When NOT to do a Sleeve Gastrectomy (and think of Gastric Bypass Instead)

Long-Term Results of Sleeve Gastrectomy: 10 years+

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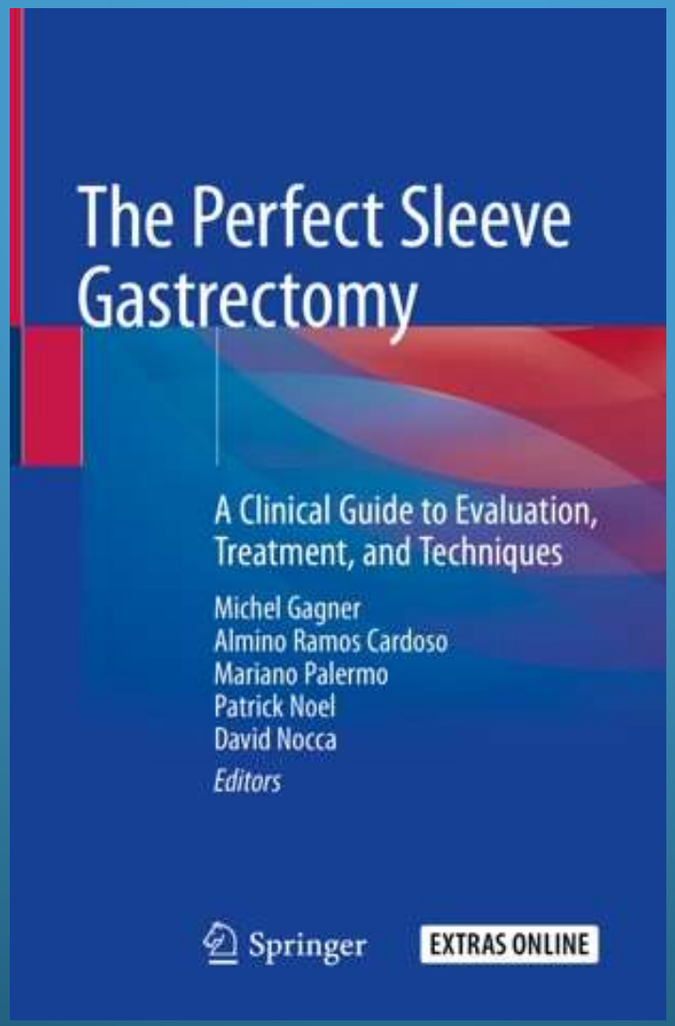
Disclosures

- Consultant: NovoNordisk, Lexington Medical
- Stock ownership: Lexington medical, GT Metabolic



Methodology

- 10+ years data
- Pubmed 2018-2023

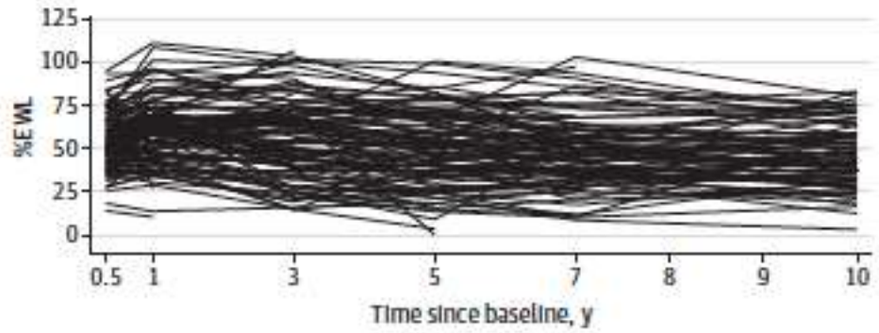
Research

JAMA Surgery | Original Investigation

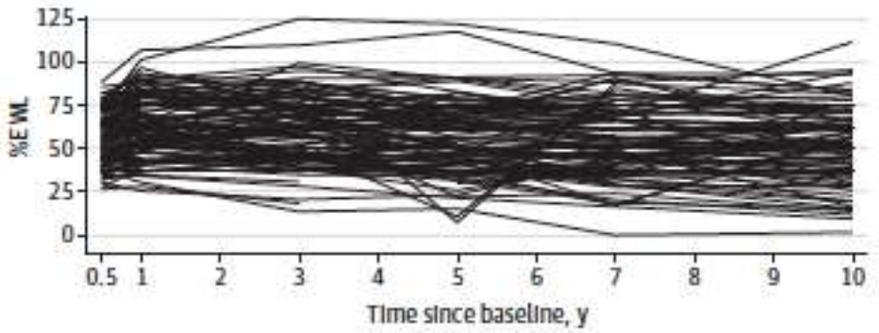
Effect of Laparoscopic Sleeve Gastrectomy vs Roux-en-Y Gastric Bypass on Weight Loss, Comorbidities, and Reflux at 10 Years in Adult Patients With Obesity
The SLEEVEPASS Randomized Clinical Trial

Paulina Salminen, MD, PhD; Sofia Grönroos, MD; Mika Helmiö, MD, PhD; Saija Hurme, MSc; Anne Juuti, MD, PhD; Risto Juusela, MD; Pipsa Peromaa-Haavisto, MD, PhD; Marja Leivonen, MD, PhD; Pirjo Nuutila, MD, PhD; Jari Ovaska, MD, PhD

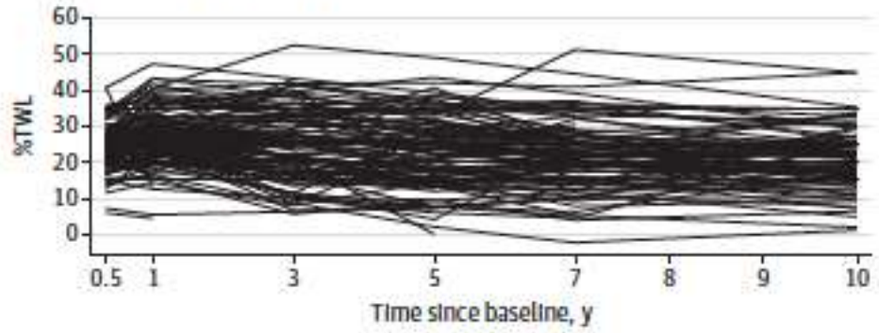
C %EWL over 10-y follow-up for patients after LSG



D %EWL over 10-y follow-up for patients after LRYGB



E %TWL over 10-y follow-up for patients after LSG



F %TWL over 10-y follow-up for patients after LRYGB

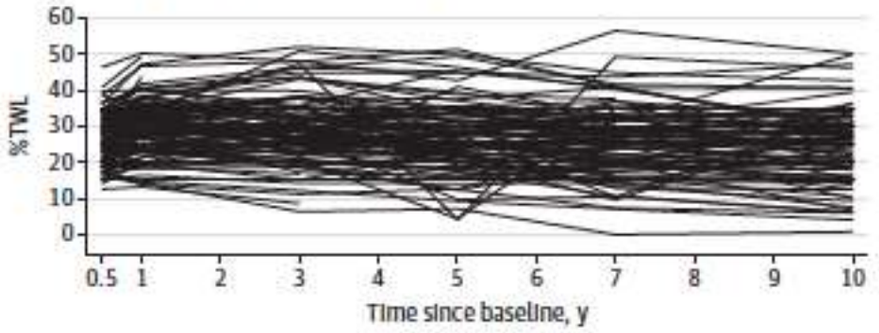
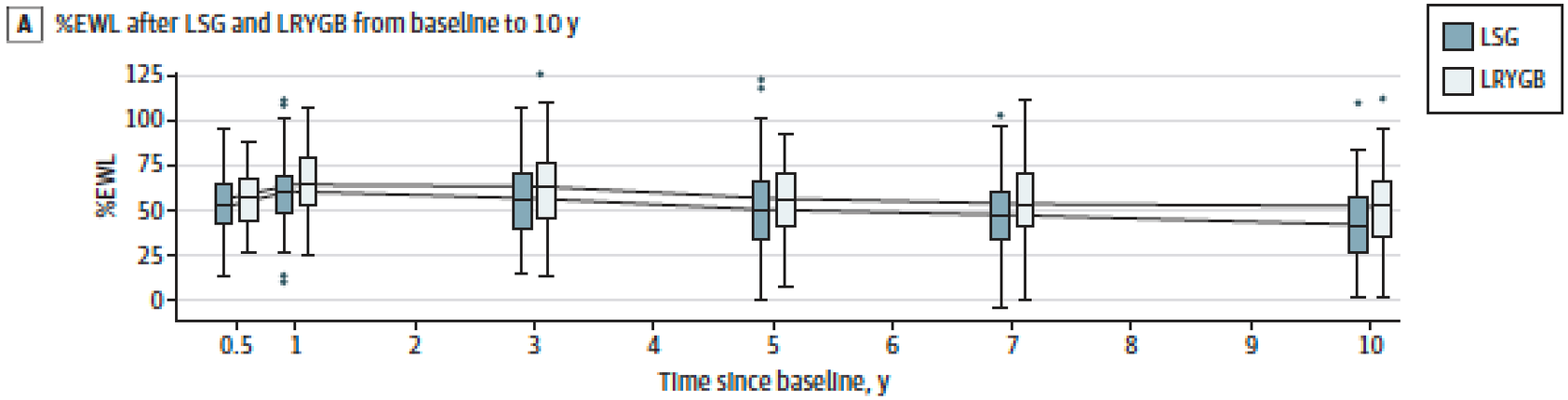
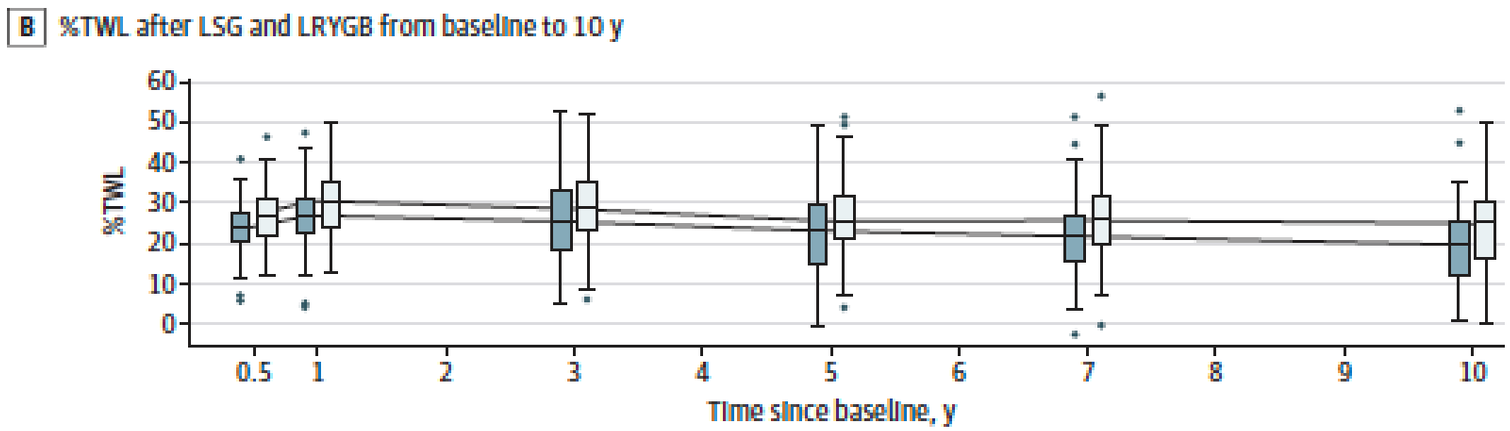


Figure 2. Percentage Excess Weight Loss (%EWL) and Percentage Total Weight Loss (%TWL) for All Patients and Individual Patients After Laparoscopic Sleeve Gastrectomy (LSG) and Laparoscopic Roux-en-Y Gastric Bypass (LRYGB) From Baseline to 10 years



No. at risk						
LRYGB patients	111	108	100	95	91	95
LSG patients	119	111	108	98	91	98



No. at risk						
LRYGB patients	111	108	100	95	91	95
LSG patients	119	111	108	98	91	98

Table 1. Model-Based Estimates of Percentage Excess Weight Loss (EWL), Body Mass Index (BMI), Percentage Excess BMI Loss, and Percentage Total Weight Loss[a]

Time	LSG	LRYGB	LRYGB vs LSG difference (95% CI)	*P* value
%EWL, No.[b,c,d]				
Baseline	121	119	NA	NA
0.5 y	119	111	4.7 (−0.4 to 9.7)	NA
1 y	111	108	5.7 (0.6 to 10.8)	NA
3 y	108	100	8.6 (3.4 to 13.7)	NA
5 y	98	95	8.4 (3.1 to 13.7)	NA
7 y	91	91	9.0 (3.6 to 14.3)	NA
10 y	98	95	8.4 (3.1 to 13.6)	NA
BMI, mean estimate (95% CI)[c,e,f]				
Baseline	47.3 (46.2 to 48.4)	48.4 (47.2 to 49.5)		
0.5 y	35.8 (34.7 to 37.0)	35.3 (34.1 to 36.5)	−0.5 (−2.1 to 1.1)	.54
1 y	34.4 (33.3 to 35.6)	33.6 (32.4 to 34.8)	−0.9 (−2.5 to 0.8)	.30
3 y	35.3 (34.2 to 36.5)	34.0 (32.8 to 35.2)	−1.3 (−2.9 to 0.3)	.12
5 y	36.5 (35.4 to 37.7)	35.4 (34.2 to 36.6)	−1.1 (−2.8 to 0.6)	.19
7 y	37.1 (36.0 to 38.3)	35.8 (34.6 to 37.0)	−1.3 (−3.0 to 0.4)	.13
10 y	37.8 (36.6 to 39.0)	36.5 (35.3 to 37.7)	−1.3 (−3.0 to 0.4)	.13
%EBL, mean estimate (95% CI)[c,e,g]	50.8 (48.0 to 53.7)	58.2 (55.3 to 61.2)	7.4 (3.4 to 11.5)	<.001
%TWL, mean estimate (95% CI)[c,e,h]	23.4 (22.1 to 24.7)	26.9 (25.6 to 28.2)	3.5 (1.6 to 5.4)	<.001

8.4% difference at 10 years

3.5 kg/m2 BMI p<0.001

Table 3. Minor and Major Late Complications After Laparoscopic Sleeve Gastrectomy (LSG) and Laparoscopic Roux-en-Y Gastric Bypass (LRYGB) Reported Cumulatively After 30 Days to 10 Years of Follow-up

