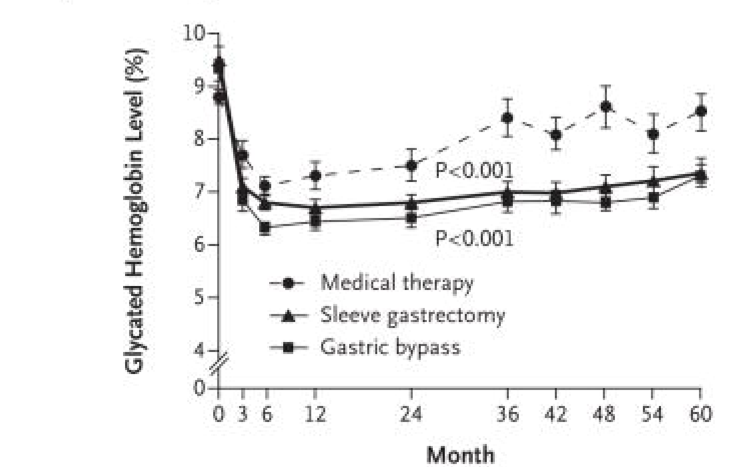
ORIGINAL ARTICLE

Bariatric Surgery versus Intensive Medical Therapy for Diabetes — 5-Year Outcomes

Philip R. Schauer, M.D., Deepak L. Bhatt, M.D., M.P.H., John P. Kirwan, Ph.D.,
Kathy Wolski, M.P.H., Ali Aminian, M.D., Stacy A. Brethauer, M.D.,
Sankar D. Navaneethan, M.D., M.P.H., Rishi P. Singh, M.D., Claire E. Pothier, M.P.H.,
Steven E. Nissen, M.D., and Sangeeta R. Kashyap, M.D.,
for the STAMPEDE Investigators*

ABSTRACT

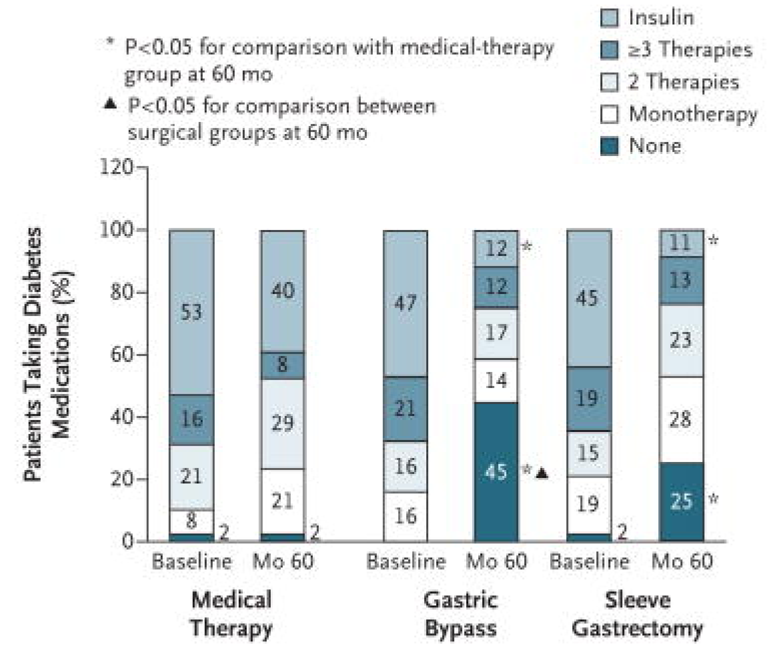
A Glycated Hemoglobin



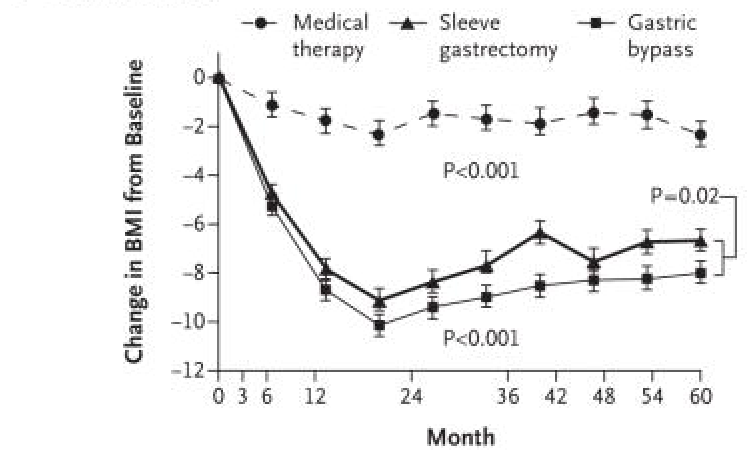
Mean (median) Value at Visit

Medical therapy	8.8 (8.6)	7.3 (6.8)	7.5 (7.2)	8.4 (7.7)	8.6 (8.2)	8.5 (8.0)
Gastric bypass	9.3 (9.4)	6.4 (6.2)	6.5 (6.4)	6.8 (6.6)	6.8 (6.8)	7.3 (6.9)
Sleeve gastrectomy	9.5 (8.9)	6.7 (6.4)	6.8 (6.8)	7.0 (6.7)	7.1 (6.6)	7.4 (7.2)

B Diabetes Medications



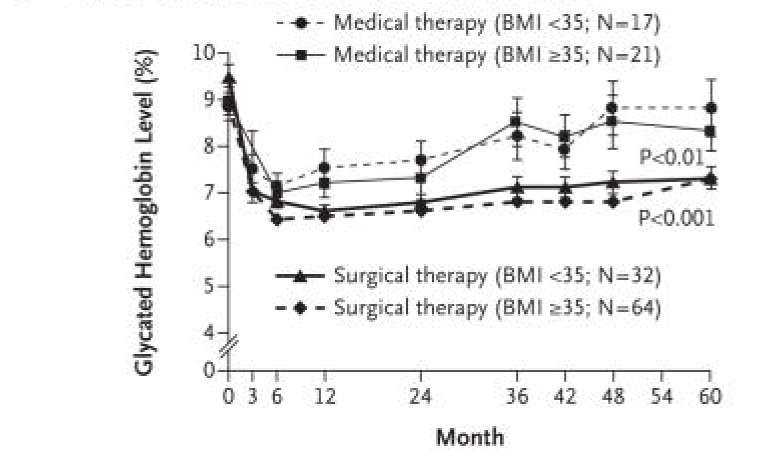
C Body-Mass Index



Mean Value at Visit

Medical therapy	36.4	34.1	35.0	34.8	35.1	34.0
Gastric bypass	37.0	26.9	27.4	28.2	28.6	28.9
Sleeve gastrectomy	36.0	26.9	27.7	28.1	28.2	29.3

D Glycated Hemoglobin According to Body-Mass Index



Mean (median) Value at Visit

Medical <35	8.8 (8.9)	7.5 (6.9)	7.7 (7.4)	8.2 (7.9)	8.8 (8.6)	8.8 (8.0)
Medical ≥35	8.9 (8.5)	7.2 (6.5)	7.3 (6.8)	8.5 (7.1)	8.5 (8.2)	8.3 (8.0)
Surgical <35	9.5 (9.1)	6.6 (6.7)	6.8 (6.8)	7.1 (6.7)	7.2 (6.8)	7.3 (7.1)
Surgical ≥35	9.4 (9.2)	6.5 (6.2)	6.6 (6.4)	6.8 (6.6)	6.8 (6.5)	7.3 (7.1)

The NEW ENGLAND JOURNAL of MEDICINE

ORIGINAL ARTICLE

Bariatric Surgery versus Conventional Medical Therapy for Type 2 Diabetes

Geltrude Mingrone, M.D., Simona Panunzi, Ph.D., Andrea De Gaetano, M.D., Ph.D., Caterina Guidone, M.D., Amerigo Iaconelli, M.D., Laura Leccesi, M.D., Giuseppe Nanni, M.D., Alfons Pomp, M.D., Marco Castagneto, M.D., Giovanni Ghirlanda, M.D., and Francesco Rubino, M.D.

ABSTRACT

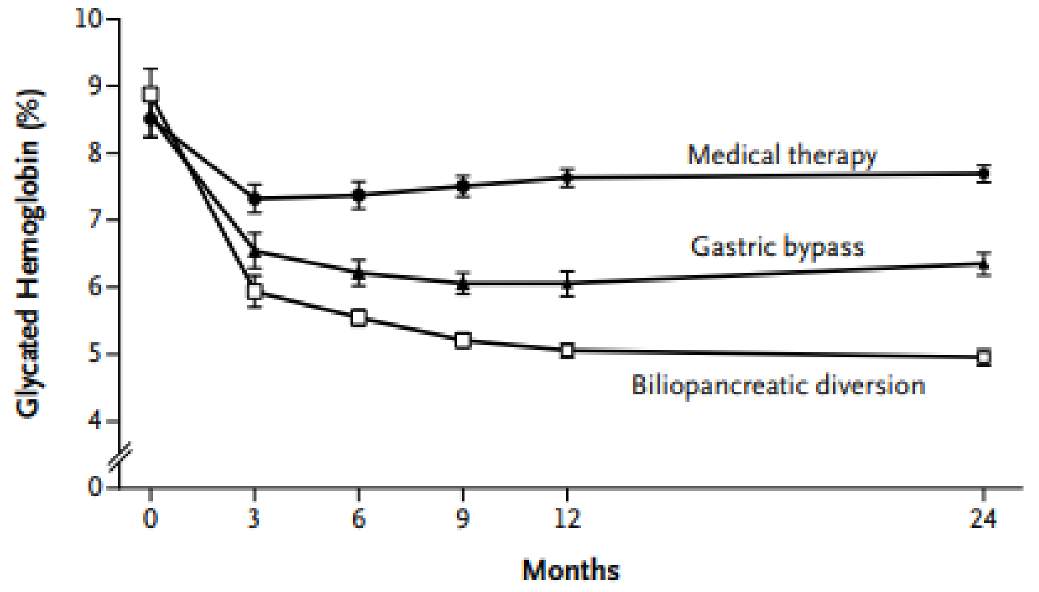


Figure 2. Glycated Hemoglobin Levels during 2 Years of Follow-up.

Table 3. Late Complications of Surgical Procedures.*

Complication	Biliopancreatic Diversion (N=19)	Gastric Bypass (N=19)
Incisional hernia (9 mo)	1 Male patient (5%)	0
Intestinal occlusion (6 mo)	0	1 Male patient (5%)
Iron-deficiency anemia	2 Female patients (11%)†	2 Female patients (11%)
Hypoalbuminemia (albumin, <3.5 g/dl)	1 Female and 1 male patient (11%)†	0
Osteopenia (BMD T score, −2)	1 Female patient (5%)	0
Osteoporosis (BMD T score, −2.7)	1 Female patient (5%)†	0

* The listed metabolic complications developed 9 to 18 months after the operations. BMD denotes bone mineral density at the femoral neck on dual-energy x-ray absorptiometry.
† One female patient had multiple complications.