	No. (%)		
	LSG (n = 121)	LRYGB (n = 119)	*P* value
Minor complications			
Vomiting/dehydration	0	3 (2.5)	NA
Gastroesophageal reflux	38 (31.4)	8 (6.7)	NA
Ulcer/stricture at gastrojejunal anastomosis	2 (1.7)	8 (6.7)	NA
Dumping	1 (0.8)[a]	3 (2.5)	NA
Fistula and abscess	1 (0.8)[b]	0 (0.0)	NA
Ureterolithiasis	0	1 (0.8)	NA
Adhesion-related intestinal obstruction	0	1 (0.8)	NA
Ventral hernia	0	1 (0.8)	NA
Suspected internal herniation	0	1 (0.8)	NA
Nonspecific abdominal pain	0	1 (0.8)	NA
Anemia	0	1 (0.8)	NA
Hypokalemia	0	1 (0.8)	NA
Total	42 (34.7)	29 (24.4)	.08[c]
Major complications			
Fistulectomia	1 (0.8)[b]	0 (0.0)	NA
Gastroesophageal reflux	14 (11.6)[a]	0 (0.0)	NA
Internal herniation	0	18 (15.1)[d]	NA
Incisional hernia	3 (2.5)	3 (2.5)[d]	NA
Candy cane/blind loop resection	0	1 (0.8)	NA
Abdominal pain and stricture	0	1 (0.8)	NA
Sleeve stenosis	1 (0.8)	0 (0.0)	NA
Total	19 (15.7)	22 (18.5)[d]	.57[c]

All patients with Barrett esophagus[e]	4/91 (4)	3/85 (4)	.29[a]
PPI intake preoperatively	0/4 (0)	1/2 (50)[f]	.33[a]
PPI intake at 10 y	3/4 (75)	2/3 (67)	.99[a]
GERD symptoms			
No symptoms preoperatively or at any point	0/4 (0)	1/3 (33)	.49[a]
Symptoms similar to preoperatively	1/4 (25)	0/3 (0)	
Symptoms alleviated postoperatively	0/4 (0)	1/3 (33)	
Symptoms worsened postoperatively	3/4 (75)	1/3 (33)	
GERD-HRQL total score, median (range)	11.0 (3.0-20.0)	4.5 (0.0-9.0)	.25[b]
Hiatal hernia[c]	2/4 (50)	NA	NA

No difference in Barrett's esophagus incidence

Nor in PPI intake at 10 years

ELSEVIER

Surgery for Obesity and Related Diseases ■ (2020) 1–9

SURGERY FOR OBESITY AND RELATED DISEASES

Original article

Incidence of GERD, esophagitis, Barrett's esophagus, and esophageal adenocarcinoma after bariatric surgery

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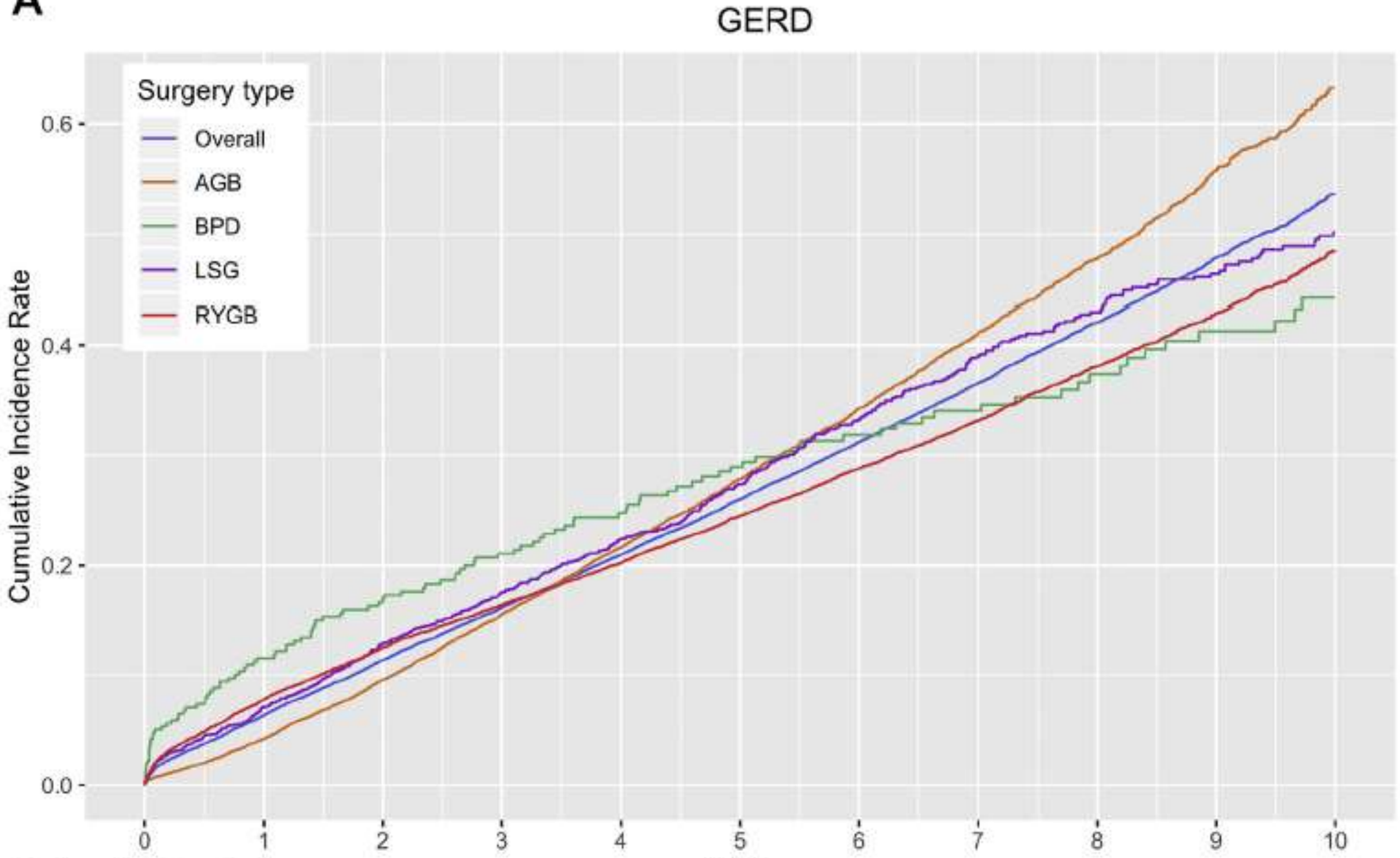
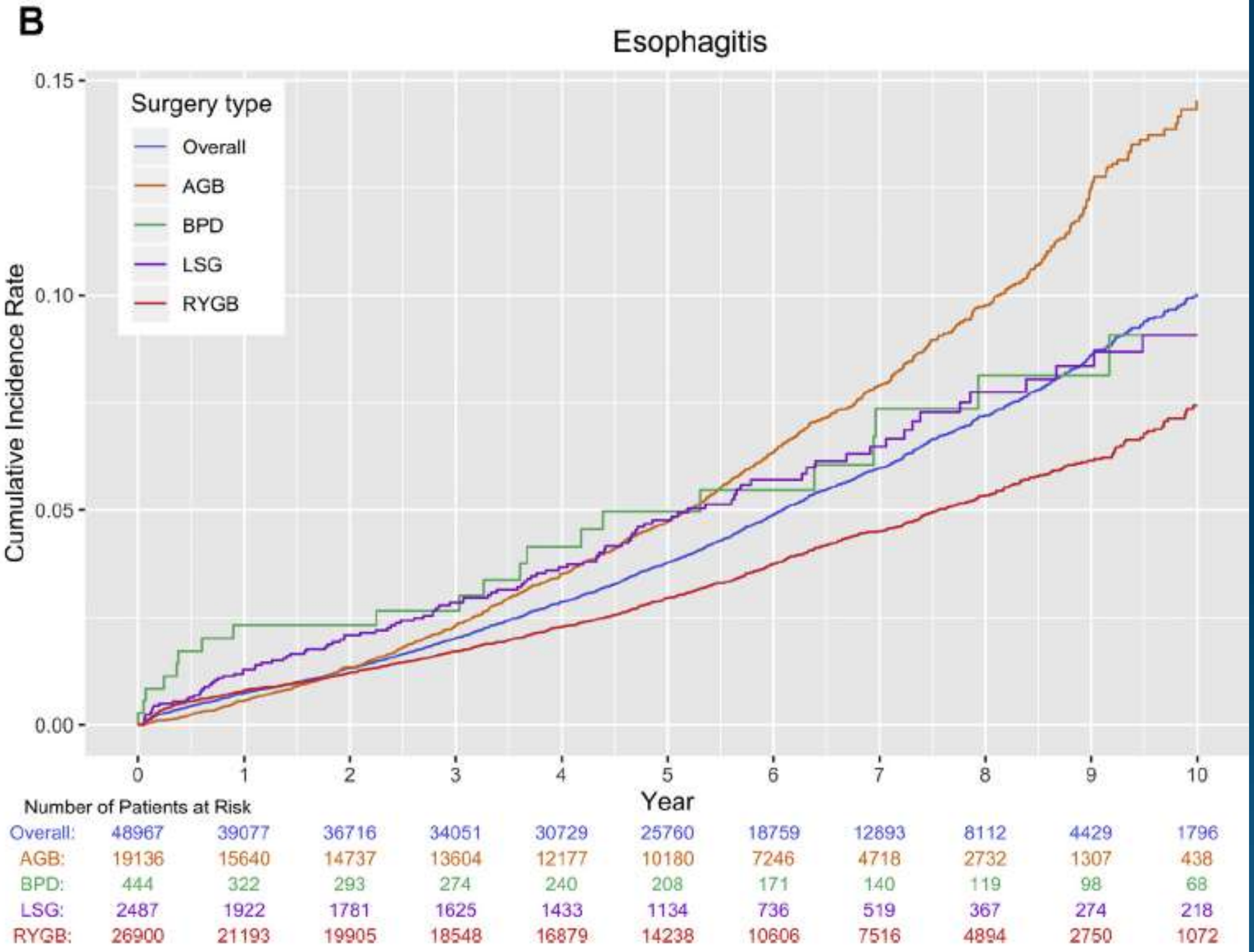
A



Number of Patients at Risk

Overall:	48967	36994	33171	29385	25270	20197	14226	9436	5734	2991	1170
AGB:	19136	15098	13557	11847	10007	7891	5377	3321	1831	826	258
BPD:	444	290	251	223	191	156	130	108	87	69	49
LSG:	2487	1818	1598	1395	1168	887	560	385	277	202	155
RYGB:	26900	19788	17765	15920	13904	11263	8159	5622	3539	1894	708

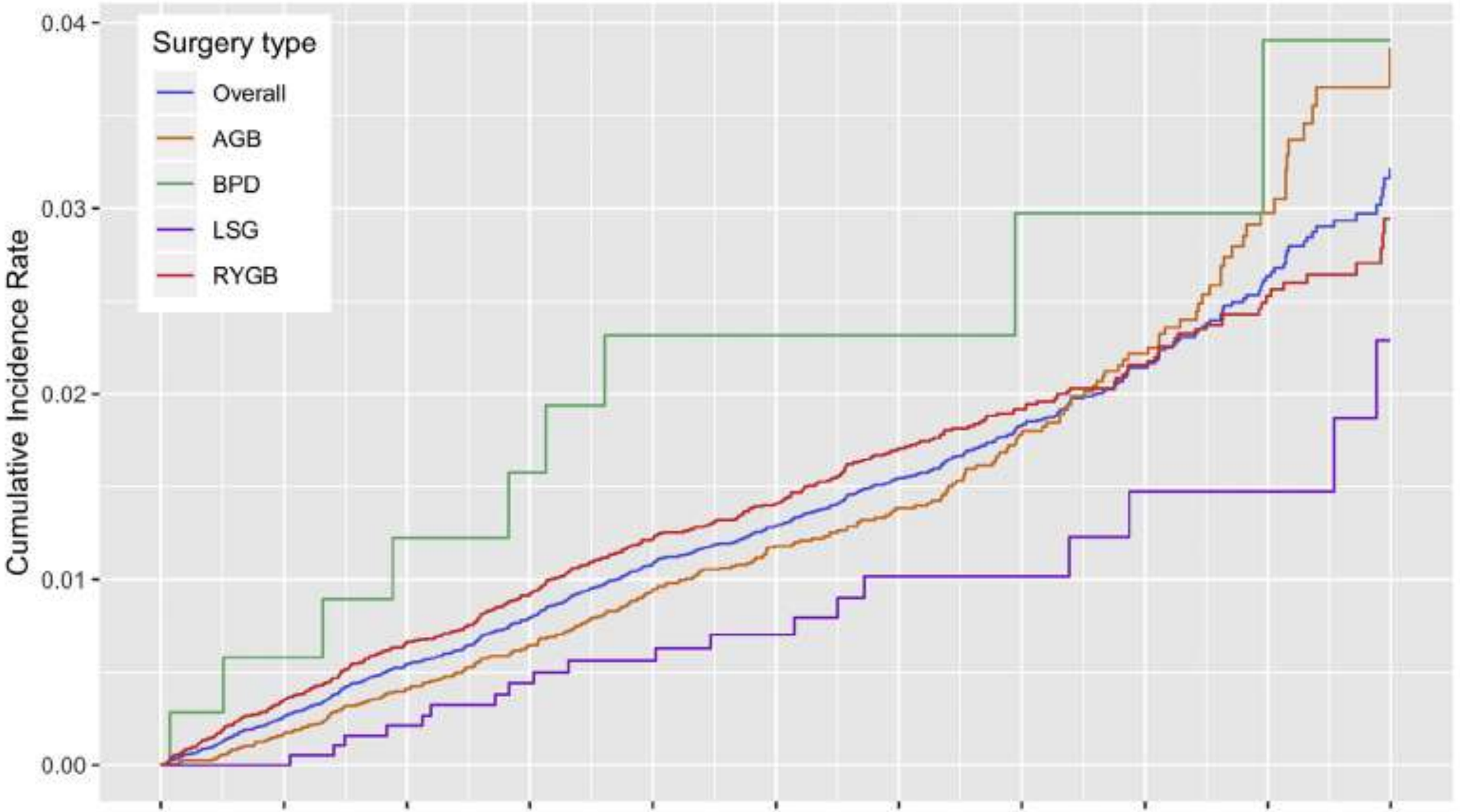
B



Number of Patients at Risk

Overall:	48967	39077	36716	34051	30729	25760	18759	12893	8112	4429	1796
AGB:	19136	15640	14737	13604	12177	10180	7246	4718	2732	1307	438
BPD:	444	322	293	274	240	208	171	140	119	98	68
LSG:	2487	1922	1781	1625	1433	1134	736	519	367	274	218
RYGB:	26900	21193	19905	18548	16879	14238	10606	7516	4894	2750	1072

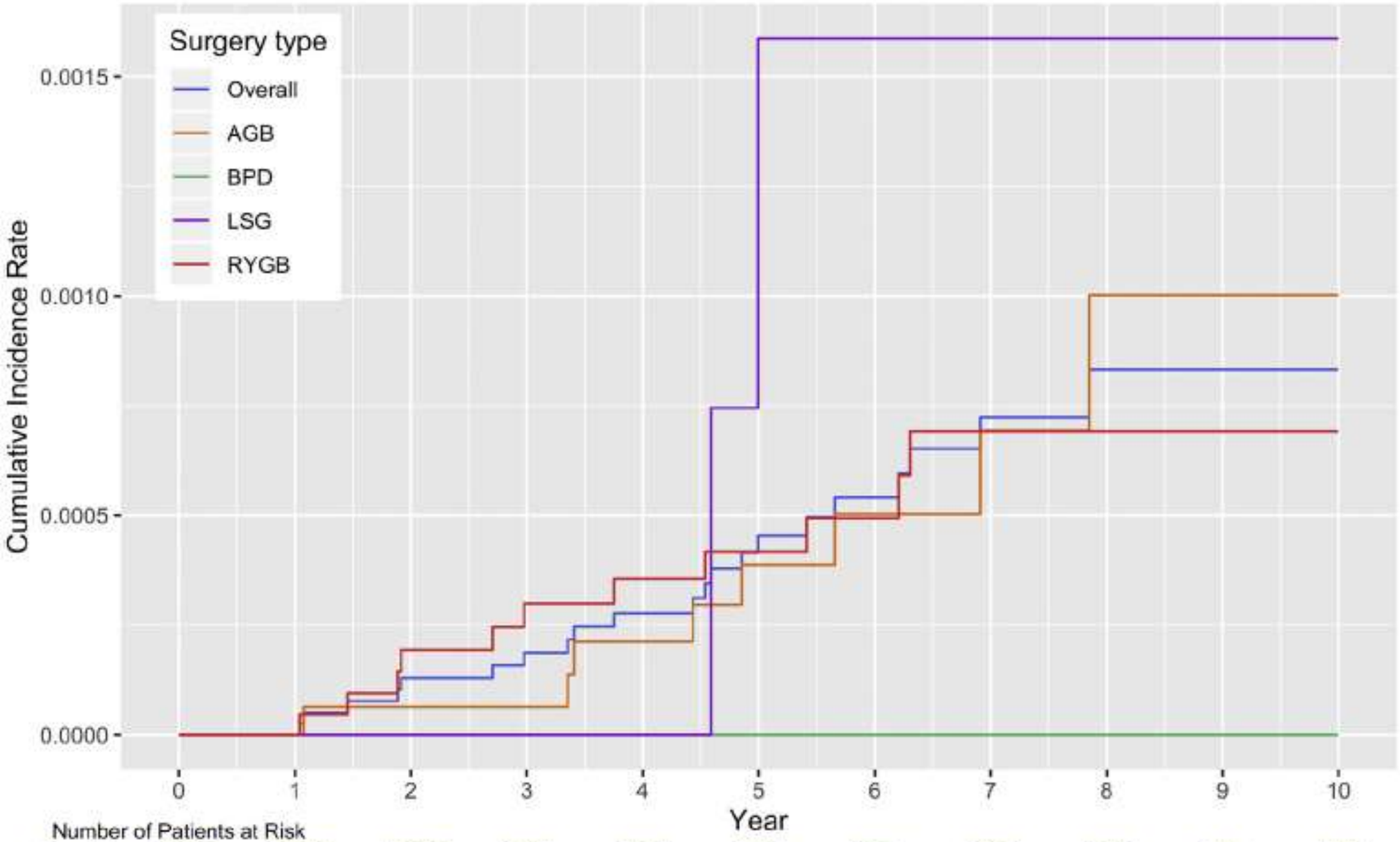
C



Number of Patients at Risk

Overall:	48967	39253	36978	34445	31232	26371	19293	13312	8425	4629	1885
AGB:	19136	15699	14864	13813	12459	10512	7533	4926	2875	1389	466
BPD:	444	326	294	276	244	213	175	145	124	102	70
LSG:	2487	1945	1814	1665	1479	1182	769	542	383	287	228
RYGB:	26900	21283	20006	18691	17050	14464	10816	7699	5043	2851	1121

D



Number of Patients at Risk

Overall:	48967	39348	37167	34698	31557	26691	19574	13540	8589	4741	1940
AGB:	19136	15725	14924	13900	12577	10633	7641	5012	2937	1430	487
BPD:	444	327	297	279	249	218	180	151	129	108	76
LSG:	2487	1945	1817	1672	1487	1186	776	548	389	291	233
RYGB:	26900	21351	20129	18847	17244	14654	10977	7829	5134	2912	1144

Research

JAMA Surgery | Original Investigation

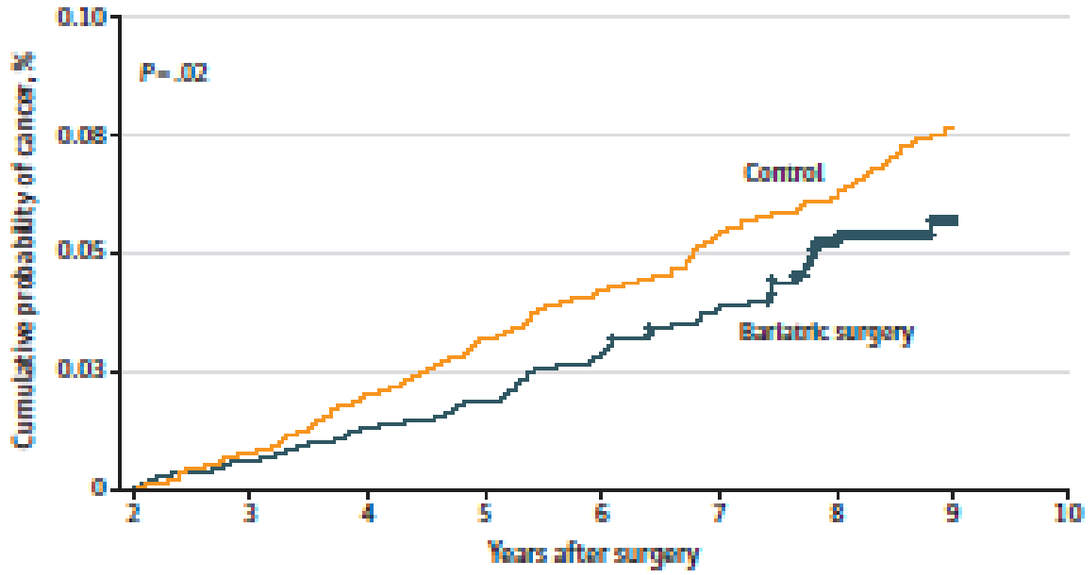
Risk of Esophageal and Gastric Cancer After Bariatric Surgery

Andrea Lazzati, MD, PhD; Tigran Poghosyan, MD, PhD; Marwa Touati, MS; Denis Collet, MD, PhD; Caroline Gronnier, MD, PhD

Table 3. Incidence Rate of Esophageal and Gastric Cancer in Study Population

	Overall	Surgical group	Control group	IRR (95% CI)	P value
Follow-up, mean (SD), y	5.91 (2.28)	6.06 (2.31)	5.62 (2.20)	NA	NA
Time at risk, person-year	5 372 886	1 705 735	3 667 151	NA	NA
Esophageal cancer events, total No.	112	26	86		
Incidence rate, cases per 100 000 population/y	2.1	1.5	2.3	1.54 (0.99-2.38)	.05
Gastric cancer events, total No.	225	57	168		
Incidence rate, cases per 100 000 population/y	4.2	3.3	4.6	1.37 (1.01-1.85)	.04
Esophagogastric cancer events, total No.	337	83	254		
Incidence rate, cases per 100 000 population/y	6.3	4.9	6.9	1.42 (1.11-1.82)	.005

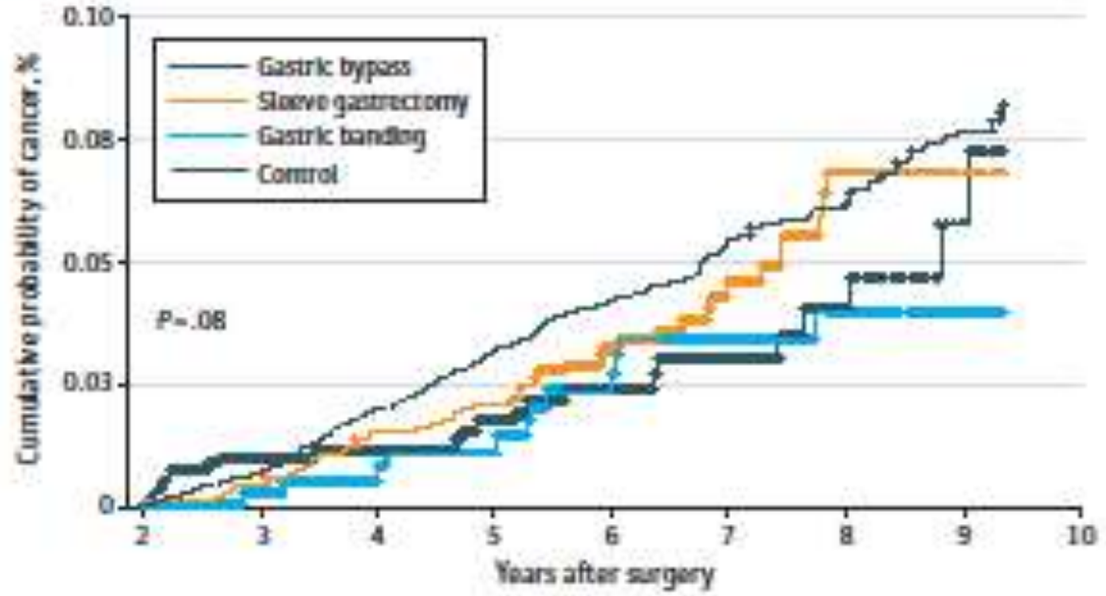
Figure 1. Cumulative Incidence of Esophagogastric Cancer by Group



No. at risk

Control	605 140	530 527	451 518	374 256	298 378	222 953	146 612	74 705
Bariatric surgery	303 709	258 599	210 907	167 159	124 525	85 680	51 551	23 825

Figure 2. Cumulative Incidence of Esophagogastric Cancer by Bariatric Procedure



No. at risk								
Control	605140	530527	451518	374256	298378	222953	146612	74705
Gastric banding	39453	37847	35495	32633	28365	22982	16098	8580
Sleeve gastrectomy	178912	147022	114266	85586	59149	37017	19816	7780
Gastric bypass	84187	72720	60250	48153	36292	25042	15096	7072

Obesity Surgery (2019) 29:3–14
https://doi.org/10.1007/s11695-018-3525-0

ORIGINAL CONTRIBUTIONS

Long-Term Outcomes After Bariatric Surgery: a Systematic Review and Meta-analysis of Weight Loss at 10 or More Years for All Bariatric Procedures and a Single-Centre Review of 20-Year Outcomes After Adjustable Gastric Banding

Paul E. O'Brien[1,2] · Annemarie Hindle[3] · Leah Brennan[3] · Stewart Skinner[1,2] · Paul Burton[1,2] · Andrew Smith[2] · Gary Crosthwaite[2] · Wendy Brown[1,2]

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Table 4 Various procedures

Reference	Procedure type	Initial #	Follow-up %	Duration of FU	# pts at max. years	%EWL at max. years	Reoperation %
Arman, 2016 [54]	Sleeve	110	59	11	47	62	32
Felslenreich, 2016 [55]	Sleeve	53	60	10	32	53	36
Fobi, 1993 [14]	Gastroplasty	100	NR	10	43	44	12
Gunther, 2006 [5]	Gastroplasty	33	79	20	18	− 10	NR
Sjostrom, 2007 [19]	Gastroplasty	1369	NR	15	108	44	21
Miller, 2007 [30]	Gastroplasty	563	92	10	154	59	40
Scozzari, 2010 [56]	Gastroplasty	266	70	10	150	60	10
Yu-Hung Lin, 2016 [57]	Gastroplasty	652	NR	10	102	42	13
Canetti, 2016 [58]	Gastroplasty	51	71	10	36	50	NR
Sjostrum, 2007 [19]	Fixed band	196	NR	15	108	32	31
Talebpour, 2012 [59]	Plication	800	NR	10	35	42	NR

Table 5 Summary of systematic review of weight loss and reoperation rates

Procedure	No. of reports	Weighted mean % EWL	Mean % EWL range	Reoperation rate range
RYGB	16	55.4	27–69	8–64%
OAGB	2	80.9	70–84	2–14%
LAGB	17	45.9	27–66	8–78%
BPD	4	71.5	64–73	NR
DS	7	75.2	61–94	3–37%
Sleeve	2	57.0	53–62	32–36%
Gastroplasty	7	50.9	− 10–62	10–40%

The single reports of fixed band and plication from Table 6 are not included

RYGB Roux-en-Y gastric bypass, *OAGB* one anastomosis gastric bypass, *LAGB* laparoscopic adjustable gastric band, *BPD* biliopancreatic diversion, *DS* duodenal switch,, , NR = not recorded

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https://doi.org/10.1007/s11695-021-05364-3

ORIGINAL CONTRIBUTIONS

Durability of Cardiometabolic Outcomes Among Adolescents After Sleeve Gastrectomy: First Study with 9-Year Follow-up

Wahiba Elhag [1] · Walid El Ansari [2,3,4]