Metabolic surgery versus conventional medical therapy in patients with type 2 diabetes: 10-year follow-up of an open-label, single-centre, randomised controlled trial

Geltrude Mingrone, Simona Panunzi, Andrea De Gaetano, Caterina Guidone, Amerigo Iaconelli, Esmeralda Capristo, Ghassan Chamseddine, Stefan R Bornstein, Francesco Rubino

Summary

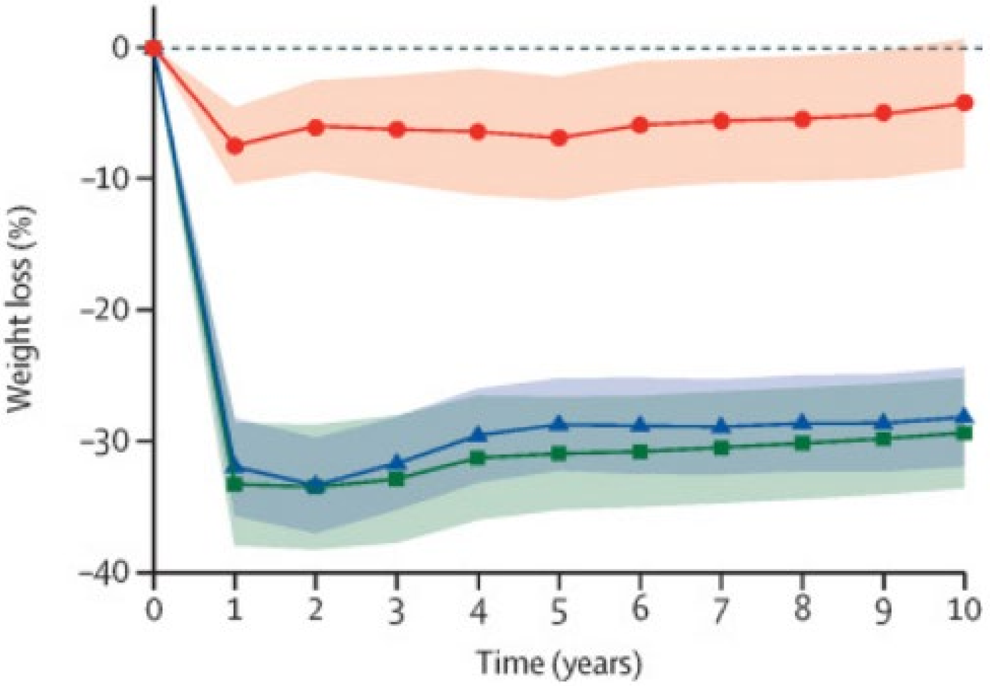
Background No data from randomised controlled trials of metabolic surgery for diabetes are available beyond 5 years of follow-up. We aimed to assess 10-year follow-up after surgery compared with medical therapy for the treatment of type 2 diabetes.

Methods We did a 10-year follow-up study of an open-label, single-centre (tertiary hospital in Rome, Italy), randomised controlled trial, in which patients with type 2 diabetes (baseline duration >5 years; glycated haemoglobin [HbA_{1c}] >7·0%, and body-mass index ≥35 kg/m²) were randomly assigned (1:1:1) to medical therapy, Roux-en-Y gastric bypass (RYGB), or biliopancreatic diversion (BPD) by a computerised system. The primary endpoint of the study was diabetes remission at 2 years (HbA_{1c} <6·5% and fasting glycaemia <5·55 mmol/L without ongoing medication for at least 1 year). In the 10-year analysis, durability of diabetes remission was analysed by intention to treat (ITT). This study is registered with ClinicalTrials.gov, NCT00888836.

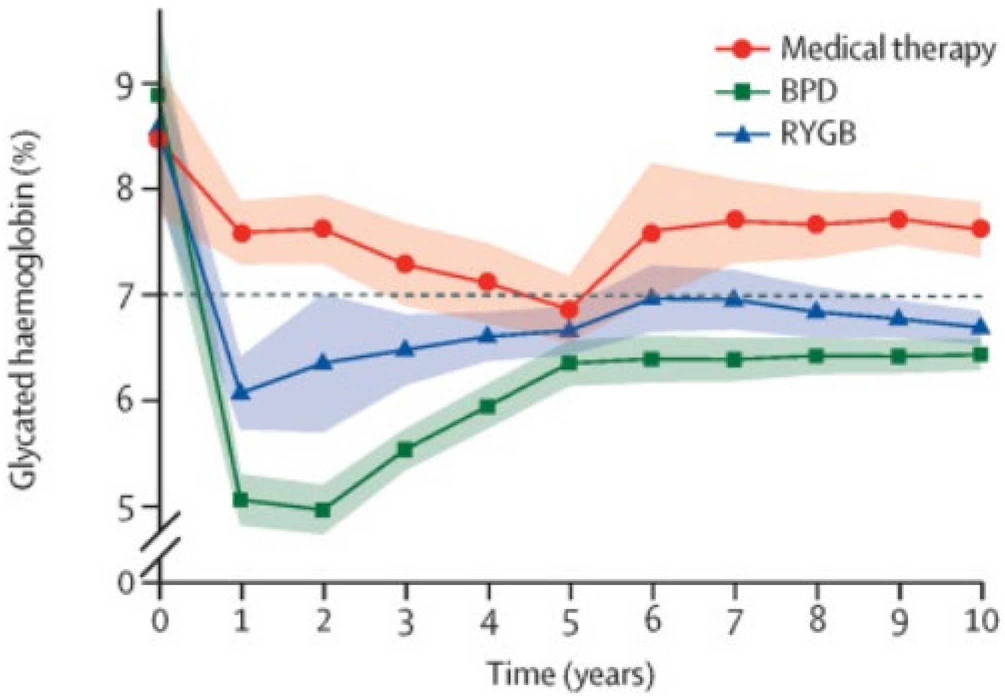
Findings Between April 30, 2009, and Oct 31, 2011, of 72 patients assessed for eligibility, 60 were included. The 10-year follow-up rate was 95·0% (57 of 60). Of all patients who were surgically treated, 15 (37·5%) maintained diabetes remission throughout the 10-year period. Specifically, 10-year remission rates in the ITT population were 5·5% for medical therapy (95% CI 1·0–25·7; one participant went into remission after crossover to surgery), 50·0% for BPD (29·9–70·1), and 25·0% for RYGB (11·2–46·9; p=0·0082). 20 (58·8%) of 34 participants who were observed to be in remission at 2 years had a relapse of hyperglycaemia during the follow-up period (BPD 52·6% [95% CI 31·7–72·7]; RYGB 66·7% [41·7–84·8]). All individuals with relapse, however, maintained adequate glycaemic control at 10 years (mean HbA_{1c} 6·7% [SD 0·2]). Participants in the RYGB and BPD groups had fewer diabetes-related complications than those in the medical therapy group (relative risk 0·07 [95% CI 0·01–0·48] for both comparisons). Serious adverse events occurred more frequently among participants in the BPD group (odds ratio [OR] for BPD *vs* medical therapy 2·7 [95% CI 1·3–5·6]; OR for RYGB *vs* medical therapy 0·7 [0·3–1·9]).

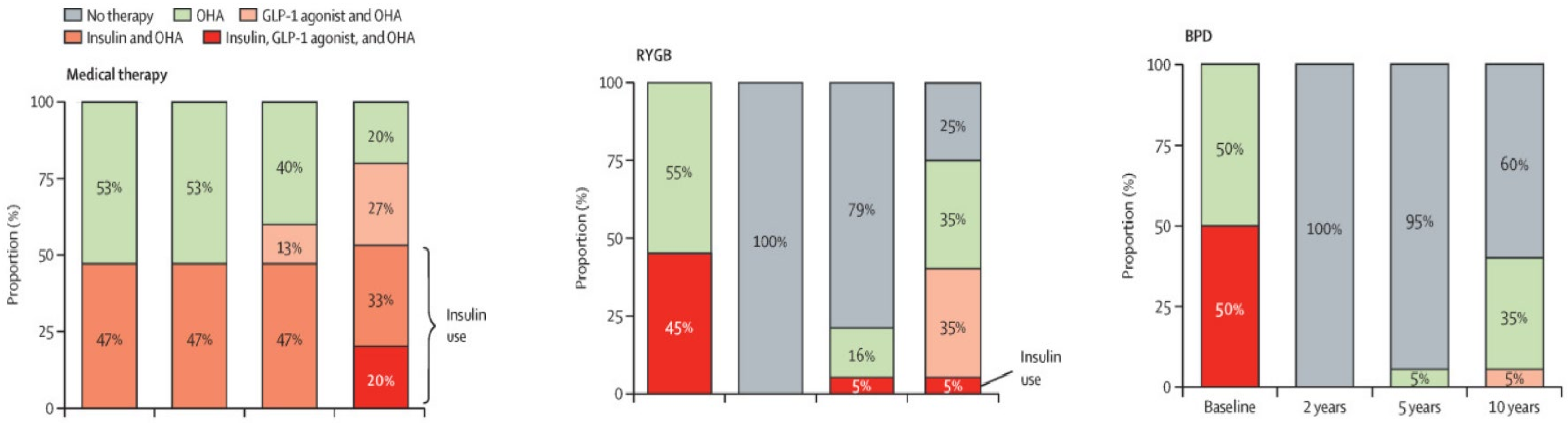
Interpretation Metabolic surgery is more effective than conventional medical therapy in the long-term control of type 2 diabetes. Clinicians and policy makers should ensure that metabolic surgery is appropriately considered in the management of patients with obesity and type 2 diabetes.

C Weight loss



B Glycaemic control



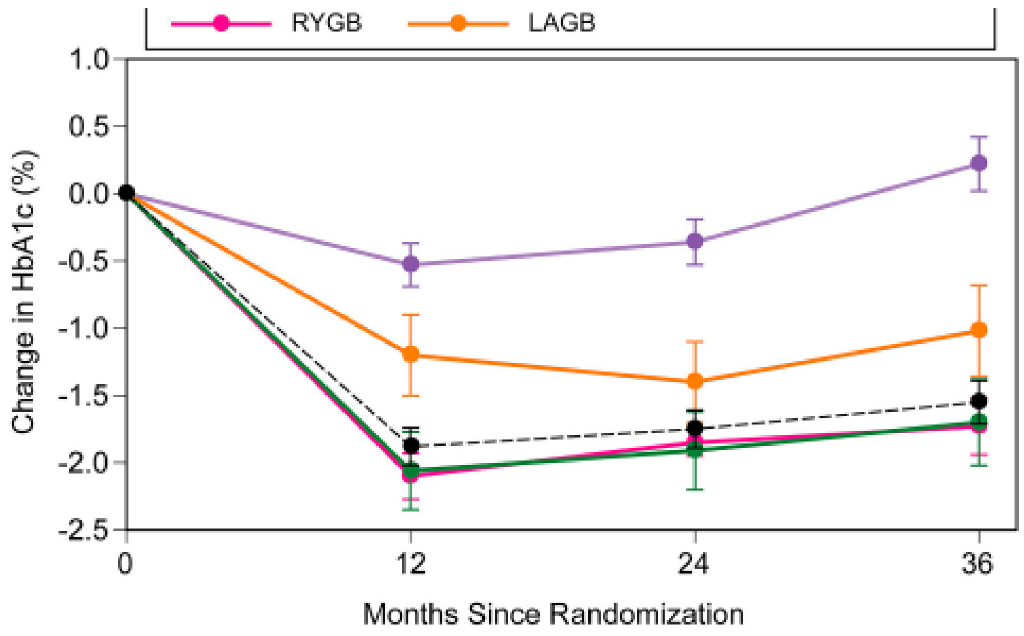


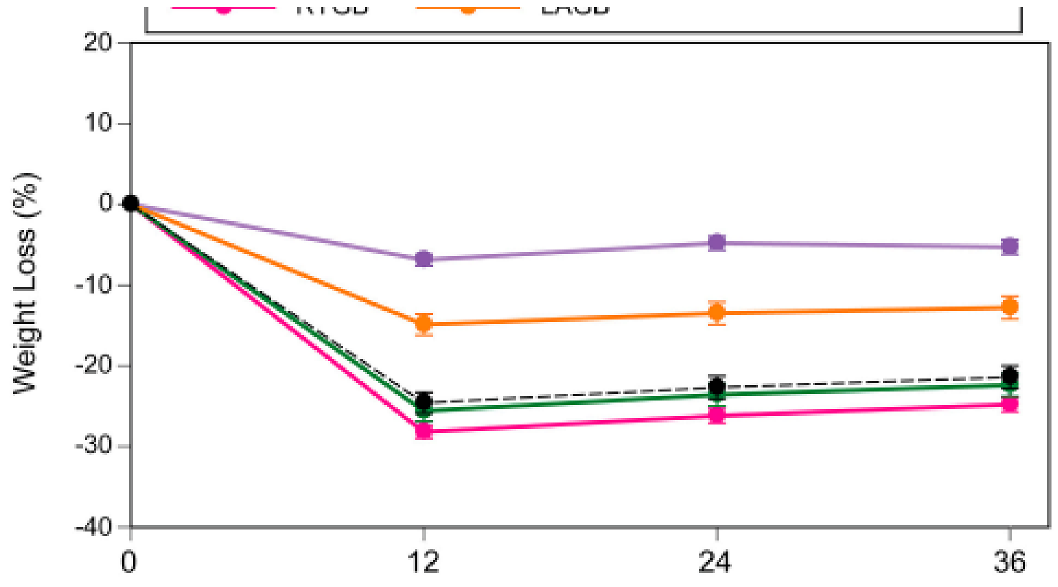
No therapy
OHA
GLP-1 agonist and OHA
Insulin and OHA
Insulin, GLP-1 agonist, and OHA
Medical therapy
Proportion (%)
100
75
50
25
0
53%
53%
40%
20%
27%
13%
47%
47%
47%
33%
20%
Insulin use
RYGB
55%
100%
79%
25%
35%
45%
16%
35%
5%
5%
Insulin use
BPD
50%
100%
95%
60%
50%
35%
5%
5%
Baseline
2 years
5 years
10 years