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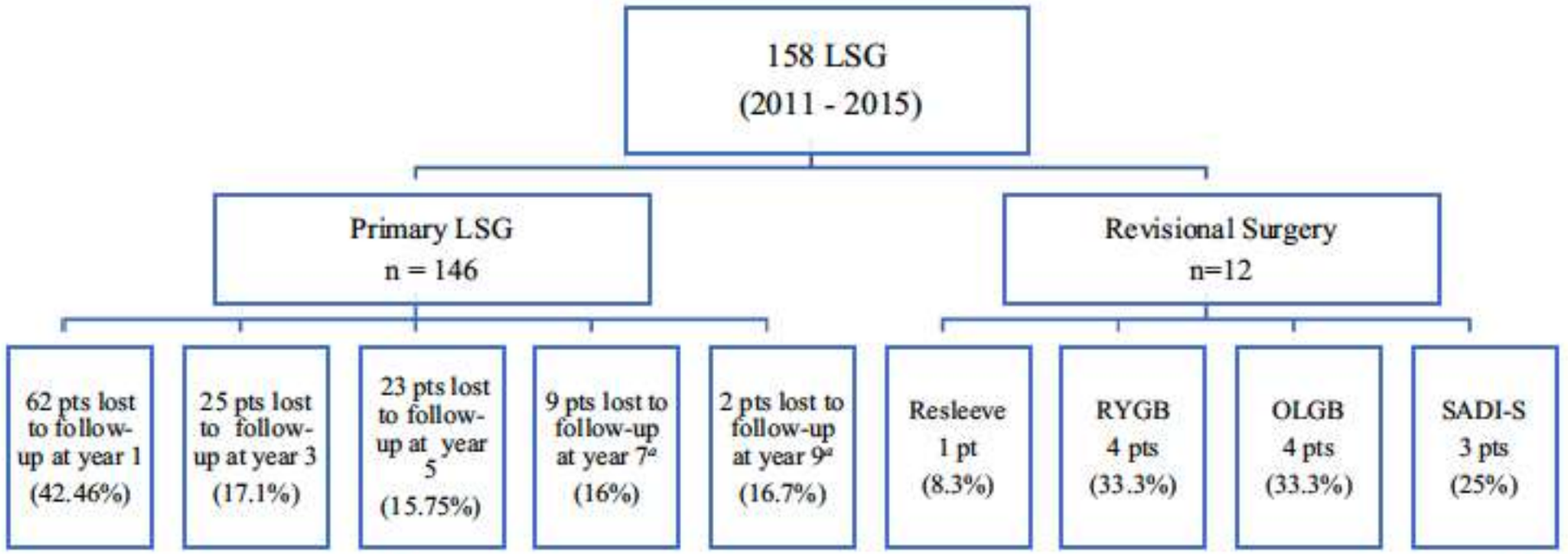

Fig. 1 Flow diagram demonstrating loss to follow-up.*N* number, *LSG* laparoscopic sleeve gastrectomy, *pts* patients, *RYGB* Roux-en-Y gastric bypass, *OLGB* omega loop gastric bypass, *SADI-S* single anastomosis duodeno-ileal bypass with sleeve gastrectomy; loss to follow-up is not necessarily loss at all time points—a patient might skip a scheduled clinic visit, but attends the subsequent scheduled clinic visit/s, [a] given the study period (2011–2015) and 7–9-year follow-up; hence, the denominator at these two time points reflects the number of patients at the time of writing

Table 2 Long-term anthropometric changes among adolescents through five successive time points after LSG

Characteristic	Preoperative	1 year	P^a	3 years	P^a	5 years	P^a	7 years	P^a	9 years	P^a
Patients *N* (%)	146 (100)	84/146 (57.53)		121/146 (82.87)		123/146 (85.24)		47/56[b] (83.92)		10/12[b] (83.33)	
Weight (kg)	125.97 ± 23.55	83.15 ± 16.40	*0.001*	81.36 ± 17.63	*0.001*	82.86 ± 18.70	*0.001*	84.72 ± 19.20	*0.001*	82.68 ± 6.28	*0.001*
Height (m)	1.65 ± 0.07	1.66 ± 0.07	0.384	1.66 ± 0.09	0.791	1.66 ± 0.08	0.362	1.67 ± 0.09	0.457	1.66 ± 0.11	0.765
Increase in height (m)	—	0.003 ± 0.03	—	0.002 ± 0.07	0.959	0.005 ± 0.03	0.361	0.006 ± 0.05	*0.031*	0.008 ± 0.08	0.523
BMI (kg/m^2)	45.60 ± 6.50	30.04 ± 4.96	*0.001*	29.61 ± 6.53	*0.001*	29.80 ± 6.24	*0.001*	30.60 ± 7.58	*0.001*	30.20 ± 3.92	*0.001*
BMI change (kg/m^2)	—	− 15.26 ± 6.39	—	− 16.41 ± 7.88	0.066	− 16.46 ± 7.59	0.448	− 18.35 ± 7.97	0.544	− 19.18 ± 6.52	0.151
EWL%	—	74.74 ± 23.85	—	81.57 ± 27.07	*0.007*	170.78 ± 137.3	*0.001*	181.32 ± 233.6	0.188	136.78 ± 38.69	0.118
WL (kg)	—	41.84 ± 18.50	—	45.69 ± 20.49	*0.007*	45.28 ± 22.18	0.050	51.31 ± 24.62	0.298	52.52 ± 21.49	0.130
TWL%	—	32.67 ± 11.01	—	35.69 ± 12.34	*0.007*	34.23 ± 12.93	0.069	36.48 ± 13.34	0.266	37.70 ± 9.83	0.133

BMI has not changed from year 1 to year 9

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Weight (kg)	125.97 ± 23.55	83.15 ± 16.40	*0.001*	81.36 ± 17.63	*0.001*	82.86 ± 18.70	*0.001*	84.72 ± 19.20	*0.001*	82.68 ± 6.28	*0.001*
Height (m)	1.65 ± 0.07	1.66 ± 0.07	0.384	1.66 ± 0.09	0.791	1.66 ± 0.08	0.362	1.67 ± 0.09	0.457	1.66 ± 0.11	0.765
Increase in height (m)	—	0.003 ± 0.03	—	0.002 ± 0.07	0.959	0.005 ± 0.03	0.361	0.006 ± 0.05	*0.031*	0.008 ± 0.08	0.523
BMI (kg/m^2)	45.60 ± 6.50	30.04 ± 4.96	*0.001*	29.61 ± 6.53	*0.001*	29.80 ± 6.24	*0.001*	30.60 ± 7.58	*0.001*	30.20 ± 3.92	*0.001*
BMI change (kg/m^2)	—	− 15.26 ± 6.39	—	− 16.41 ± 7.88	0.066	− 16.46 ± 7.59	0.448	− 18.35 ± 7.97	0.544	− 19.18 ± 6.52	0.151
EWL%	—	74.74 ± 23.85	—	81.57 ± 27.07	*0.007*	170.78 ± 137.3	*0.001*	181.32 ± 233.6	0.188	136.78 ± 38.69	0.118
WL (kg)	—	41.84 ± 18.50	—	45.69 ± 20.49	*0.007*	45.28 ± 22.18	0.050	51.31 ± 24.62	0.298	52.52 ± 21.49	0.130
TWL%	—	32.67 ± 11.01	—	35.69 ± 12.34	*0.007*	34.23 ± 12.93	0.069	36.48 ± 13.34	0.266	37.70 ± 9.83	0.133

TWL% remained strong at 37.7% at 9 years

Table 3 Long-term cardiometabolic changes among adolescents through five successive time points after LSG

Variable	Preoperative	1 year	*P*	3 years	*P*	5 years	*P*	7 years	*P*	9 years	*P*
SBP	125.68 ± 10.53	115.16 ± 11.56	*0.001*	111.98 ± 13.25	*0.001*	115.22 ± 11.88	*0.001*	111.18 ± 10.43	*0.001*	100.0[a]	—
n	92	88		125		129		45		10	
DBP	73.40 ± 8.05	70.47 ± 8.75	*0.042*	67.56 ± 10.08	*0.001*	70.78 ± 8.41	0.074	71.56 ± 7.59	0.895	67.0[a]	—
n	92	88		125		129		45		10	
TG	1.18 ± 0.62	1.18 ± 0.62	*0.001*	0.81 ± 0.68	*0.013*	0.75 ± 0.24	*0.001*	1.31 ± 1.54	0.647	0.81 ± 0.26	0.068
n	131	68	52			55		15		4	
HDL	1.15 ± 0.32	1.31 ± 0.36	*0.001*	1.52 ± 0.42	*0.001*	1.53 ± 0.35	*0.001*	1.54 ± 0.25	*0.001*	1.57 ± 0.32	*0.043*
n	134	67		51		55		14		4	
LDL	2.91 ± 0.77	2.75 ± 0.72	*0.041*	2.34 ± 0.64	*0.001*	2.50 ± 0.78	*0.001*	2.28 ± 0.59	*0.011*	3.14 ± 0.56	0.632
n	133	67		51		55		14		4	
TC	4.65 ± 0.80	4.48 ± 0.76	0.056	4.19 ± 0.69	0.073	4.30 ± 0.80	*0.049*	4.30 ± 0.74	0.240	5.0 ± 0.26	0.680
n	135	69		52		56		14		4	
FBG	5.48 ± 2.97	4.57 ± 0.71	*0.003*	4.75 ± 1.10	*0.006*	4.82 ± 0.63	*0.028*	4.85 ± 0.66	0.156	4.45 ± 0.36	0.055
n	133	89		75		70		27		7	
HbA1c	6.07 ± 2.10	5.22 ± 0.51	*0.003*	5.33 ± 1.19	*0.002*	5.40 ± 0.84	*0.010*	5.25 ± 0.56	0.053	5.06 ± 0.20	0.072
n	120	47		45		48		16		5	
AST	21.62 ± 9.48	16.84 ± 5.59	*0.001*	16.61 ± 4.75	*0.001*	19.48 ± 7.87	0.418	19.71 ± 6.79	*0.038*	14.33 ± 0.57	0.340
n	123	79		74		67		22		4	
ALT	28.41 ± 18.57	15.97 ± 9.87	*0.001*	15.20 ± 7.66	*0.001*	16.43 ± 9.63	*0.001*	17.10 ± 6.22	*0.008*	7.66 ± 1.52	0.300
n	131	83		79		70		22		4	
Uric acid	341.37 ± 62.36	340.68 ± 74.75	0.968	281 ± 70.55	0.468	308.33 ± 41.53	0.080	—	—	—	—
n	65	29		21		11		5		0	

Table 5 Characteristics of adolescents who underwent revisional bariatric surgery ($n = 12$)

Variable	Value
Age M ± SD	16.50 ± 1.44
Gender, *n* (%)	
Male	4 (33.3)
Female	8 (66.7)
Before primary LSG	
Anthropometric (M ± SD)	
Weight (kg)	135.12 ± 23.51
Height (meter)	1.64 ± 0.07
BMI (kg/m^2)	49.71 ± 5.97
EW (kg)	67.40 ± 19.04
Clinical (M ± SD)	
Systolic BP (mm/Hg)	140.33 ± 3.05
Diastolic BP (mm/Hg)	76. 33 ± 19.55
Comorbidities *n* (%)	
T2DM	3 (25)
Prediabetes	3 (25)
Depression	1(8.3)
Asthma	2 (25)
Others[a]	0 (0)
After primary LSG (M ± SD)	
BMI change (kg/m^2)	6.95 ± 4.54
EWL%	28.71 ± 17.72
Minimal weight (kg)	84 ± 18.25
Minimal BMI (kg/m^2)	30.94 ± 4.93
Average time to revisional surgery (m)	56.41 ± 16.67

Types of revisional surgery *n* (%)	
Resleeve	1 (8.3)
RYGB	4 (33.3)
OLGB	4 (33.3)
SADI-S	3 (25)
Causes of revision *n* (%)	
Weight regain/insufficient weight loss	11 (91.7)
Weight regain + GERD	1 (8.3)
Recurrence of DM or HTN	0 (0)
Surgical complication	0 (0)
Directly before the revision	
Weight (kg)	112.17 ± 17.01
BMI (kg/m^2)	41.61 ± 4.78

ORIGINAL SCIENTIFIC ARTICLES

Ten-Year Outcomes of Children and Adolescents Who Underwent Sleeve Gastrectomy: Weight Loss, Comorbidity Resolution, Adverse Events, and Growth Velocity

Aayed R Alqahtani, MD, FRCSC, Mohamed Elahmedi, MBBS, Hanan Y Abdurabu, MBBS, Sultan Alqahtani, MD

Table 1. Descriptive and Clinical Characteristics of Children and Adolescents Who Underwent Laparoscopic Sleeve Gastrectomy

	Age group		
Characteristic	**5–14 y**	**15–18 y**	**19–21 y**
Patients, n (%)	801 (32)	1,517 (61)	186 (7)
Age, y, mean ± SD	11.3 ± 2.5	16.9 ± 0.9	19.0 ± 0.6
Sex, male, n (%)	343 (43)	681 (45)	89 (47)
Height, cm, mean ± SD	152.1 ± 14.5	165.3 ± 10.2	166.0 ± 10.0
Weight, kg, mean ± SD	101.3 ± 26.5	124.1 ± 24.5	127.5 ± 27.7
Percent of 95th percentile, mean ± SD	177 ± 38	—	—
BMI, kg/m^2, mean ± SD	43.4 ± 7.9	45.4 ± 8.1	46.3 ± 8.2
BMI *z*-score,* mean ± SD	3.2 ± 0.7	2.4 ± 0.4	3.0 ± 0.4
Height *z*-score,* mean ± SD	1.4 ± 1.2	0.6 ± 1.1	0.6 ± 1.0

*The *z*-scores were calculated based on national growth charts.