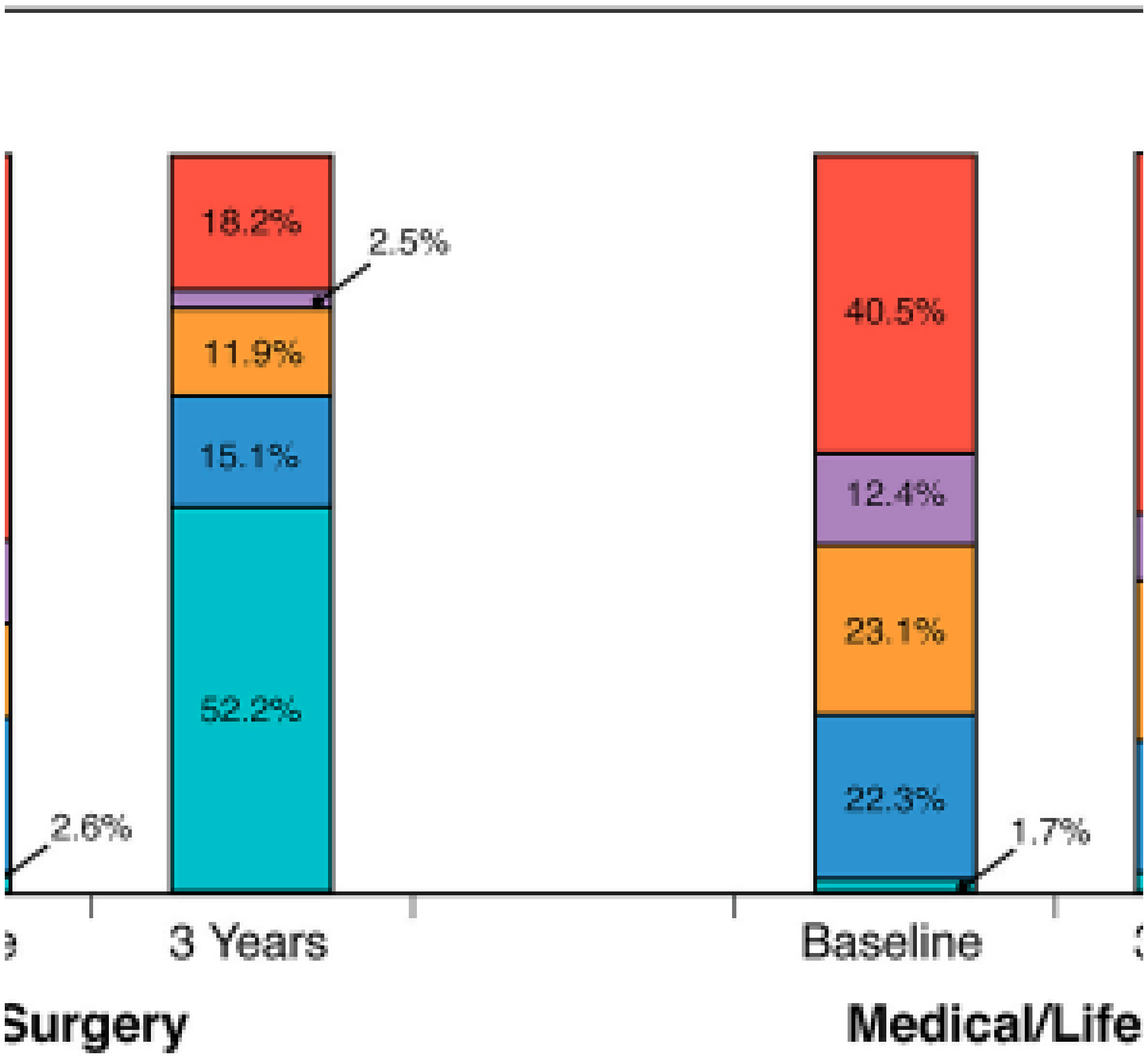
Diabetes Remission in the Alliance of Randomized Trials of Medicine Versus Metabolic Surgery in Type 2 Diabetes (ARMMS-T2D)

Diabetes Care 2022;45:1574–1583 | https://doi.org/10.2337/dc21-2441

John P. Kirwan,[1,2] Anita P. Courcoulas,[3] David E. Cummings,[4,5] Allison B. Goldfine,[6,7] Sangeeta R. Kashyap,[1] Donald C. Simonson,[7,8] David E. Arterburn,[9] William F. Gourash,[3] Ashley H. Vernon,[7,8] John M. Jakicic,[10] Mary Elizabeth Patti,[6,7] Kathy Wolski,[1] and Philip R. Schauer[1,2]


RYGB
LAGB
1.0
0.5
0.0
-0.5
-1.0
-1.5
-2.0
-2.5
Change in HbA1c (%)
0
12
24
36
Months Since Randomization


20
10
0
-10
-20
-30
-40
Weight Loss (%)
0
12
24
36


18.2%
2.5%
11.9%
15.1%
52.2%
2.6%
40.5%
12.4%
23.1%
22.3%
1.7%
3 Years
Baseline
Surgery
Medical/Life

Obesity Surgery
https://doi.org/10.1007/s11695-021-05870-4

ORIGINAL CONTRIBUTIONS

Diabetes Resolution at 10 Years After Biliopancreatic Diversion in Overweight and Class 1 Obese Patients with Type 2 Diabetes

Francesco Saverio Papadia[1] · Flavia Carlini[1] · Alice Rubartelli[1] · Micaela Battistini[2] · Renzo Cordera[2] · Gian Franco Adami[2] · Giovanni Camerini[1]

Received: 3 November 2021 / Revised: 22 December 2021 / Accepted: 22 December 2021

Table 2 Type 2 diabetes (T2DM) patients undergoing behavioral, dietetic, and pharmacological treatment (CO subjects). Anthropometric, biochemical, and clinical data at the enrollment and after a 10-year follow-up. *BMI*, body mass index; *BW*, body weight; *FBG*, fasting blood glucose; *Hba1$_C$*, glycosylated hemoglobin. T2DM was considered as remitted when FBG is steadily lower than 125 mg/dl without antidiabetic agents

	Basal evaluation	At 10-year follow-up
Age (years)	59 ± 4.5	
Gender (male)	22	
T2DM duration (years and range)	8 (4–12)	
Presence of T2DM	30	30
Antidiabetic therapy (#)	30	30
Insulin use (# and %)	13 (43)	15 (50)
BMI (kg/m^2, mean ± sd)	28.9 ± 3.28	31.6 ± 2.58
BW (kg, mean ± sd)	82.6 ± 10.1	84.8 ± 14.6
FBG (mg/day, mean ± sd l)	156 ± 45	190 ± 42
HbA1$_C$ (%, mean ± sd)	7.9 ± 0.37	7.43 ± 0.85
Triglycerides (mg/dl, mean ± sd	141 ± 74	102 ± 58
Cholesterol (mg/dl, mean ± sd)	189 ± 30	182 ± 34.6
HDL cholesterol (mg/dl, mean ± sd)	42 ± 8.3	43 ± 11

Table 1 Type two diabetes (T2DM) class 1 obese and overweight patients: anthropometric, biochemical, and clinical data prior to, at 5 and at 10 years following biliopancreatic diversion. *BMI*, body mass index; *BW*, body weight; *%EWL*: percentage excess weight lost; *FBG*, fasting blood glucose; Hba1$_C$, glycosylated hemoglobin. T2DM was considered as remitted when FBG is steadily lower than 125 mg/dl without antidiabetic agents

	Prior to BPD	At 1 year after BPD	At 5 years after BPD	At 10 years after BPD
Cases (#)	30	30	29	27
Age (years)	56.7 (35–70)			
Gender (male)	19 M			
T2DM duration (years and range)	11.1 (3–15)			
Antidiabetic therapy (# and %)	30 (100)	21 (80)*	16 (55)*	12 (40)*
Insulin use (# and %)	15 (50)	16 (53)	13 (45)	12 (40)
BMI (kg/m^2, mean ± sd)	30.6 ± 2.9	25.3 ± 2.3*	25.7 ± 2.8*	24.9 ± 2.4*
BW (kg, mean ± sd)	84.8 ± 11.1	70.7 ± 10.2*	73 ± 10.2*	68.5 ± 9.2*
EWL (%, mean ± sd)		24.8 ± 11.9	23.3 ± 12	25.6 ± 14.2
FBG (mg/day, mean ± sd l)	220 ± 69	149 ± 41*	140 ± 32.1*	140 ± 40.7*
HbA1$_C$ (%, mean ± sd)	9.3 ± 1.5	6.3 ± 0.8*	6.6 ± 2.1*	6.5 ± 1.3*
Presence of T2DM (# and %)	30 (100)	21 (70)*	12 (41)*§	14 (52)*§
Triglycerides (mg/dl, mean ± sd	198 ± 226	204 ± 109	164 ± 81	145 ± 90
Cholesterol (mg/dl, mean ± sd)	190 ± 48	147 ± 32*	144 ± 41*	125 ± 30*
HDL cholesterol (mg/dl, mean ± sd)	47 ± 122	44 ± 10	46 ± 14	47 ± 10
Blood hypertension (# and %)	16 (53)	6 (20)*	3 (10)*	2 (7)*

$^*p < 0.01$ vs. prior to BPD

$^§p < 0.01$ vs. at 1 year after BPD

Table 4 Type two diabetes (T2DM) class 1 obese and overweight patients having undergone biliopancreatic diversion (BPD): occurrence of BPD-related complication throughout the 10-year follow-up period

BPD-related complication	Cases (#)	Reoperation (# of subjects)		
		Laparotomy	Elongation	Restoration
Postoperative intraperitoneal bleeding	1	1		
Nutrition and vitamin deficiency	8			
Protein malnutrition	3		2	
Gastrointestinal transit alterations	6		2	4
Severe bleeding from gastric ulcer	4			
Nephrolithiasis	1			
Incisional hernia	2			
Hepatic cirrhosis	1			1
Uneventful (# and % of subjects)	14 (46)			

SURGERY FOR OBESITY AND RELATED DISEASES

Surgery for Obesity and Related Diseases 19 (2023) 1110–1118

Original article

Pyrrhic victory? Long-term results of biliopancreatic diversion on patients with type 2 diabetes and severe obesity

Francesco Papadia, M.D.[a], Flavia Carlini, M.D.[a], Gaia Longo, M.D.[a], Alice Rubartelli, M.D.[a], Micaela Battistini, M.D.[a,b], Beatrice Drago, M.D.[a], Gian Franco Adami, M.D.[a,b,*], Giuseppe Marinari, M.D.[c], Giovanni Camerini, M.D.[a]

[a]*Department of Surgery, University of Genoa, Genoa, Italy*
[b]*Department of Internal Medicine, University of Genoa, Genoa, Italy*
[c]*Bariatric Surgery Unit, IRCCS Humanitas Research Hospital, Milan, Italy*

Received 19 January 2023; accepted 1 April 2023

Table 1
Patients with type 2 diabetes and severe obesity submitted to biliopancreatic diversion

Factor	Prior to BPD	At 1 yr after BPD	At 3–5 yr after BPD	At 10–20 yr after BPD
Patients	173	157	139	86
BW (kg)	140 ± 38	97 ± 19*	93 ± 16.9*	91 ± 17*
BMI (kg/m^2)	49.7 ± 9.4	35.1 ± 7.7*	34 ± 7.6*	33 ± 6.3*
EBWL (kg)	—	43 ± 40	34 ± 18	33 ± 18
FBG (mg/dL)	187 ± 75	98 ± 6*	95 ± 39*	92 ± 15*
HbA1C (%)	8.2 ± 2.1	5.1 ± .8*	5.2 ± .7*	4.8 ± .7*
TG (mg/dL)	213 ± 208	150 ± 90*	120 ± 74*	102 ± 80*
HDL cholesterol (mg/dL)	45.3 ± 21	40 ± 15.6	43 ± 15.6	45 ± 12
Hb (g/dL)	15 ± 4.7	14 ± 4.9	13 ± 8.9	12 ± 1.6
Ht (%)	46.3 ± 41.4	40 ± 7.4	38 ± 5.9	38 ± 4.5
Ferritin (μg/L)	171 ± 157	117 ± 119	124 ± 214	84 ± 100
Fe (μg/L)	82 ± 34	73 ± 33	65 ± 41.3	64 ± 29
Albumin (mg/dL)	4.2 ± .4	3.9 ± .5	3.9 ± .4	3.9 ± .4

BPD = biliopancreatic diversion; BW = body weight; BMI = body mass index; EBWL = excess body weight lost; FBG = fasting blood glucose concentration; HbA1C = serum glycosylated hemoglobin concentration; TG = serum triglyceride concentration; HDL = high-density lipoprotein; Hb = serum hemoglobin concentration; Ht = hematocrit; Fe = serum iron concentration.