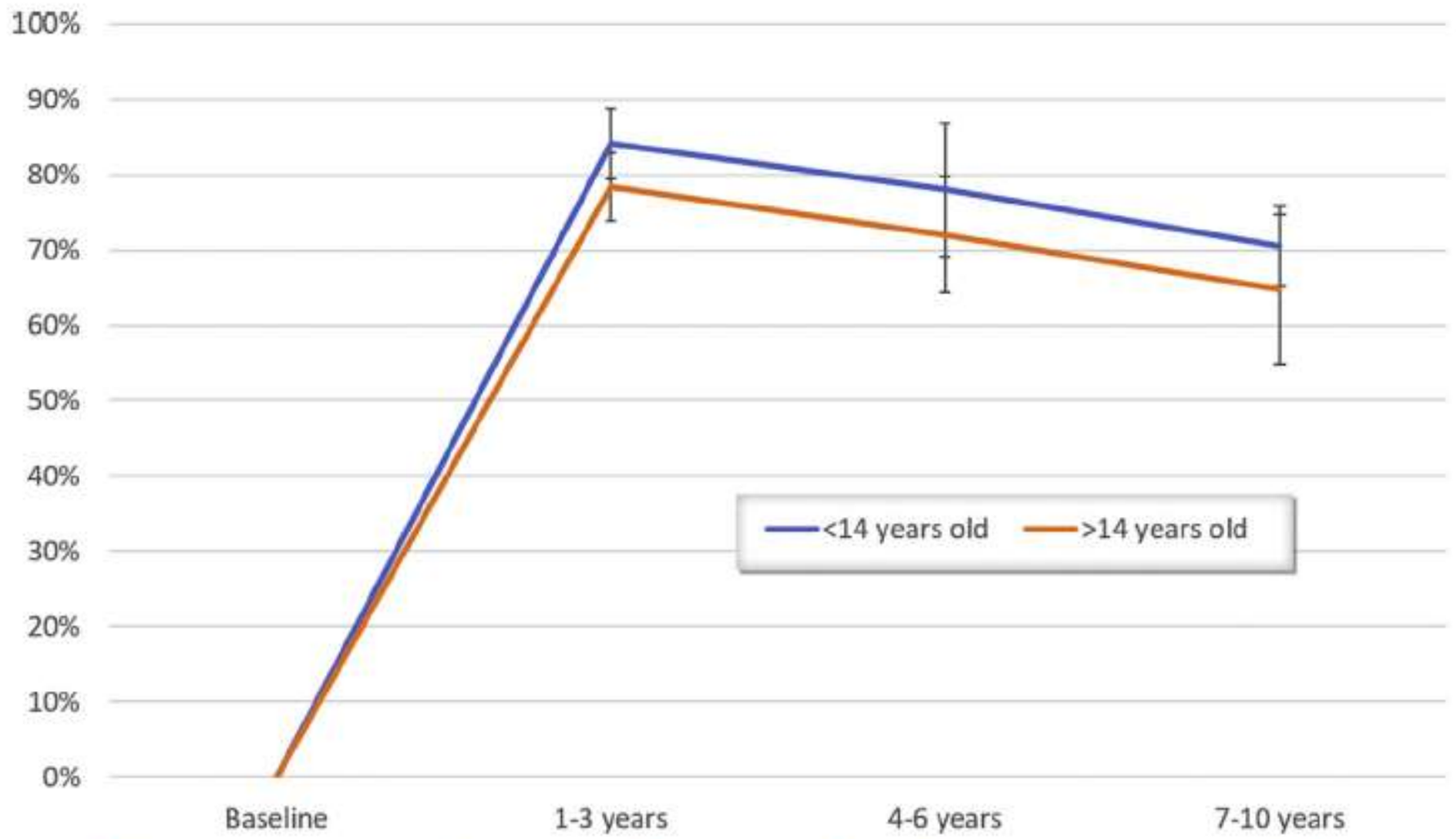

Figure 2. Percent excess weight loss after laparoscopic sleeve gastrectomy in children with severe obesity (aged 5 through 14 years at time of operation) and adolescents with severe obesity (aged 15 through 21 years at time of operation).

Table 4. Adverse Events Observed in Children and Adolescents Who Underwent Laparoscopic Sleeve Gastrectomy

Event	n	%	Management
Staple line leak	2	0.09	Conservative management; revision to Roux-en-Y gastric bypass
Metabolic neuropathy	3	0.1	IV thiamine, long-term thiamine supplementation
Nausea and vomiting	22	1.0	Analgesia, proton pump inhibitor, IV rehydration

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ORIGINAL CONTRIBUTIONS

Laparoscopic Sleeve Gastrectomy in Adolescents: Ten-Years Follow-up

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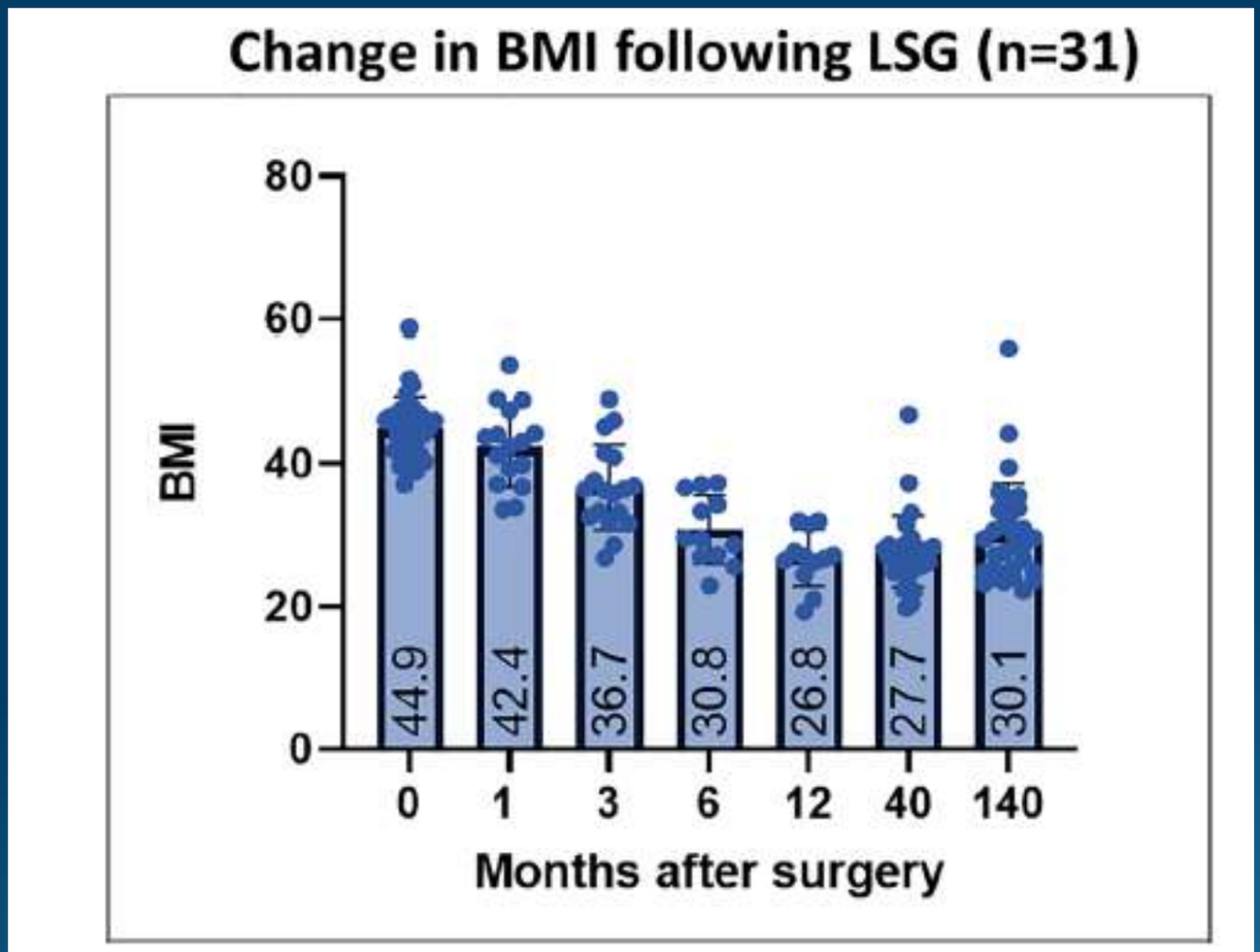
Table 1 Baseline characteristics

Characteristics	All cohort patients ($n=46$)	Patients completed long term follow up ($n=31$)
Age (mean ± SD)	16.19 ± 1.07	16.31 ± 1.13
Female (%)	29 (63.04%)	18 (58.06)
Weight (kg, mean ± SD)	126.99 ± 20.14	126.97 ± 19.73
Excess weight (kg, mean ± SD)	56.56 ± 18.05	56.46 ± 14.97
BMI (mean ± SD)	45.89 ± 5.44	44.94 ± 4.40
Excess BMI (mean ± SD)	20.89 ± 5.44	19.94 ± 4.40
Comorbidities	11 (23.91)	9 (29.03)
Hypertension	14 (30.43)	9 (29.05)
Impaired fasting glucose (%)	2 (4.34)	0 (0)
Diabetes mellitus (%)	5 (10.87)	3 (9.68)
OSA (%)	6 (13.04)	3 (9.68)
Fatty liver disease (%)	3 (6.52)	2 (6.45)
Depression (%)	22 (47.82)	17 (54.83)
Dyslipidemia (%)		

Table 2 Long-term changes in anthropometric and cardiometabolic parameters ($n=31$)

Data	Baseline	3.5 years	*P* value	10 years	*P* value
Weight (kg, mean ± SD)	126.97 ± 19.73	80.45 ± 15.94	**< 0.001**	85.98 ± 22.44	**< 0.001**
Height (m, mean ± SD)	1.68 ± 0.09	1.70 ± 0.1	**< 0.001**	1.70 ± 0.09	**< 0.001**
BMI (kg/m^2, mean ± SD)	44.94 ± 4.40	27.74 ± 4.99	**< 0.001**	30.11 ± 7.1	**< 0.001**
Hypertension	9 (29.03)	0 (0)	**< 0.001**	1 (3.22)	**< 0.001**
Fasting glucose level	98.85 ± 14.63	81.77 ± 6.03	**0.001**		
Dyslipidemia	17 (41.49)	4 (12.9)	0.343		
Cholesterol mg/dl	164.95 ± 28.31	179.18 ± 29.76	0.234		
Triglycerides mg/dl	133.80 ± 52.19	106.82 ± 47.87	0.201		
HDL mg/dl	39.50 ± 6.15	54.20 ± 14.73	**0.002**		
LDL md/dl	99.05 ± 28.14	105.70 ± 21.19	0.747		

HDL high density lipoprotein, *LDL* low density lipoprotein



Key Points

- In 10-year follow-up after laparoscopic sleeve gastrectomy (LSG) 67.74% of the patients achieved a BMI < 30 kg/m^2.
- Following weight reduction, a resolution of hypertension was noted in almost 90% of the patients.
- Frequent long-term side effects of surgery were gastrointestinal reflux disease (GERD) and alopecia in 22.58% and 48.39% respectively.
- LSG is a durable intervention for weight reduction in adolescents.

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https://doi.org/10.1007/s11695-021-05437-3

ORIGINAL CONTRIBUTIONS

Long-term Effects of Laparoscopic Sleeve Gastrectomy: What Are the Results Beyond 10 Years?

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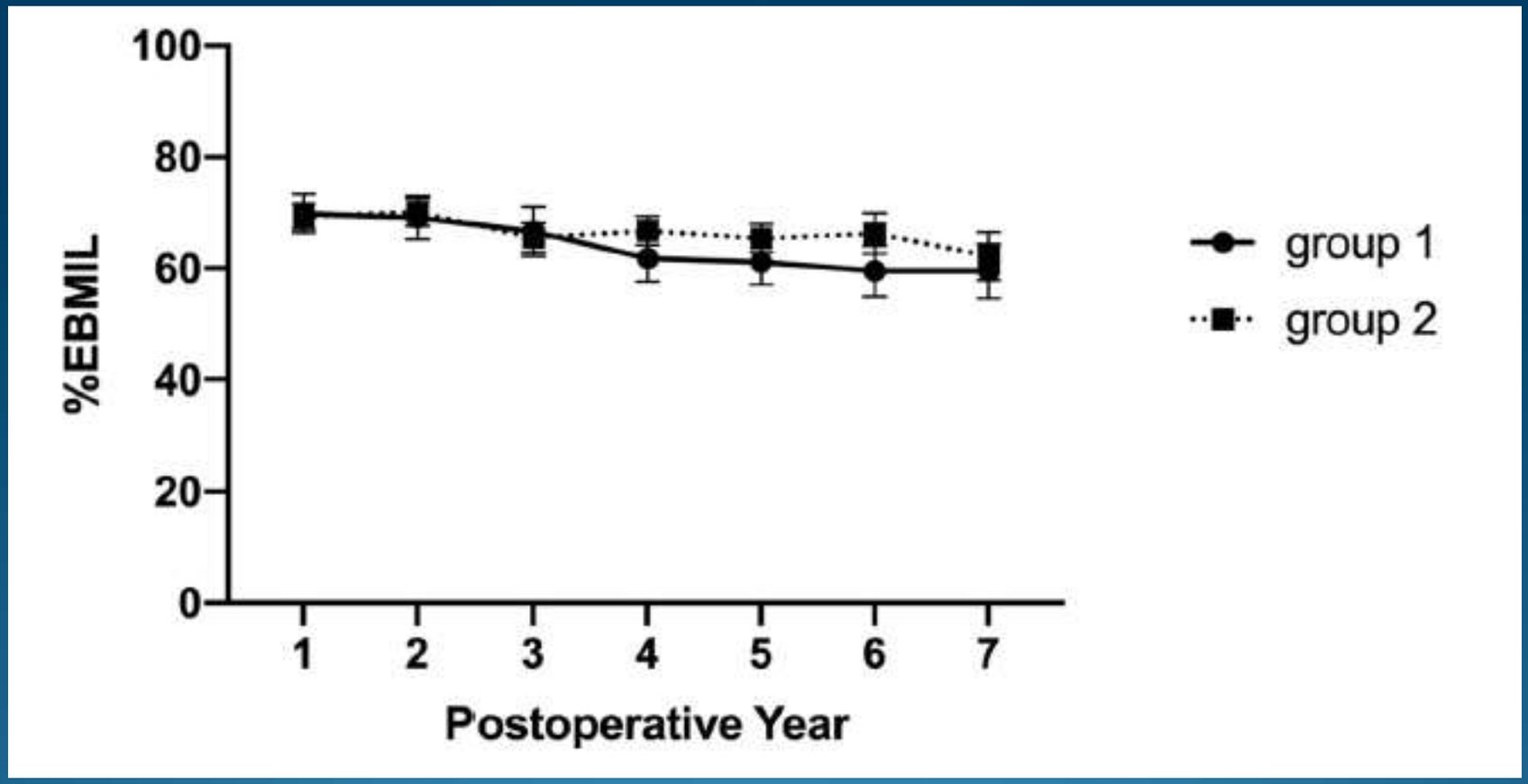
100
80
60
40
20
0
%EBMIL
1
2
3
4
5
6
7
Postoperative Year
group 1
group 2

Surgical Endoscopy (2021) 35:6466–6471
https://doi.org/10.1007/s00464-020-08137-8

Ten-year outcomes after primary vertical sleeve gastrectomy for morbid obesity: a monocentric cohort study

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Table 1 Long-term outcomes after SG

	Follow-up				*p* value
	Pre-op	1 year	5 years	10 years	
BMI (kg/m^2)	44 ± 5	31 ± 5	34 ± 5	36 ± 8	$p < 0.005$
%BMI ≤ 30	0 (0%)	14 (41%)	5 (15%)	6 (18%)	$p < 0.05$
%TWL	–	29 ± 7	20 ± 9	17 ± 15	$p < 0.001$
%EWL	–	70 ± 21	49 ± 24	42 ± 37	$p < 0.001$
%EWL > 50	–	27 (79%)	17 (50%)	14 (41%)	$p < 0.005$

Table 2 Univariate analysis of potential predictive factors of the long-term weight loss

Parameter		10-year follow-up			
		Success rate (%EWL > 50)	*p* value	%EWL	*p* value
Sex	F	11/23 (47%)	0.295	45 ± 39	0.433
	M	3/11 (27%)		35 ± 31	
Age	< 40	6/14 (43%)	0.890	48 ± 47	0.419
	≥ 40	8/22 (36%)		39 ± 30	
BMI	≤ 43	10/16 (63%)	0.058	58 ± 35	0.054
	44–49	3/14 (21%)		30 ± 33	
	≥ 50	1/4 (25%)		22 ± 37	
Volume eater	Yes	13/24 (54%)	0.024	48 ± 38	0.111
	Other	1/10 (10%)		26 ± 26	
1-year %EWL	< 60	0/12 (0%)	0.001	13 ± 25	0.001
	60–75	4/10 (40%)		41 ± 27	
	> 75	10/12 (83%)		71 ± 31	

BMI >50 kg/m2 and results a year 1 are predictive factors

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https://doi.org/10.1007/s11695-021-05735-w

ORIGINAL CONTRIBUTIONS

Ten-Year Results of Laparoscopic Sleeve Gastrectomy: Retrospective Matched Comparison with Laparoscopic Adjustable Gastric Banding—Is There a Significant Difference in Long Term?