Anthropometric and biochemical (mean ± SD) data prior to and 1, 3–5, and 10–20 years after BPD.

* $P < .01$ versus prior to BPD.

Table 3
Nonoperated patients with type 2 diabetes and severe obesity treated with conventional therapy

Factor	At admission	At the end of follow-up
Number of patients	173	120
BW (kg)	100 ± 15.4	91.5 ± 11.6
BMI (kg/m^2)	35 ± 5.68	33.6 ± 4.28
FBG (mg/dL)	159 ± 56	147 ± 53
HbA1C (%)	7.7 ± 1.7	7.7 ± 1.5
TG (mg/dL)	159 ± 89	147 ± 65
HDL cholesterol (mg/dL)	46 ± 10	46 ± 12
CVD, n (%)	—	17 (16)
Deaths, n (%)	—	16 (16)

BW = body weight; BMI = body mass index; FBG = fasting blood glucose concentration; HbA1C = serum glycosylated hemoglobin concentration; TG = serum triglyceride concentration; HDL = high-density lipoprotein; CVD = cardiovascular disease.

Anthropometric and biochemical (mean ± SD) data at admission and at the end of follow-up.

Table 4
Patients with type 2 diabetes and severe obesity submitted to biliopancreatic diversion

Factor	First post-BPD year	Early (3–5 yr) follow-up period	Late (10–20 yr) follow-up period
Patients, n	157	139	86
Perioperative complications, n (%)	3 (2)	—	—
Acute bleeding from peptic ulcer, n (%)	7 (4)	5 (3)	—
Gastroesophageal reflux disease, n (%)	9 (6)	6 (4)	4 (5)
Distressing anorectal disorder, n (%)	14 (9)	14 (10)	4 (5)
Severe and recurrent deficiency anemia, n (%)	—	—	6 (7)
Metabolic bone disease, n (%)		2 (1)	6 (7)
Protein malnutrition, n (%)	2 (1)	4 (3)	6 (7)
Symptomatic vitamin deficiency, n (%)	—	4 (3)	16 (12)
Gastrointestinal transit alterations and chronic diarrhea, n (%)	7 (4)	5 (3)	17 (2)
Liver cirrhosis, n (%)	—	2 (1)	3 (4)
Incisional hernia, n (%)	80 (51)	—	—
BPD revision or restoration, n (%)	0	1 (1)	10 (12)
Patients without significant complications, excluding incisional hernia, n (%)	133 (85)	111 (79)	55 (64)

BPD = biliopancreatic diversion.

BPD-related complications in the first postoperative year and throughout the follow-up period in the first (3–5 yr) and late (10–20 yr) periods.

The NEW ENGLAND JOURNAL of MEDICINE

ORIGINAL ARTICLE

Tirzepatide Once Weekly for the Treatment of Obesity

Ania M. Jastreboff, M.D., Ph.D., Louis J. Aronne, M.D.,
Nadia N. Ahmad, M.D., M.P.H., Sean Wharton, M.D., Pharm.D.,
Lisa Connery, M.D., Breno Alves, M.D., Arihiro Kiyosue, M.D., Ph.D.,
Shuyu Zhang, M.S., Bing Liu, Ph.D., Mathijs C. Bunck, M.D., Ph.D.,
and Adam Stefanski, M.D., Ph.D., for the SURMOUNT-1 Investigators*

ABSTRACT

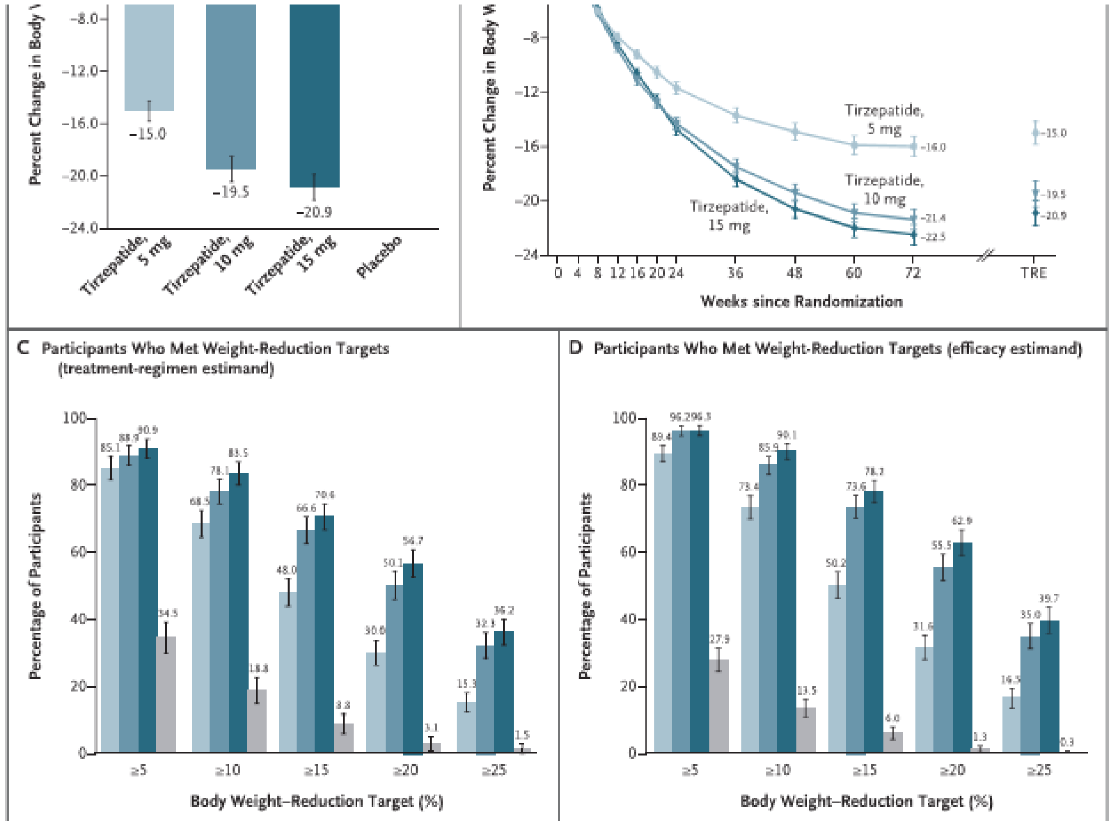


Table 3. Key Secondary and Additional Secondary End Points for Pooled Tirzepatide Dose Groups (Treatment-Regimen Estimand).*

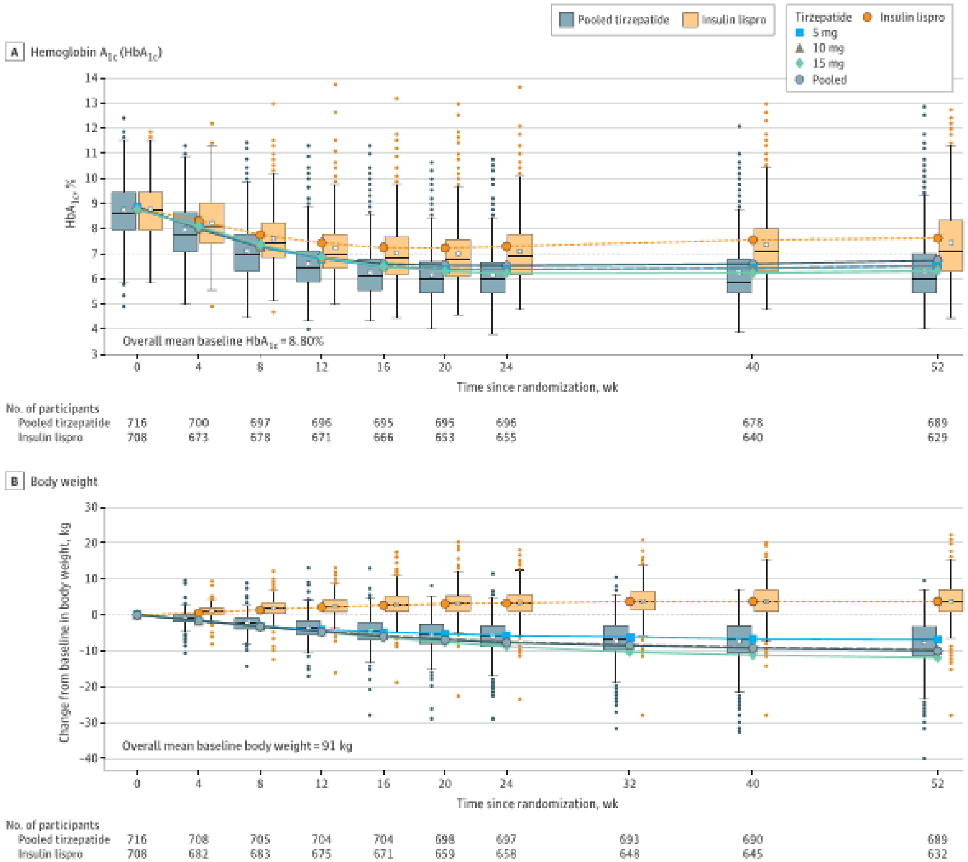
End Points	Pooled Tirzepatide Groups†	Placebo (N=643)	Estimated Treatment Difference from Placebo (95% CI)
	least-squares mean (95% CI)		
Key secondary end points‡			
Change from baseline to week 20 in body weight — kg§	−12.8 (−13.1 to −12.5)	−2.7 (−3.2 to −2.2)	−10.1 (−10.7 to −9.6)
Change in measure			
SF-36 physical function score§¶	3.6 (3.2 to 4.0)	1.7 (0.8 to 2.6)	1.9 (1.0 to 2. 9)
Systolic blood pressure — mm Hg	−7.2 (−7.8 to −6.7)	−1.0 (−2.3 to −0.3)	−6.2 (−7.7 to −4.8)
Percentage change in level‖			
Triglycerides — mg/dl	−24.8 (−26.3 to −23.1)	−5.6 (−10.0 to −1.2)	−20.3 (−24.3 to −16.1)
Non-HDL cholesterol — mg/dl	−9.7 (−10.7 to −8.6)	−2.3 (−4.9 to −0.2)	−7.5 (−10.1 to −4.9)
HDL cholesterol — mg/dl	8.0 (6.9 to 9.1)	−0.7 (−2.9 to 1.5)	8.8 (6.1 to 11.5)
Fasting insulin — mIU/liter**	−42.9 (−44.9 to −40.9)	−6.6 (−15.3 to 2.2)	−38.9 (−44.8 to −32.4)
Additional secondary end points††			
Change in diastolic blood pressure — mm Hg	−4.8 (−5.2 to −4.4)	−0.8 (−1.6 to 0.0)	−4.0 (−4.9 to −3.1)
Percentage change in level‖			
Total cholesterol — mg/dl	−4.8 (−5.6 to −4.0)	−1.8 (−3.7 to 0.1)	−3.1 (−5.2 to −1.0)
LDL cholesterol — mg/dl	−5.8 (−6.9 to −4.6)	−1.7 (−4.6 to 1.3)	−4.2 (−7.2 to −1.0)
VLDL cholesterol — mg/dl	−24.4 (−25.9 to −22.9)	−4.8 (−9.2 to −0.4)	−20.6 (−24.6 to −16.4)
Free fatty acids — mmol/liter	−7.5 (−10.7 to −4.3)	9.5 (3.8 to 15.3)	−15.6 (−20.8 to −9.9)

JAMA | Original Investigation

Tirzepatide vs Insulin Lispro Added to Basal Insulin in Type 2 Diabetes
The SURPASS-6 Randomized Clinical Trial

Julio Rosenstock, MD; Juan P. Frías, MD; Helena W. Rodbard, MD; Santiago Tofé, MD; Emmalee Sears, MS; Ruth Huh, PhD; Laura Fernández Landó, MD; Hiren Patel, MPharm

Figure 2. Effect of Tirzepatide vs Insulin Lispro on Hemoglobin A_{1c} (HbA_{1c}) and Body Weight



Cimetidine Versus Surgery for Recurrent Ulcer After Gastric Surgery

JARLEY KOO, M.D., S. K. LAM, M.D., G. B. ONG, D.Sc.