Mario Musella[1] · Giovanna Berardi[1] · Nunzio Velotti[1] · Vincenzo Schiavone[1] · Antonio Vitiello[1]

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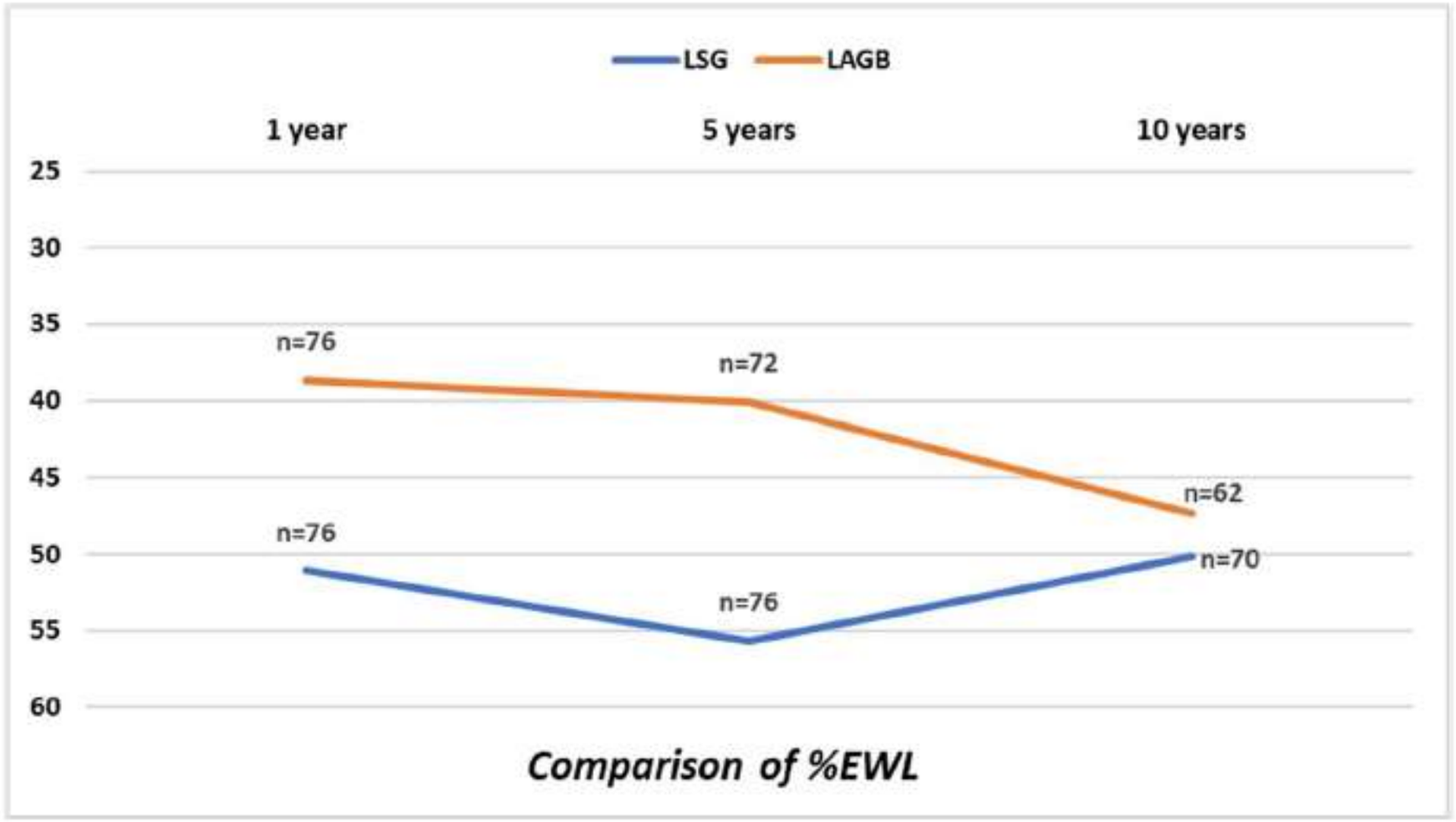
Table 3 Comparison of weight loss in the two groups. *BMI*, body mass index; *%EWL*, percentage of excess weight loss; *%EBMIL*, excess body mass index loss percent; *%TWL*, total weight loss percent; *LSG*, laparoscopic sleeve gastrectomy; *LAGB*, laparoscopic adjustable gastric band

	LSG (n=76)	*LAGB (n=76)*	*p value*
BMI 1 year	35.1 ± 5.4	37.7 ± 5.2	< 0.0001
BMI 5 years	33.9 ± 5.3	37.5 ± 6,8	0.0003
BMI 10 years	34.7 ± 5.4	35.6 ± 7.4	0.98
%EWL 1 year	51.1 ± 26.2	38.7 ± 19.1	0.0004
% EWL 5 years	55.7 ± 27.2	40.1 ± 29.3	0.0005
% EWL 10 years	50.1 ± 30.5	47.3 ± 35.2	0.88
%TWL 1 year	22.2 ± 10.7	16.8 ± 8.4	0.0002
%TWL 5 years	30.7 ± 15.5	22.4 ± 17.1	0.0006
%TWL 10 years	22.2 ± 13	21.2 ± 16.1	0.89
%EBMIL 1 year	50.5 ± 26.5	37.4 ± 19.6	0.0002
%EBMIL 5 years	55.1 ± 27.7	38.7 ± 30.1	0.0004
%EBMIL 10 years	49.5 ± 30.9	46 ± 36	0.89
EWL > 50% at 10 years	34/70 (48.6%)	30/62 (48.4%)	0.98
EWL < 25% at 10 years	14/70 (20%)	20/62 (32.3%)	0.11
Weight regain at 10 years	4/70 (5.7%)	10/62 (16.1%)	0.05

Fig. 1 Weight loss comparison between the two groups



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ORIGINAL ARTICLE

Clinical Trials and Investigations

Roux-en-Y gastric bypass, sleeve gastrectomy, or one-anastomosis gastric bypass? A systematic review and meta-analysis of randomized-controlled trials

Isabelle Uhe | Jonathan Douissard | Michele Podetta | Mickael Chevallay | Christian Toso | Minoa Karin Jung | Jeremy Meyer

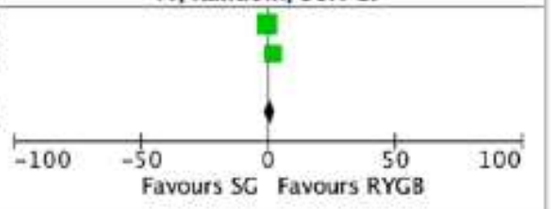
TABLE 1 Summary of weight outcomes

	n	MD (95% CI)	I^2	*p* value	Interpretation
RYGB versus SG					
EWL (percentage)					
At 1 month	4	3.30 (−0.80 to 7.40)	33%	0.12	No difference between groups
At 3 months	2	0.89 (−3.51 to 5.29)	60%	0.69	No difference between groups
At 6 months	4	0.11 (−5.52 to 5.73)	71%	0.97	No difference between groups
At 1 year	6	1.77(−5.11 to 8.64)	72%	0.61	No difference between groups
At 2 years	3	5.06 (−7.27 to 17.38)	76%	0.42	No difference between groups
At 3 years	3	11.93 (6.90 to 16.95)	0%	<0.00001	Favors RYGB
At 5 years	3	13.11 (5.83 to 20.39)	0%	0.0004	Favors RYGB
TWL (percentage)					
At 1 month	2	0.74 (−1.39 to 2.88)	72%	0.5	No difference between groups
At 3 months	2	2.41 (0.46 to 4.36)	76%	0.02	Favors RYGB
At 6 months	2	3.83 (2.46 to 5.21)	5%	<0.00001	Favors RYGB
At 1 years	3	6.35 (4.69 to 8.01)	0%	<0.00001	Favors RYGB
At 5 years	2	3.90 (1.21 to 6.59)	0%	0.005	Favors RYGB
EBMIL (percentage)					
At 1 month	2	2.20 (−4.30 to 8.71)	73%	0.51	No difference between groups
At 3 months	2	−6.64 (−27.02 to 13.74)	94%	0.52	No difference between groups
At 1 year	3	11.66 (2.33 to 21.00)	70%	0.01	Favors RYGB
At 2 years	2	10.26 (−4.69 to −25.21)	77%	0.18	No difference between groups
At 5 years	2	11.57 (−2.51 to 25.64)	61%	0.11	No difference between groups

A

Study or Subgroup	RYGB Mean	RYGB SD	RYGB Total	Sleeve gastrectomy Mean	Sleeve gastrectomy SD	Sleeve gastrectomy Total	Weight	Mean Difference IV, Random, 95% CI
Hofso et al. 2019	11.6	2.6	54	11.8	3.4	55	57.1%	-0.20 [-1.34, 0.94]
Wallenius et al. 2020	14	3	25	12	4	24	42.9%	2.00 [0.01, 3.99]
Total (95% CI)			**79**			**79**	**100.0%**	**0.74 [-1.39, 2.88]**

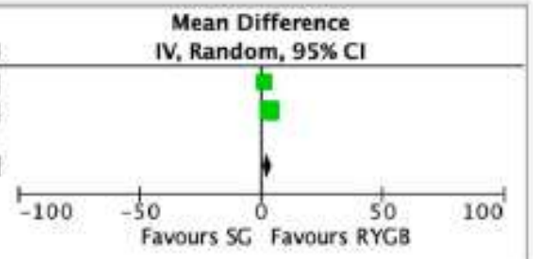
Heterogeneity: $Tau^2 = 1.74$; $Chi^2 = 3.55$, df = 1 (P = 0.06); $I^2 = 72\%$
Test for overall effect: Z = 0.68 (P = 0.50)



B

Study or Subgroup	RYGB Mean	RYGB SD	RYGB Total	Sleeve gastrectomy Mean	Sleeve gastrectomy SD	Sleeve gastrectomy Total	Weight	Mean Difference IV, Random, 95% CI
Hofso et al. 2019	19.6	3.7	54	18.3	4.9	54	44.4%	1.30 [-0.34, 2.94]
Woelnerhanssen et al. 2011	16.4	1.3	12	13.1	1.1	11	55.6%	3.30 [2.32, 4.28]
Total (95% CI)			**66**			**65**	**100.0%**	**2.41 [0.46, 4.36]**

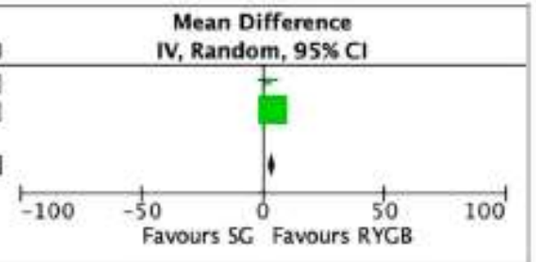
Heterogeneity: $Tau^2 = 1.53$; $Chi^2 = 4.22$, df = 1 (P = 0.04); $I^2 = 76\%$
Test for overall effect: Z = 2.43 (P = 0.02)



C

Study or Subgroup	RYGB Mean	RYGB SD	RYGB Total	Sleeve gastrectomy Mean	Sleeve gastrectomy SD	Sleeve gastrectomy Total	Weight	Mean Difference IV, Random, 95% CI
Wallenius et al. 2020	23	6	24	21	7	22	12.8%	2.00 [-1.78, 5.78]
Woelnerhanssen et al. 2011	24.8	1.7	12	20.7	1.5	11	87.2%	4.10 [2.79, 5.41]
Total (95% CI)			**36**			**33**	**100.0%**	**3.83 [2.46, 5.21]**

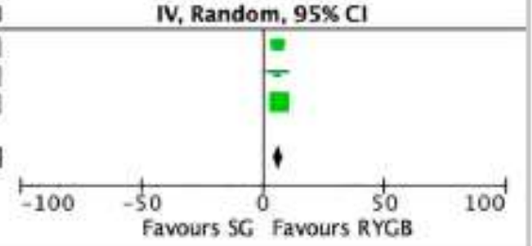
Heterogeneity: $Tau^2 = 0.12$; $Chi^2 = 1.06$, df = 1 (P = 0.30); $I^2 = 5\%$
Test for overall effect: Z = 5.46 (P < 0.00001)



D

Study or Subgroup	RYGB Mean	RYGB SD	RYGB Total	Sleeve gastrectomy Mean	Sleeve gastrectomy SD	Sleeve gastrectomy Total	Weight	Mean Difference IV, Random, 95% CI
Hofso et al. 2019	28.8	6.7	53	22.8	9.2	54	29.1%	6.00 [2.95, 9.05]
Wallenius et al. 2020	28	7	26	22	9	24	13.4%	6.00 [1.51, 10.49]
Woelnerhanssen et al. 2011	34.5	2.7	12	27.9	2.6	11	57.5%	6.60 [4.43, 8.77]
Total (95% CI)			**91**			**89**	**100.0%**	**6.35 [4.70, 7.99]**

Heterogeneity: $Tau^2 = 0.00$; $Chi^2 = 0.13$, df = 2 (P = 0.94); $I^2 = 0\%$
Test for overall effect: Z = 7.57 (P < 0.00001)



E

Study or Subgroup	RYGB Mean	RYGB SD	RYGB Total	Sleeve gastrectomy Mean	Sleeve gastrectomy SD	Sleeve gastrectomy Total	Weight	Mean Difference IV, Random, 95% CI
Wallenius et al. 2020	22	7	18	16	10	14	19.1%	6.00 [-0.16, 12.16]
Schauer et al. 2017	21.8	8.3	49	18.4	6.6	47	80.9%	3.40 [0.41, 6.39]
Total (95% CI)			**67**			**61**	**100.0%**	**3.90 [1.21, 6.59]**