The efficacy of cimetidine vs. surgery in the treatment of recurrent ulcers after definitive surgery for chronic duodenal ulcer was evaluated in two comparable groups (23 each) of patients. Cimetidine 1 g daily healed 79% and 91.6% of recurrent ulcers, as assessed endoscopically, after 6 and 12 weeks respectively. At the end of one year, maintenance treatment with cimetidine (400 mg nocte) prevented relapse in 89.5% of the healed ulcers, while surgery was successful in 94.4% ($p > 0.1$). The cimetidine group experienced significantly ($p < 0.05$) less side effects than the surgical group, with respectively 10% and 50% of patients having Visick grade II and above. After one year of maintenance treatment, cimetidine was withdrawn, and ulcer recurred in 71.4% within six months. The relapse rates between the two groups were significantly different by life-table analysis ($p < 0.01$). We conclude that cimetidine was as effective as surgery in preventing relapse of postsurgical recurrent ulcers and had fewer side effects, but indefinitely prolonged therapy appeared necessary.

From the Combined Gastrointestinal Unit, Departments of Medicine and Surgery, University of Hong Kong, Queen Mary Hospital, Hong Kong

recurrence of these ulcers after they have been healed, and (c) the relative merits of cimetidine and surgery in the treatment of recurrent ulcers.

Methods

Patients

Forty-six Chinese patients (39 males, mean age 50.4 ± SD 16.1 years; 7 females, mean age 55.0 ± SD 10.6 years) were entered into the study between January

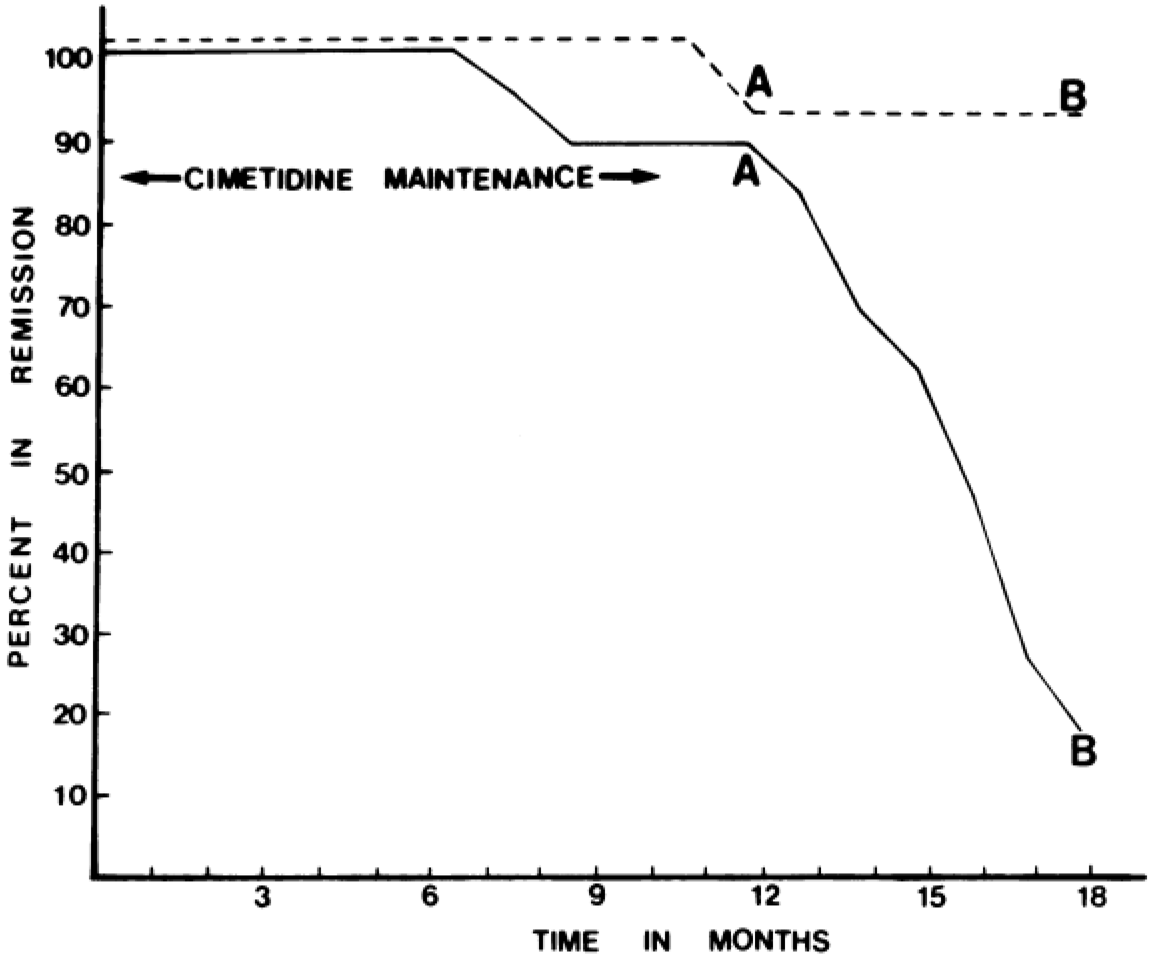
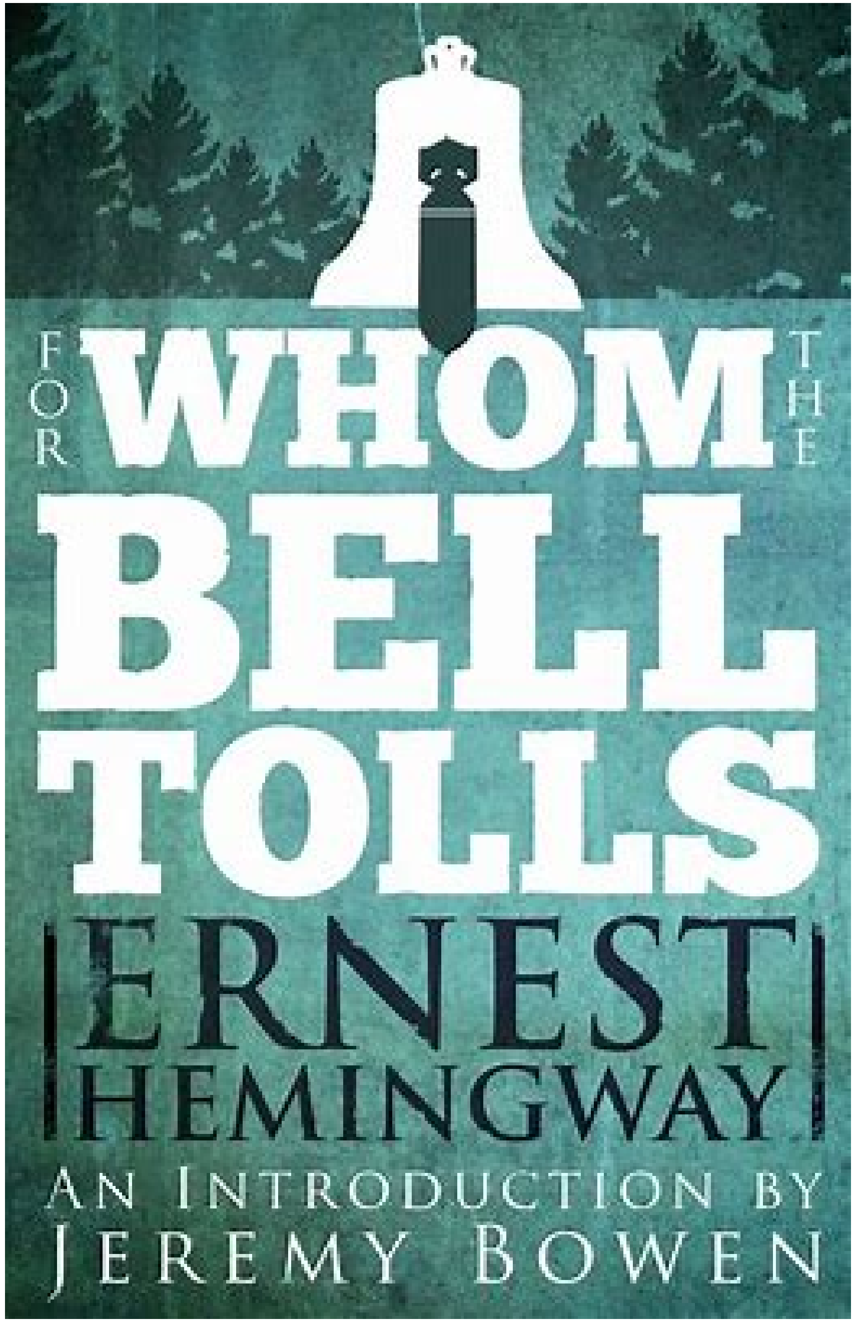


FIG. 1. Life Table analysis according to method of Peto et al.[16] showing per cent of remission during and after cimetidine maintenance for one year (solid line) and after surgery (broken line). The numbers of patients in cimetidine group not in relapse at entry and after 3, 6, 9, 12, 15, and 18 months were respectively 23, 22, 20, 17, 17, 10, and 4. Corresponding numbers in surgical group were 23, 23, 22, 19, 17, 12 and 10. A at end of one year: $z = 0.9836$ $p > 0.5$; B six months after cimetidine withdrawal: $z = 2.6407$ $p < 0.001$. Statistics by Generalised Wilcoxon Test.[17]