Heterogeneity: $Tau^2 = 0.00$; $Chi^2 = 0.55$, df = 1 (P = 0.46); $I^2 = 0\%$
Test for overall effect: Z = 2.84 (P = 0.005)

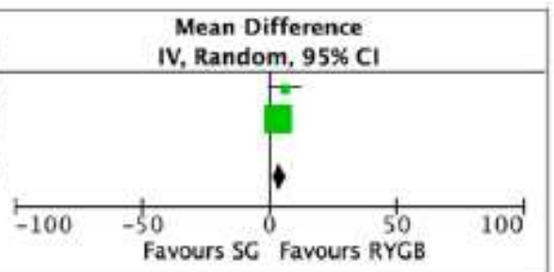


FIGURE 1 Forest plot comparing TWL (percentage) between RYGB and SG at (A) 1 month after surgery; (B) 3 months after surgery; (C) 6 months after surgery; (D) 1 year after surgery; and (E) 5 years after surgery. The vertical line represents the null effect. Each horizontal line represents the 95% CI of one study. The size of the green box is related to the weight of each study. The diamond symbolizes the overall effect of all the studies. RYGB, Roux-en-Y gastric bypass; SG, sleeve gastrectomy; TWL, total weight loss [Color figure can be viewed at wileyonlinelibrary.com]

TABLE 2 Summary of type 2 diabetes remission

	n	RR (95% CI)	I^2	*p* value	Interpretation
RYGB versus SG					
Type 2 diabetes resolution					
At 1 month	3	0.67 (0.41-1.12)	0%	0.13	No difference between groups
At 3 months	3	0.86 (0.47-1.58)	77%	0.63	No difference between groups
At 6 months	3	1.21 (0.95-1.55)	0%	0.13	No difference between groups
At 1 year	6	1.18 (0.92-1.51)	62%	0.22	No difference between groups
At 2 years	2	1.03 (0.52-2.06)	65%	0.93	No difference between groups
At 3 years	4	1.14 (0.94-1.38)	0%	0.18	No difference between groups
At 5 years	3	1.21 (0.87-1.67)	0%	0.25	No difference between groups

Obesity Surgery (2023) 33:173–178
https://doi.org/10.1007/s11695-022-06349-6

ORIGINAL CONTRIBUTIONS

Ten-Year Results of Laparoscopic Sleeve Gastrectomy: a Retrospectively Designed Study of a Single Tertiary Center

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Received: 18 September 2022 / Revised: 19 October 2022 / Accepted: 25 October 2022 / Published online: 4 November 2022

Table 1 Patients' weight and BMI parameters pre- and post-SG procedure*

Preoperative weight (mean ± SD, kg)	120.11 ± 22.03
Preoperative BMI (mean ± SD, kg/m^2)	43.21 ± 8.01
Postoperative minimum weight (mean ± SD, kg)	81.23 ± 19.61
Postoperative minimum BMI (mean ± SD, kg/m^2)	29.44 ± 7.12
≥ 10 years postoperative weight (mean ± SD, kg)	98.41 ± 26.24
≥ 10 years postoperative BMI (mean ± SD, kg/m^2)	36.34 ± 9.77
≥ 10 years %EWL (mean ± SD)	42.65 ± 36.02
≥ 10 years %EWL in non-converted patients (n = 62)	42.49 ± 35.9
≥ 10 years %EWL in converted patients (n = 18)	42.93 ± 35.1
≥ 10 years %EWL in converted vs non-converted patients	p = 0.96
≥ 10 years %TWL (mean ± SD)	19.33 ± 16.73
≥ 10 years %TWL in non-converted patients (n = 62)	19.47 ± 17.5
≥ 10 years %TWL in converted patients (n = 18)	17.97 ± 13.02
≥ 10 years %TWL in converted vs non-converted patients	p = 0.72

Table 3 Series of Sleeve Gastrectomy studies with at least 10-year FU

Author, year	Number of patients	Study design	Mean EWL (SD)	T2D resolution	HTN resolution	De-novo GERD	Revisional surgery during FU
Felsenreich, 2016 [15]	53	Retrospective	53.5% (26.6)	1.9%**	23.5%**	N/A	36%
Castagneto Gissey, 2018 [16]	114	Retrospective	52.5% (21.1)	64.7%	44.2%	42.9%	44%
Hauters, 2021 [18]	34	Retrospective	42% (37)	12%	17%	41%	18%
Musella, 2019 [19]	76	Retrospective	50.1% (30.5)	0%	51.4%	25.7%	15.8%
Kraljević, 2021 [20]	215	Retrospective	53.6% (24.6)*	61%	60.5%	32.4%	19.2%
Chang, 2018 [21]	65	Retrospective	70.5% (27.8)	39.6%	78.4%	58.4%	21.5%
Arman, 2016 [24]	65	Retrospective	67.4%	N/A	28.6%**	21.4%	31.7%

FU, follow-up; *T2D*, type 2 diabetes; *HTN*, hypertension; *EWL*, excess weight loss; *GERD*, gastroesophageal reflux disease; *N/A*, not available

*Corresponds to primary sleeve gastrectomy only

**Includes patients with resolution and/or improvement of T2D/HTN

Obesity Surgery (2023) 33:117–128
https://doi.org/10.1007/s11695-022-06365-6

ORIGINAL CONTRIBUTIONS

Long-term Reported Outcomes Following Primary Laparoscopic Sleeve Gastrectomy

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Received: 7 May 2022 / Revised: 30 October 2022 / Accepted: 18 November 2022 / Published online: 28 November 2022

Abstract

Table 1 Baseline patient characteristics and additional procedures during primary LSG

Characteristics	Total LSG population ($n=578$)
Age (yrs), mean ± SD	41.9 ± 10.6
Initial weight (kg), mean ± SD	118.9 ± 19.6
Initial height (m), mean ± SD	1.67 ± 0.09
Initial body mass index (k/m^2), mean ± SD	42.5 ± 5.5
Females, *n* (%)	387 (67.0)
Female to male ratio	2.0:1.0
Smoking status, *n* (%)	105 (18.2)
Marital status, *n* (%)	
• Married	424 (73.4)
• Divorced	74 (12.8)
• Other	80 (13.8)
Prevalent associated medical conditions, *n* (%)	
• Hyperlipidemia	254 (43.9)
• Hypertension	160 (27.7)
• Obstructive sleep apnea	82 (14.2)
• Type 2 diabetes	146 (25.3)
Additional laparoscopic procedures during LSG, *n* (%)	
• Cholecystectomy	41 (7.1)
• Hiatal hernia repair	38 (6.6)
• Umbilical or ventral hernia repair w/ mesh	7 (1.2)

All data are based on electronic medical records

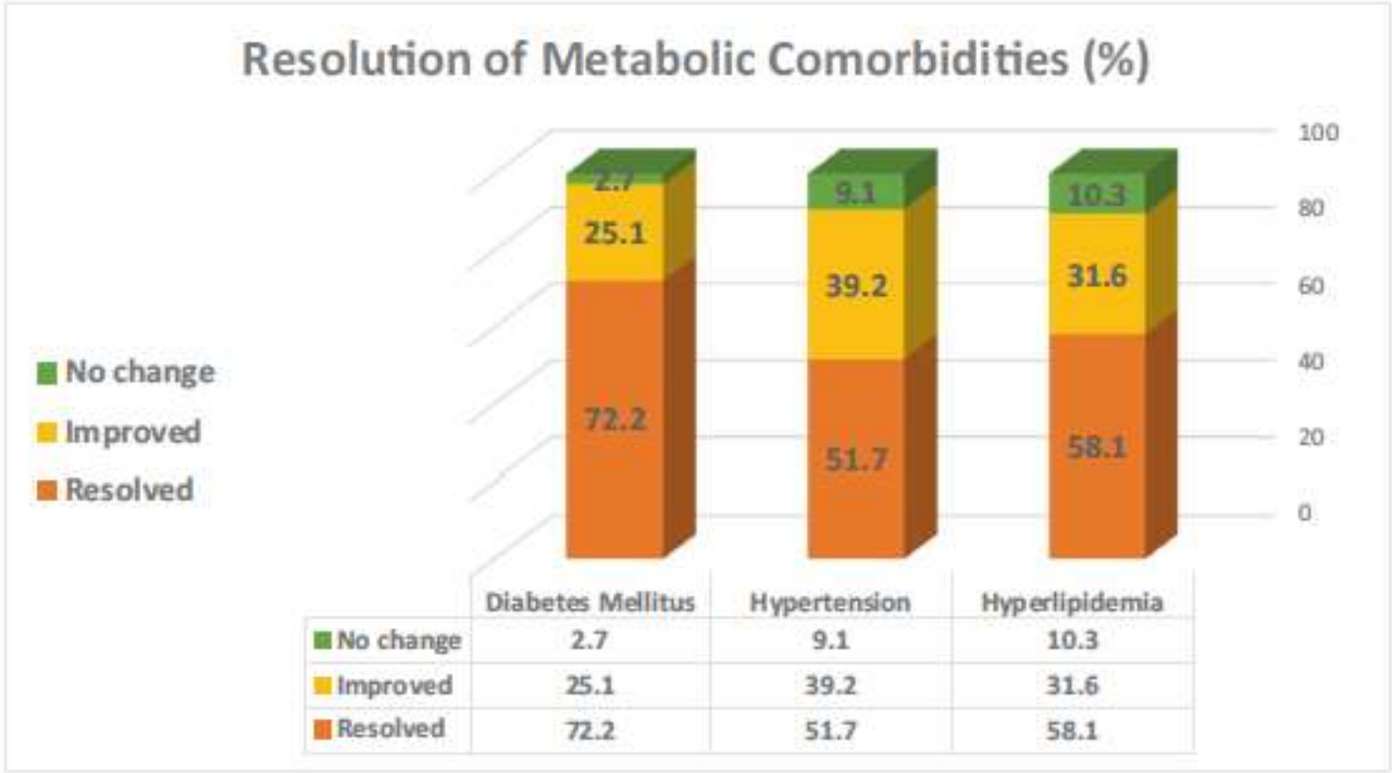
Table 2 Post-LSG long-term weight loss and weight regain

Parameter	Total LSG population ($n=578$)	5–10 years of follow-up ($n=400$)	≥ 10 years of follow-up ($n=178$)	*P*-value between 5–10 and ≥ 10 yrs follow-up
Short follow-up				
Time to achieve nadir (lowest weight from LSG) (mo.), mean ± SD	12.8 ± 12.4	12.9 ± 12.0	12.4 ± 12.1	0.826
Nadir BMI (lowest BMI attained) (kg/m^2), mean ± SD	27.5 ± 4.9	27.1 ± 4.6	28.4 ± 5.3	0.011
Nadir weight (kg), mean ± SD	77.9 ± 15.5	77.2 ± 15.2	79.7 ± 16.1	0.153
Nadir weight loss (kg), mean ± SD	40.9 ± 12.5	40.9 ± 12.1	40.8 ± 13.4	0.708
Nadir TWL (%), mean ± SD	34.3 ± 8.1	34.5 ± 8.1	33.7 ± 8.2	0.475
Nadir EWL (%) mean ± SD	86.9 ± 22.8	88.3 ± 23.1	83.7 ± 22.2	0.075
Insufficient weight loss, *n* (%)	32 (5.5)	21 (5.3)	11 (6.2)	0.696
Short follow-up successful patients, *n* (%)§§	541 (94.4)	374 (93.5)	167 (93.8)	0.696
Short follow-up insufficient weight loss, *n* (%)§§§	32 (5.5)	21 (5.3)	11 (6.2)	0.696
Long follow-up				
Follow-up duration (yrs.), mean ± SD	8.8 ± 2.5	7.3 ± 1.9	11.9 ± 0.9	< 0.001
Current weight (kg), mean ± SD	91.3 ± 20.4	89.5 ± 19.2	95.4 ± 22.5	0.010
Current BMI (kg/m^2), mean ± SD	32.6 ± 6.4	32.0 ± 5.9	34.1 ± 7.1	0.002
Weight loss (kg), mean ± SD	27.5 ± 14.5	28.5 ± 13.5	25.2 ± 16.3	0.005
Current TWL (%), mean ± SD	23.1 ± 11.4	24.1 ± 10.6	20.9 ± 12.6	0.005
Current EWL (%), mean ± SD	58.9 ± 30.1	61.7 ± 28.4	52.8 ± 32.8	0.002

Table 4 Post-LSG clinical follow-up and surgical procedures

Post-primary LSG procedures	Total LSG population ($n=578$) n (%)
Readmission rate	52 (9.0)
Hospitalizations following LSG	71 (12.3)
Additional non-bariatric surgery	230 (39.8)
Upper endoscopy	179 (31.0)
Plastic surgery	56 (9.7)
Cholecystectomy	54 (9.3)
Gynecologic surgery	39 (6.7)
Orthopedic surgery	36 (6.2)
Hiatal/umbilical/ventral hernia repair	23 (4.0)
Dietitian follow-up	
• Not at all	0 (0.0)
• Only in the 1–2 years after the LSG	260 (45.0)
• Intermittently during the years	84 (14.5)
• Routine follow-up	40 (6.9)
Blood tests performed	
• Did not perform blood tests at all since LSG	8 (1.4)
• Only in the first 1–2 years after the LSG	37 (6.4)
• Intermittently over the years	214 (37.0)
• Routine follow-up	319 (55.2)

Fig. 1 Resolution of associated medical conditions following laparoscopic sleeve gastrectomy



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SURGERY FOR OBESITY AND RELATED DISEASES

Surgery for Obesity and Related Diseases ■ (2020) 1–8

Original article

Revision surgery after sleeve gastrectomy: a nationwide study with 10 years of follow-up