FOR WHOM THE BELL TOLLS
ERNEST HEMINGWAY
AN INTRODUCTION BY
JEREMY BOWEN

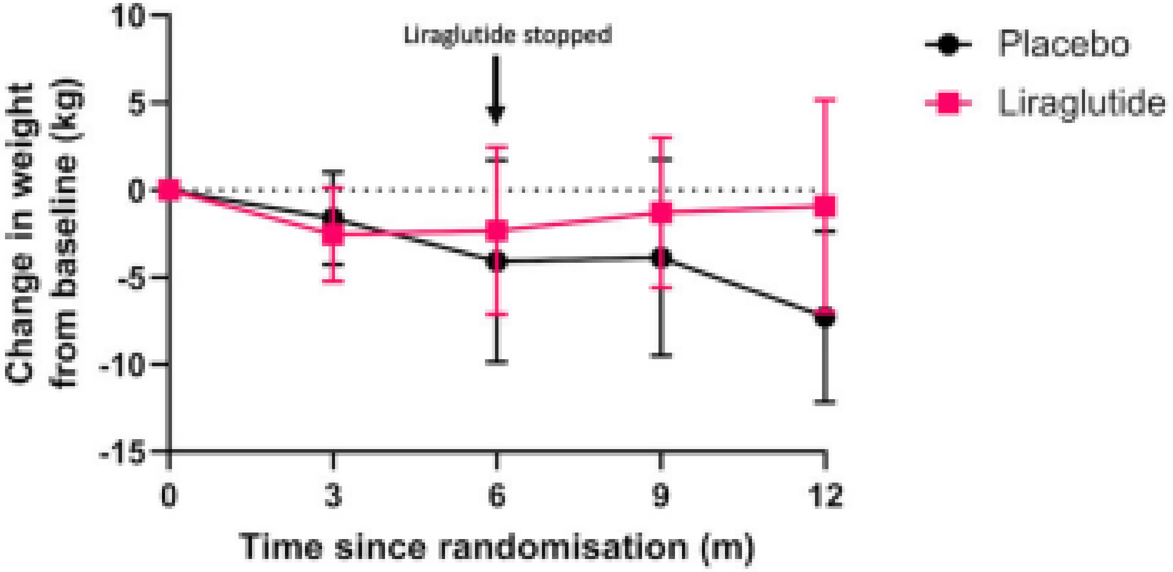
ARTICLE OPEN

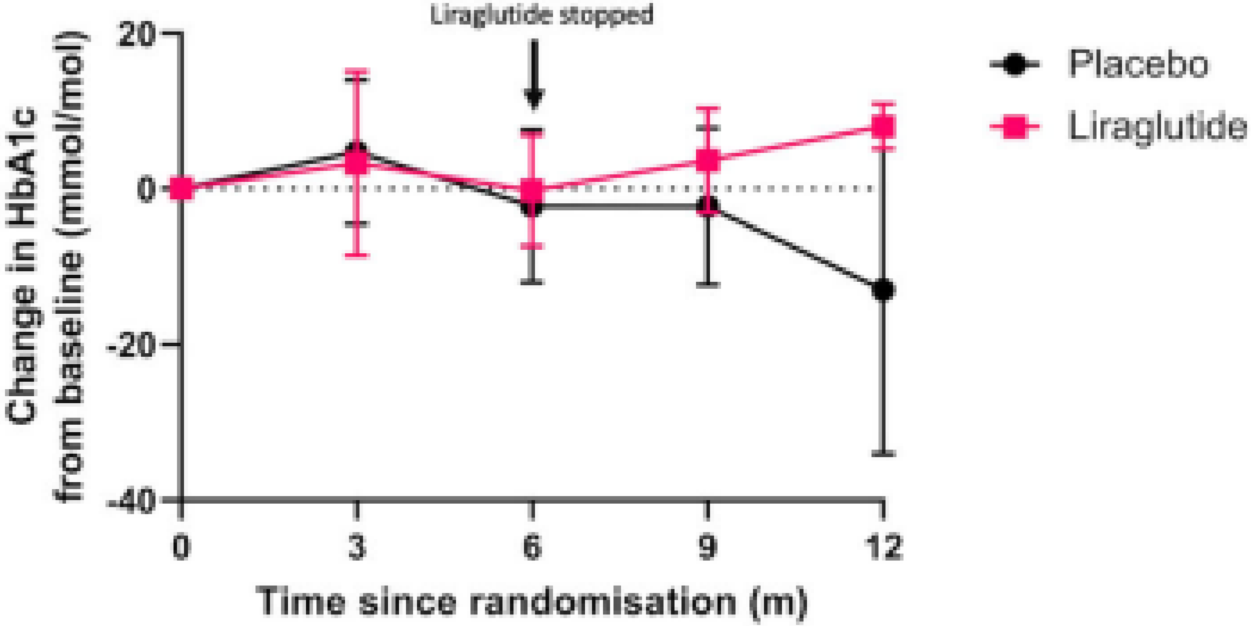
Check for updates

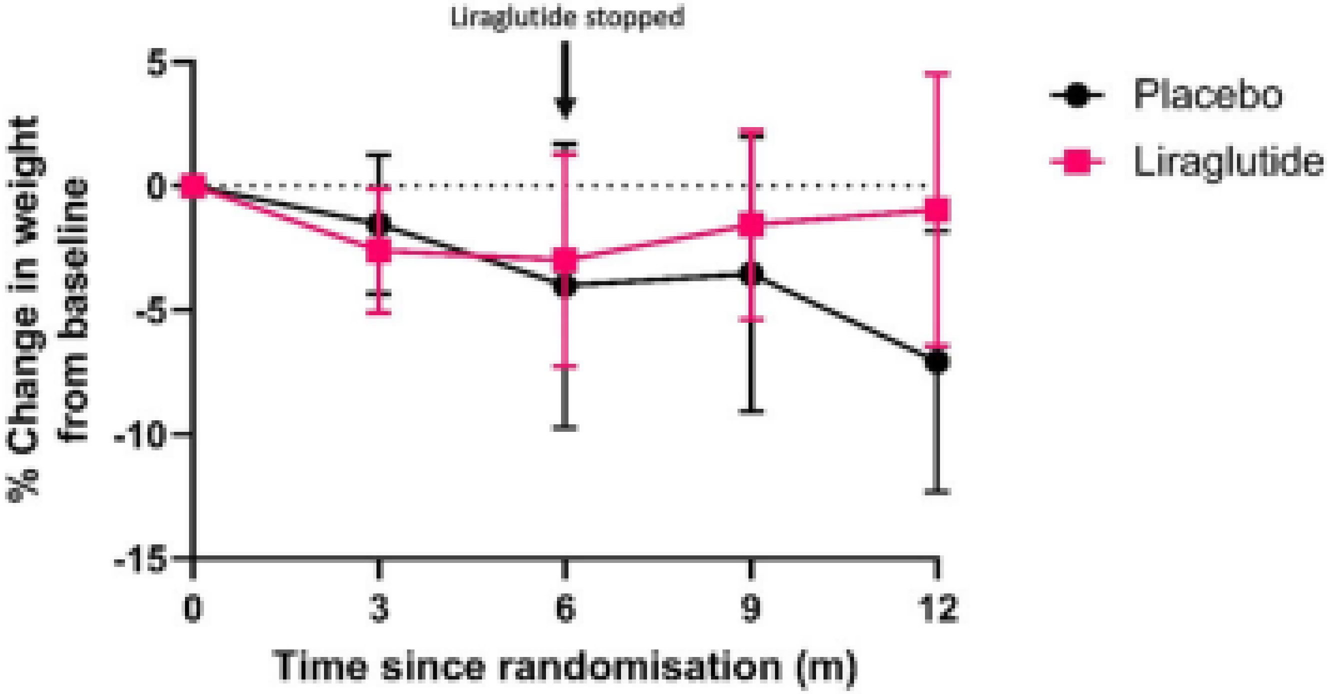
Clinical Research

Laparoscopic adjustable gastric banding with liraglutide in adults with obesity and type 2 diabetes (GLIDE): a pilot randomised placebo controlled trial

Claudia Coelho[1], Laurence J. Dobbie[1], James Crane[2], Abdel Douiri[3], Annastazia E. Learoyd[3], Olanike Okolo[1], Spyros Panagiotopoulos[4], Dimitri J. Pournaras[5], Sasindran Ramar[4], Francesco Rubino[6], Rishi Singhal[7], Carel W. le Roux[8], Shahrad Taheri[9] and Barbara McGowan[1] ✉


Liraglutide stopped
Placebo
Liraglutide
Change in weight
from baseline (kg)
10
5
0
-5
-10
-15
0
3
6
9
12
Time since randomisation (m)


Liraglutide stopped
Placebo
Liraglutide
Change in HbA1c
from baseline (mmol/mol)
20
0
-20
-40
0
3
6
9
12
Time since randomisation (m)


Liraglutide stopped
Placebo
Liraglutide
% Change in weight
from baseline
5
0
-5
-10
-15
0
3
6
9
12
Time since randomisation (m)

Conclusioni

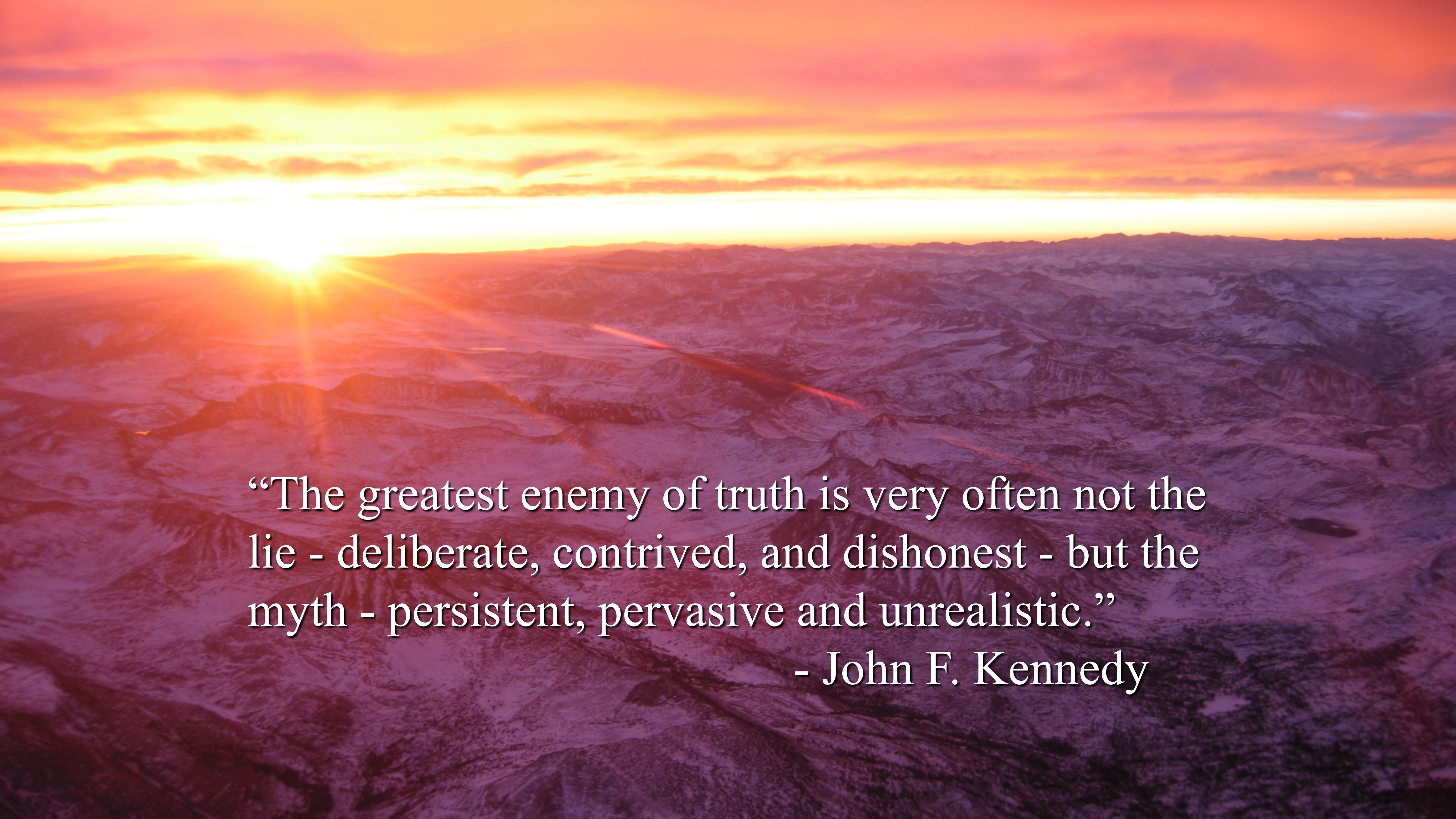
- La **chirurgia bariatrica** consente un **controllo/remissione** del diabete mellito tipo 2 associato ad obesità in un **numero molto alto di pazienti** e a **lungo termine**

- Gli **interventi ipoassorbitivi/derivativi hanno un effetto superiore** sul controllo glicemico rispetto alle procedure di restrizione gastrica

- La percentuale di **controllo e remissione del diabete tende a diminuire** per i pazienti con **malattia di durata maggiore**, in **terapia insulinica**, con **BMI più basso**

- I **nuovi farmaci** mostrano livelli di attività **simili alla chirurgia bariatrica**, ad un **follow-up più breve**

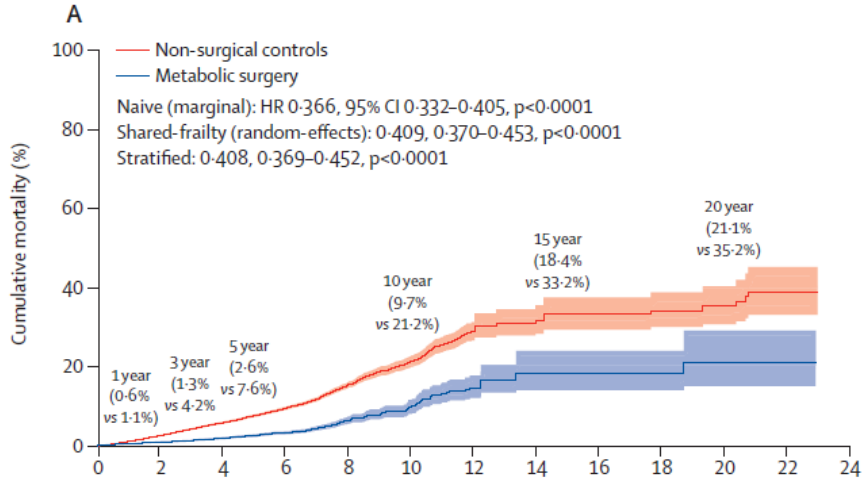
- Chirurgia e farmaci possono avere un ***ruolo addittivo/adiuvante*** (?)


"The greatest enemy of truth is very often not the lie - deliberate, contrived, and dishonest - but the myth - persistent, pervasive and unrealistic."
- John F. Kennedy

Grazie per l'attenzione!

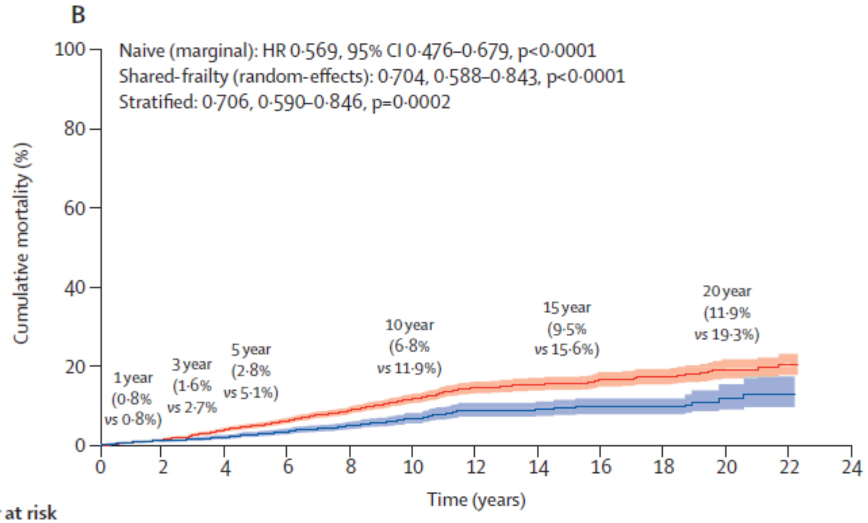
francesco.papadia@unige.it

francesco.papadia@hsanmartino.it



Number at risk

	0	2	4	6	8	10	12	14	16	18	20	22	24
Non-surgical	38 853	31 268	21 582	10 203	3153	807	280	93	85	70	55	49	0
Metabolic surgery	16 190	13 187	8825	3985	1333	394	206	45	42	34	25	24	0



Number at risk

	0	2	4	6	8	10	12	14	16	18	20	22	24
Non-surgical	5740	5523	4523	3488	2517	1334	813	519	460	353	242	211	0
Metabolic surgery	3256	3140	2670	2066	1431	618	429	317	273	180	87	59	0

***Figure 3*: Cumulative mortality and numbers-at-risk table for all participants who underwent metabolic–bariatric surgery *vs* usual non-surgical management of obesity, stratified by diabetes status**

(A) Subgroup analysis of patients with type 2 diabetes. (B) Subgroup analysis of patients without type 2 diabetes. Note that the relative hazard reduction is computed as (1 – HR) × 100% (eg, a HR of 0·409 translates to a reduction in the hazard rate of death of 59·1%). HR=hazard ratio.

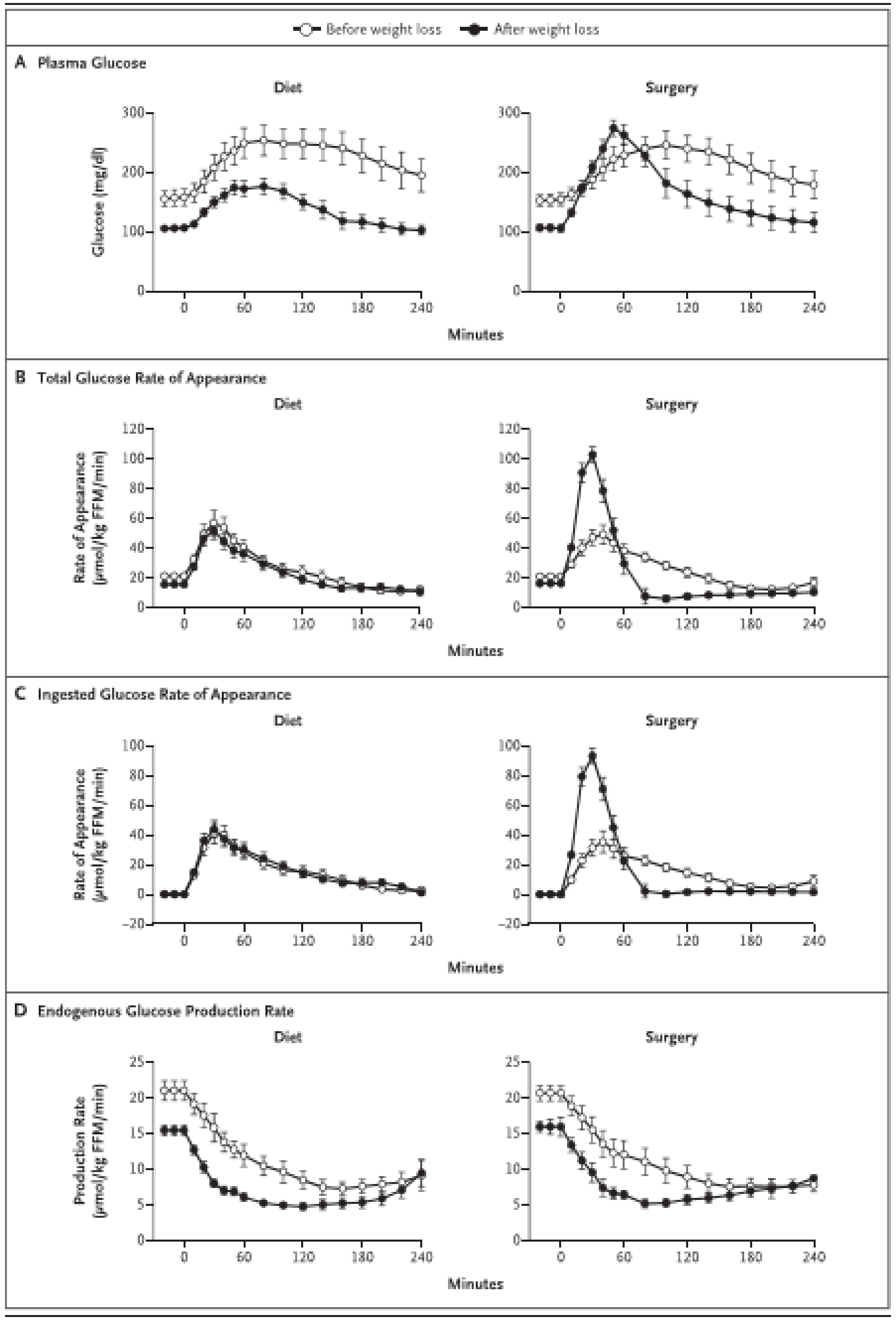
The NEW ENGLAND JOURNAL of MEDICINE

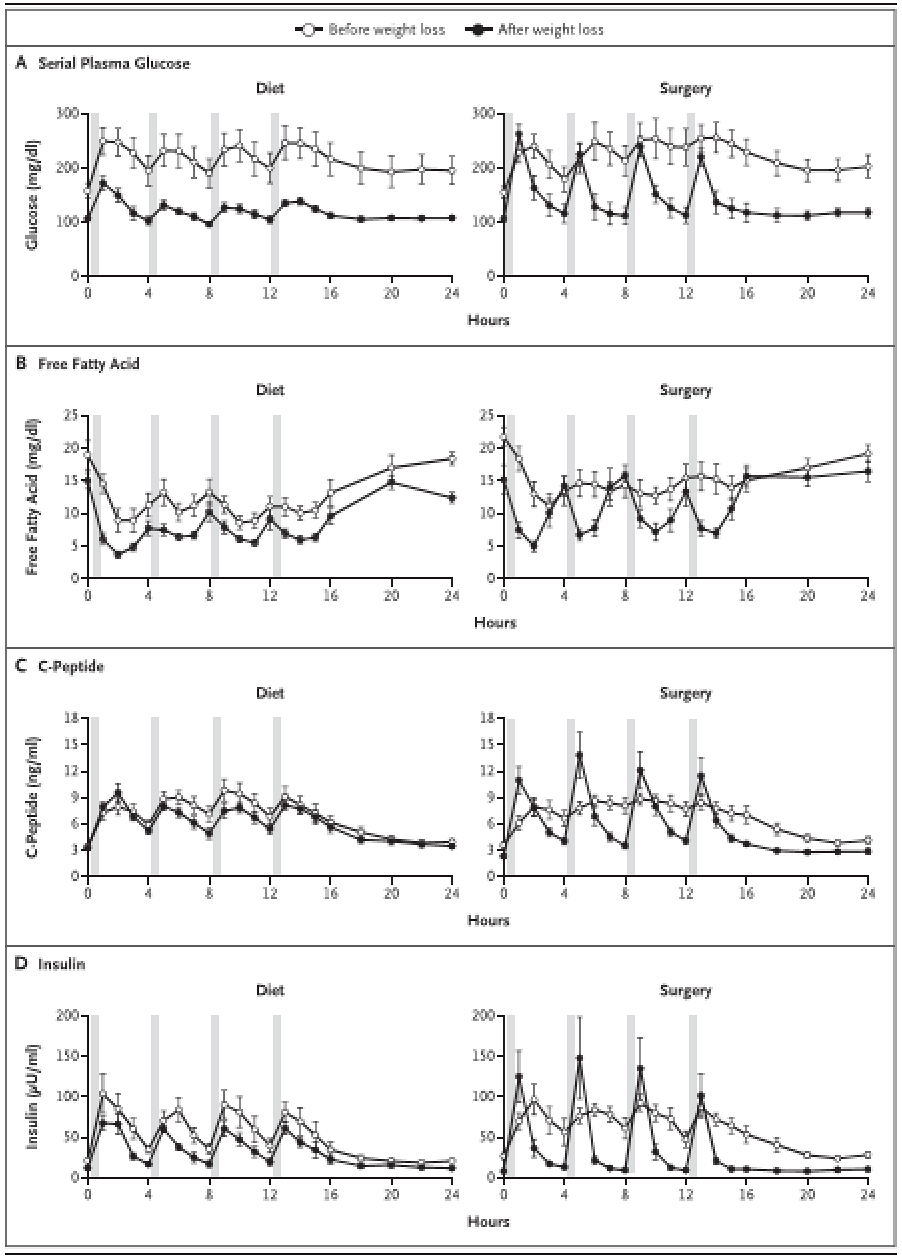
ORIGINAL ARTICLE

Effects of Diet versus Gastric Bypass on Metabolic Function in Diabetes

Mihoko Yoshino, M.D., Ph.D., Brandon D. Kayser, Ph.D.,
Jun Yoshino, M.D., Ph.D., Richard I. Stein, Ph.D., Dominic Reeds, M.D.,
J. Christopher Eagon, M.D., Shaina R. Eckhouse, M.D.,
Jeramie D. Watrous, Ph.D., Mohit Jain, M.D., Ph.D., Rob Knight, Ph.D.,
Kenneth Schechtman, Ph.D., Bruce W. Patterson, Ph.D., and Samuel Klein, M.D.

ABSTRACT


Before weight loss
After weight loss
A Plasma Glucose
Diet
Surgery
Glucose (mg/dl)
Minutes
B Total Glucose Rate of Appearance
Diet
Surgery
Rate of Appearance (μmol/kg FFM/min)
Minutes
C Ingested Glucose Rate of Appearance
Diet
Surgery
Rate of Appearance (μmol/kg FFM/min)
Minutes
D Endogenous Glucose Production Rate
Diet
Surgery
Production Rate (μmol/kg FFM/min)
Minutes


Before weight loss
After weight loss
A Serial Plasma Glucose
Diet
Surgery
Glucose (mg/dl)
Hours
B Free Fatty Acid
Diet
Surgery
Free Fatty Acid (mg/dl)
Hours
C C-Peptide
Diet
Surgery
C-Peptide (ng/ml)
Hours
D Insulin
Diet
Surgery
Insulin (μU/ml)
Hours

Association of metabolic–bariatric surgery with long-term survival in adults with and without diabetes: a one-stage meta-analysis of matched cohort and prospective controlled studies with 174 772 participants

Nicholas L Syn*, David E Cummings*, Louis Z Wang*, Daryl J Lin*, Joseph J Zhao, Marie Loh, Zong Jie Koh, Claire Alexandra Chew, Ying Ern Loo, Bee Choo Tai, Guowei Kim, Jimmy Bok-Yan So, Lee M Kaplan, John B Dixon, Asim Shabbir

Summary

Background Metabolic–bariatric surgery delivers substantial weight loss and can induce remission or improvement of obesity-related risks and complications. However, more robust estimates of its effect on long-term mortality and life expectancy—especially stratified by pre-existing diabetes status—are needed to guide policy and facilitate patient counselling. We compared long-term survival outcomes of severely obese patients who received metabolic–bariatric surgery versus usual care.

Methods We did a prespecified one-stage meta-analysis using patient-level survival data reconstructed from prospective controlled trials and high-quality matched cohort studies. We searched PubMed, Scopus, and MEDLINE (via Ovid) for randomised trials, prospective controlled studies, and matched cohort studies comparing all-cause mortality after metabolic–bariatric surgery versus non-surgical management of obesity published between inception and Feb 3, 2021. We also searched grey literature by reviewing bibliographies of included studies as well as review articles. Shared-frailty (ie, random-effects) and stratified Cox models were fitted to compare all-cause mortality of adults with obesity who underwent metabolic–bariatric surgery compared with matched controls who received usual care, taking into account clustering of participants at the study level. We also computed numbers needed to treat, and extrapolated life expectancy using Gompertz proportional-hazards modelling. The study protocol is prospectively registered on PROSPERO, number CRD42020218472.

Findings Among 1470 articles identified, 16 matched cohort studies and one prospective controlled trial were included in the analysis. 7712 deaths occurred during 1·2 million patient-years. In the overall population consisting 174 772 participants, metabolic–bariatric surgery was associated with a reduction in hazard rate of death of 49·2% (95% CI 46·3–51·9, p<0·0001) and median life expectancy was 6·1 years (95% CI 5·2–6·9) longer than usual care. In subgroup analyses, both individuals with (hazard ratio 0·409, 95% CI 0·370–0·453, p<0·0001) or without (0·704, 0·588–0·843, p<0·0001) baseline diabetes who underwent metabolic–bariatric surgery had lower rates of all-cause mortality, but the treatment effect was considerably greater for those with diabetes (between-subgroup I^2 95·7%, p<0·0001). Median life expectancy was 9·3 years (95% CI 7·1–11·8) longer for patients with diabetes in the surgery group than the non-surgical group, whereas the life expectancy gain was 5·1 years (2·0–9·3) for patients without diabetes. The numbers needed to treat to prevent one additional death over a 10-year time frame were 8·4 (95% CI 7·8–9·1) for adults with diabetes and 29·8 (21·2–56·8) for those without diabetes. Treatment effects did not appear to differ between gastric bypass, banding, and sleeve gastrectomy (I^2 3·4%, p=0·36). By leveraging the results of this meta-analysis and other published data, we estimated that every 1·0% increase in metabolic–bariatric surgery utilisation rates among the global pool of metabolic–bariatric candidates with and without diabetes could yield 5·1 million and 6·6 million potential life-years, respectively.

Interpretation Among adults with obesity, metabolic–bariatric surgery is associated with substantially lower all-cause mortality rates and longer life expectancy than usual obesity management. Survival benefits are much more pronounced for people with pre-existing diabetes than those without.

Lancet 2021; 397: 1830–41

Published Online May 6, 2021 https://doi.org/10.1016/S0140-6736(21)00591-2

See Comment page 1785

*Contributed equally

Yong Loo Lin School of Medicine, National University of Singapore, Singapore (N L Syn MBBS, L Z Wang MRCP, D J Lin BEng, J J Zhao, Z J Koh MRCS, C A Chew MCI, Y E Loo, Prof B C Tai CStat, G Kim FRCS, Prof J B-Y So FRCS, A Shabbir FRCS); Biostatistics & Modelling Domain, Saw Swee Hock School of Public Health, Singapore (N L Syn, Prof B C Tai); UW Medicine Diabetes Institute, Department of Medicine, Division of Metabolism, Endocrinology, and Nutrition, and Weight Management Program, Veteran Affairs Puget Sound Health Care System, University of Washington, Seattle, WA, USA (Prof D E Cummings MD); SingHealth Internal Medicine Residency Programme, Singapore General Hospital, Singapore (L Z Wang); Department of Epidemiology and Biostatistics, School of Public Health, Imperial College London, London, UK (M Loh PhD); Lee Kong Chian School of Medicine, Nanyang Technological University, Singapore (M Loh); Department of Surgery, University Surgical Cluster, National University Health System, Singapore

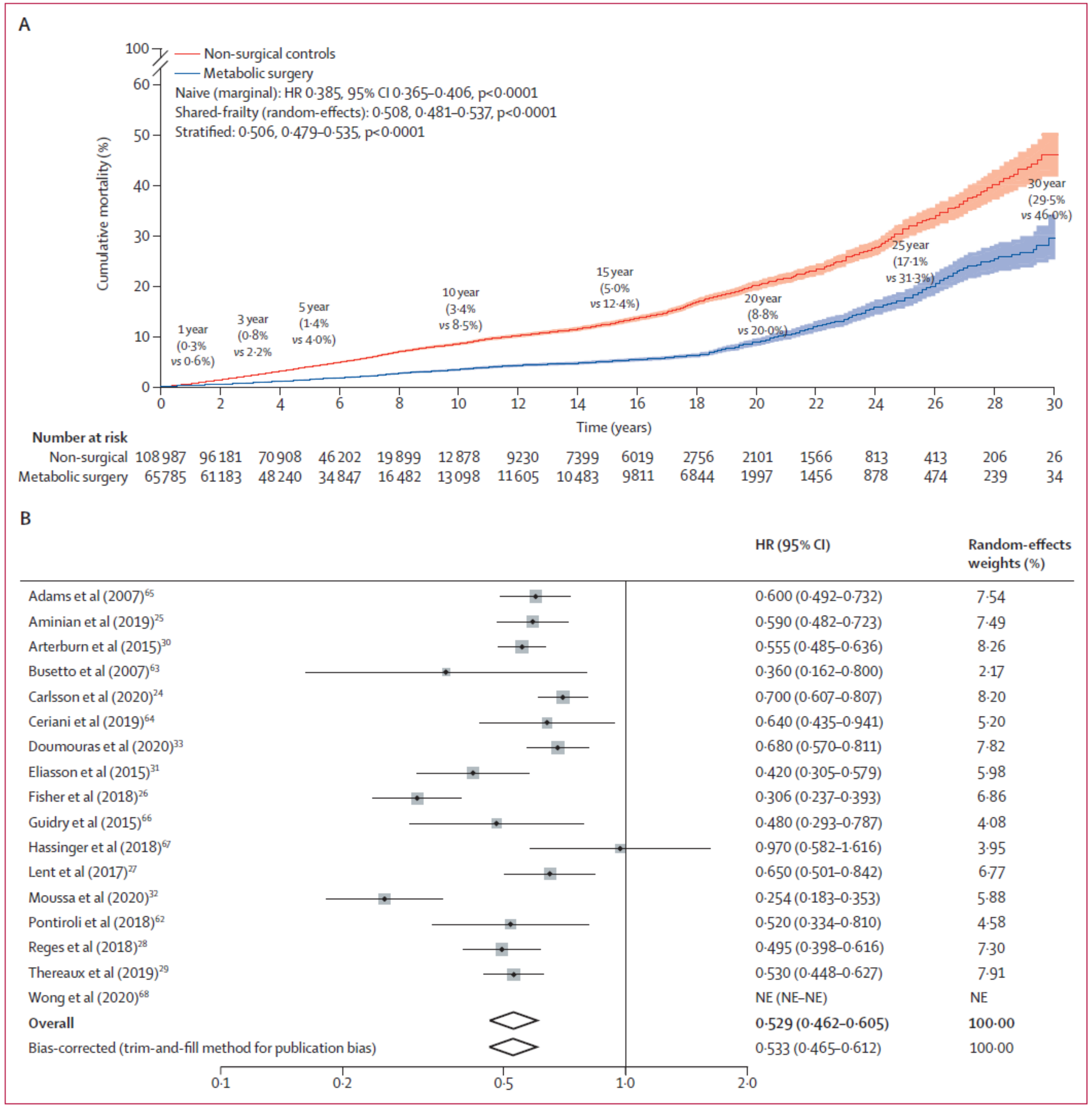


***Figure 2:* Cumulative mortality and numbers-at-risk table for all participants who underwent metabolic–bariatric surgery *vs* usual non-surgical management of obesity**

(A) One-stage meta-analyses. (B) Two-stage aggregate data meta-analysis. Hazard ratio estimates were NE for the Wong et al (2020)[68] study, and did not contribute any computational weights to either the one-stage or two-stage random-effects meta-analyses, since no events occurred in their surgical group. Note that the relative hazard reduction is computed as (1 – HR) × 100% (eg, a HR of 0·508 translates to a reduction in the hazard rate of death of 49·2%). HR=hazard ratio. NE=not evaluable.

ORIGINAL ARTICLE
Clinical Trials and Investigations

Obesity A Research Journal | THE OBESITY SOCIETY | WILEY

Semaglutide 2.4 mg/wk for weight loss in patients with severe obesity and with or without a history of bariatric surgery

Jean-Baptiste Bonnet[1,2] | Sarah Tournayre[1] | Jean Anitcheou[1] | Marion Faivre[1] | Catherine Boegner[1] | Abdulkader Jalek[1] | Dominique Jullien[1] | Vincent Attalin[1] | Justine Myzia[1] | Lucile Marty[1] | Youadigue Kemba[1] | David Nocca[3,4] | Ariane Sultan[1,5] | Antoine Avignon[1,2]

TABLE 3 Evolution of anthropometric and biological characteristics from baseline to 24 weeks of patients who actually benefited from the treatment for 24 weeks

	BS+ group (n = 36)		BS− group (n = 75)		p value
Weight loss (%)	−9.8%	(5.7)[a]	−8.8%	(5.3)[a]	0.37
EWL (%)	−23.2	(14.9)[a]	−20%	(12.4)[a]	0.23
Change in anthropometric characteristics					
BMI (kg/m^2)	−4.3	(−5.1 to −3.5)	−4.2	(−4.8 to −3.6)	0.77
Body weight (kg)	−11.6	(−13.8 to −9.5)	−11.3	(−13.1 to −9.6)	0.83
Waist circumference (cm)	−9.2	(−11.1 to −7.2)	−8.0	(−9.4 to −6.5)	0.30
Systolic blood pressure (mm Hg)	0.13	(−5.8 to −6.0)	−1.69	(−5.3 to 1.9)	0.58
Heat rate (beats/min)	1.5	(−3.6 to 6.5)	6.8	(3.0 to 10.6)	0.10
Change in biological characteristics					
HbA1c (percentage points)	−0.44	(−0.65 to −0.23)	−0.42	(−0.55 to −0.29)	0.89
SGOT (UI/L)	−10.6	(−20.7 to −0.5)	−3.3	(−5.5 to −1.1)	0.16
SGPT (UI/L)	−12.6	(−27.1 to 1.9)	−6.0	(−10.4 to −1.4)	0.38
HDL cholesterol (mmol/L)	−0.02	(−0.07 to 0.03)	−0.04	(−0.09 to 0.02)	0.33
LDL cholesterol (mmol/L)	−0.1	(−0.59 to −0.05)	−0.19	(−0.31 to −0.06)	0.42
Triglycerides (mmol/L)	−0.25	(−0.43 to −0.08)	−0.15	(−0.27 to −0.03)	0.32
C-reactive protein (nmol/L)	9.9	(−1.28 to 3.25)	3.5	(−1.83 to 2.53)	0.68
Change in FIB-4	−0.16	(−0.28 to −0.04)	−0.08	(−0.19 to 0.02)	0.36
Weekly dosage of semaglutide at 24 wk (mg)	2.35	(0.32)	2.33	(0.30)	0.76

Note: Data are means (standard deviation or 95% confidence interval). The p value column represents the comparison between the BS− and BS+ groups