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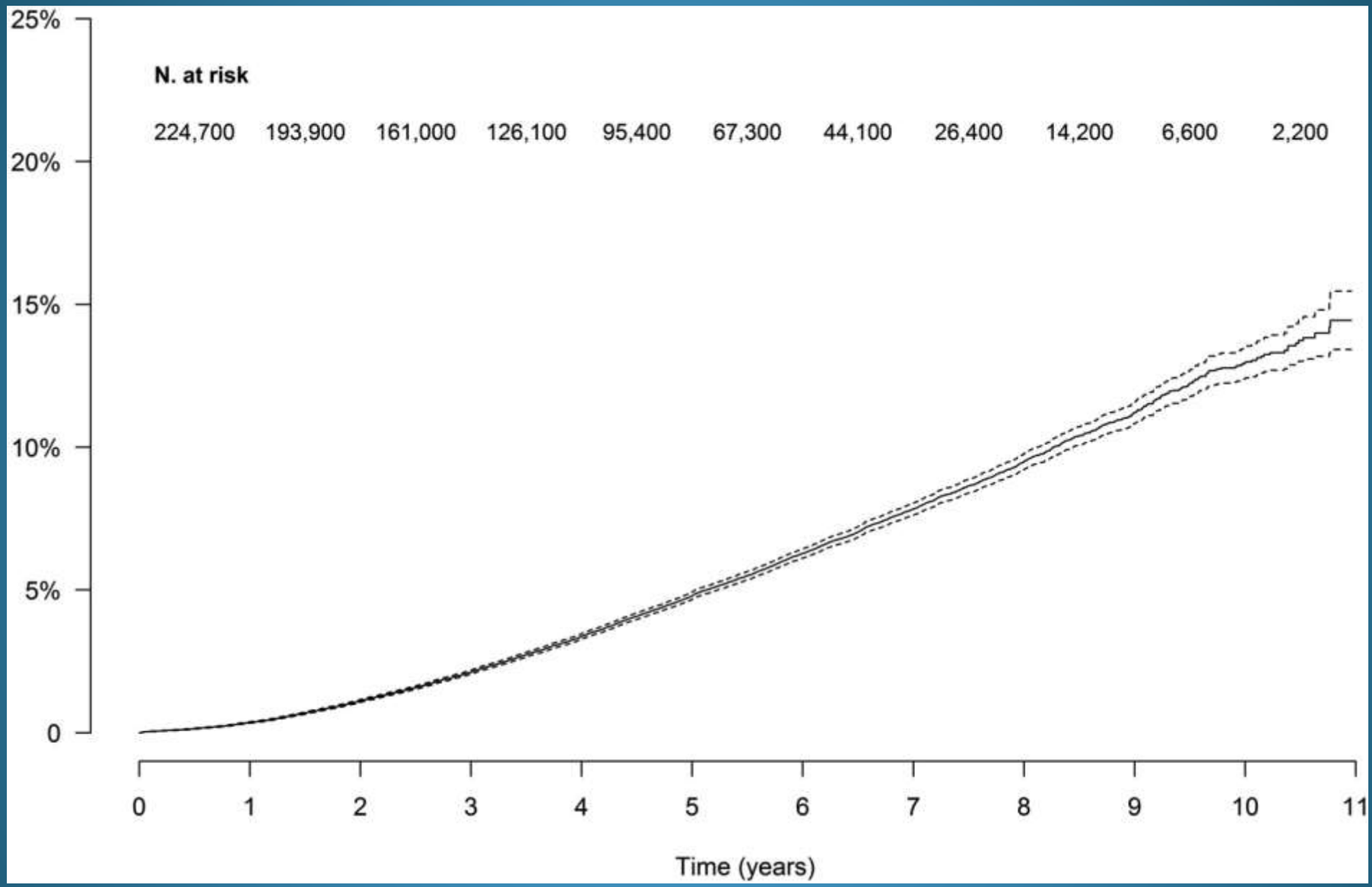
Received 24 February 2020; accepted 16 May 2020

Figure 1



Surgery for Obesity and Related Diseases DOI: (10.1016/j.soard.2020.05.021)

followed by at least one revision procedure. Compared to patients who did not undergo a reoperation, patients who experienced a revision surgery presented a higher prevalence of the female sex (84.7% versus 79.6%, $p < 0.001$), a BMI > 50 kg/m^2 (18.2% versus 10.3%, $p < 0.001$), a more common history of previous gastric banding (24.6%, versus 10.0% $p < 0.001$) and type-2 diabetes (T2D) was almost 2-times more frequent (9.7% versus 5.0%, $p<0.001$).

HIGHLIGHTS

- Rate of revisional surgery after sleeve gastrectomy was 4 12.2%, at 10 years.
- Revisional procedures was gastric bypass (75.2%), and by re-sleeve (18.7%).
- Reasons for revision were persistence of obesity (87.0%) and GERD (5.2%)
- Early complications: 5.1% gastric leak, 18% bleeding and a reoperation rate of 6.4%.

But…

- BMI>50kg/m2 … they should be 2 stages
- 2-stages not counted
- RYGB for BMI>50kg/m2 , also results in 40% failure rates
- Wrong strategy to do for weight loss failure after sleeve, in my strongest opinion

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Check for updates

Surgery for Obesity and Related Diseases 15 (2019) 556–566

SURGERY FOR OBESITY AND RELATED DISEASES

Original article

Single- or double-anastomosis duodenal switch versus Roux-en-Y gastric bypass as a revisional procedure for sleeve gastrectomy: A systematic review and meta-analysis

Yung Lee, B.H.Sc.[a,b], Yosef Ellenbogen, B.H.Sc.[a], Aristithes G. Doumouras, M.P.H., M.D.[b], Scott Gmora, M.D.[b], Mehran Anvari, M.D., Ph.D.[b], Dennis Hong, M.Sc., M.D., F.R.C.S.C., F.A.C.S.[b,*]

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Received 26 October 2018; received in revised form 31 December 2018; accepted 28 January 2019

SADI , DS vs. RGB, %Total Weight loss

Study or Subgroup	RYGB Mean	SD	Total	SADI/BPD-DS Mean	SD	Total	Weight	Mean Difference IV, Random, 95% CI	Year
Carmeli 2014 (BPD-DS)	32.5	26	56	41.25	36	70	14.4%	-8.75 [-19.59, 2.09]	2014
Homan 2015 (BPD-DS)	9	4.75	11	27	10.75	14	18.3%	-18.00 [-24.29, -11.71]	2014
El Chaar 2017 (BPD-DS)	32	18.17	9	29.9	10.33	3	10.0%	2.10 [-14.56, 18.76]	2016
Ceha 2018 (SADI)	30.3	7.7	32	33.73	9.2	32	19.8%	-3.43 [-7.59, 0.73]	2018
Dijkhorst 2018 (SADI)	6.9	11.3	45	26.4	10.4	66	19.8%	-19.50 [-23.65, -15.35]	2018
Shimon 2018 (BPD-DS)	18.76	10.12	18	26.29	12.07	21	17.7%	-7.53 [-14.49, -0.57]	2018
Total (95% CI)			**171**			**206**	**100.0%**	**-10.22 [-17.46, -2.97]**	

Heterogeneity: $Tau^2 = 64.57$; $Chi^2 = 36.93$, df = 5 ($P < 0.00001$); $I^2 = 86\%$
Test for overall effect: $Z = 2.76$ ($P = 0.006$)

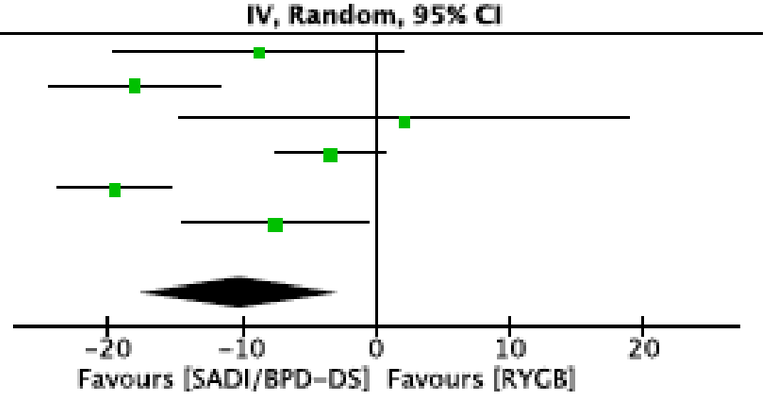


Fig. 2. Random effect meta-analysis of percentage total weight loss after revisional bariatric surgery.

Morbidity

Study or Subgroup	RYGB Events	RYGB Total	SADI/BPD-DS Events	SADI/BPD-DS Total	Weight	Risk Ratio M-H, Random, 95% CI	Year
Carmeli 2014 (BPD-DS)	1	10	1	9	1.3%	0.90 [0.07, 12.38]	2014
Homan 2015 (BPD-DS)	6	18	9	25	13.1%	0.93 [0.40, 2.14]	2014
El Chaar 2017 (BPD-DS)	0	9	0	3		Not estimable	2016
Ceha 2018 (SADI)	20	32	20	32	63.6%	1.00 [0.68, 1.46]	2018
Dijkhorst 2018 (SADI)	13	45	11	66	18.3%	1.73 [0.85, 3.52]	2018
Shimon 2018 (BPD-DS)	4	18	2	21	3.7%	2.33 [0.48, 11.29]	2018
Total (95% CI)		**132**		**156**	**100.0%**	**1.13 [0.83, 1.53]**	
Total events	44		43				

Heterogeneity: $Tau^2 = 0.00$; $Chi^2 = 3.08$, df = 4 (P = 0.55); $I^2 = 0\%$

Test for overall effect: Z = 0.78 (P = 0.44)

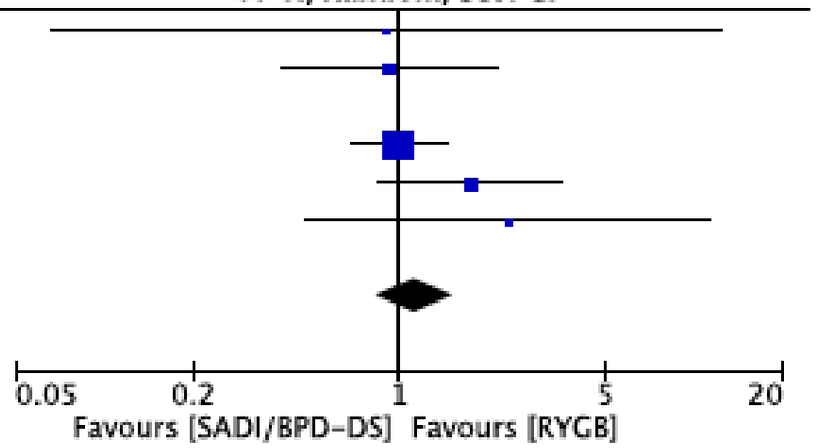
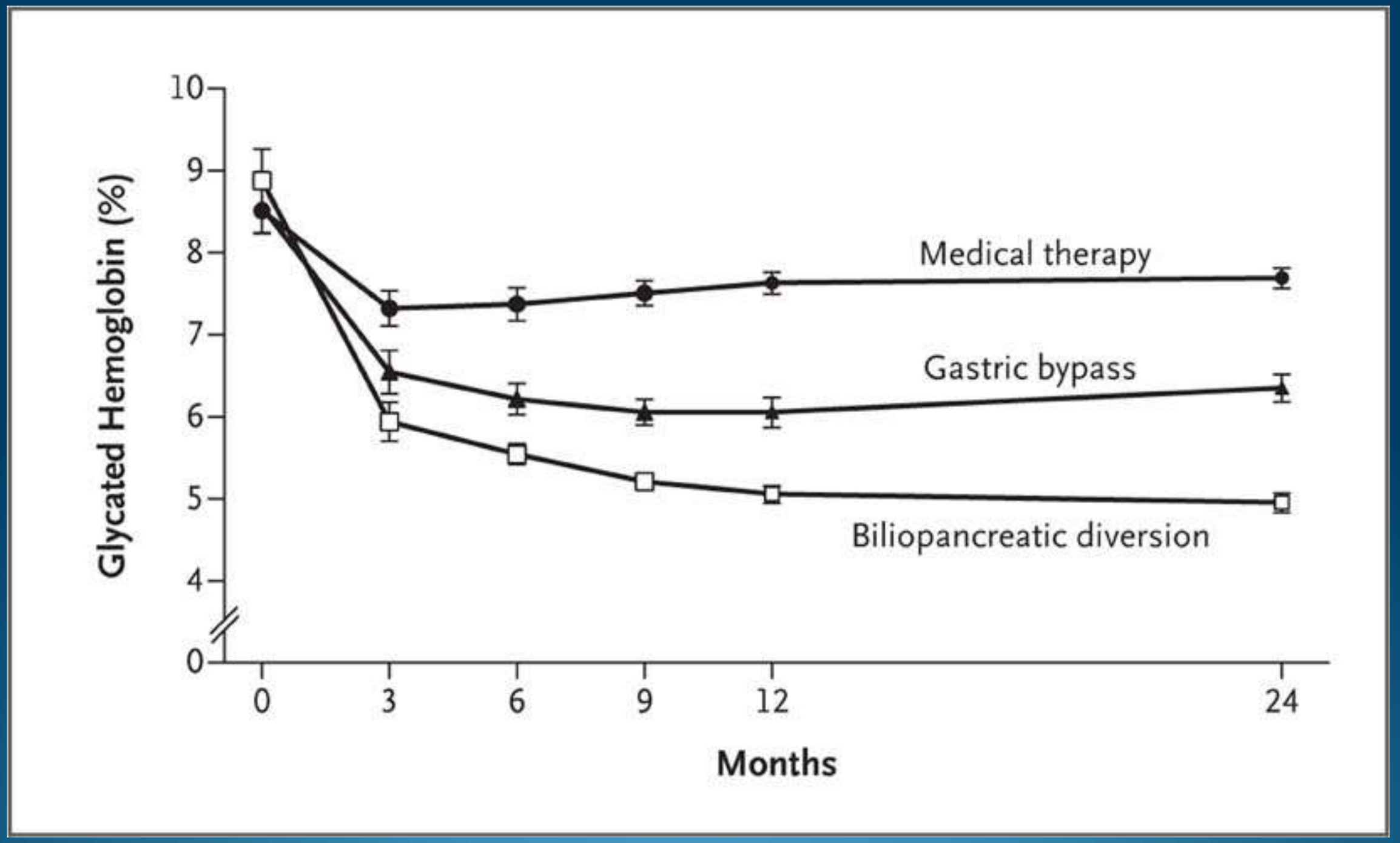


Fig. 4. Random effect meta-analysis of adverse events after revisional bariatric surgery.

Glycated Hemoglobin Levels during 2 Years of Follow-up.



Mingrone G et al. N Engl J Med 2012;366:1577-1585

The NEW ENGLAND JOURNAL of MEDICINE

5 years follow-up (Lancet Sept 2015)

- Complete remission was 63% in BPD group vs. 37% in Gastric bypass group
- (Overall 50% at 5 years)
- Complications in med. Group (5) Myocardial infarction
- Complications in gastric bypass (1)
- Complications in BPD (0)

Lancet. 2015 Sep 5;386(9997):964-73.

Specifically, 10-year remission rates in the were:

5% for medical therapy

50% for BPD,

and 25% for RYGB

p=0·0082

Mingrone G, Panunzi S, De Gaetano A, Guidone C, Iaconelli A, Capristo E, Chamseddine G, Bornstein SR, Rubino F. 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. Lancet. 2021 Jan 23;397(10271):293-304.

Ten-year remission rates in insulin-treated type 2 diabetes after biliopancreatic diversion with duodenal switch

Jordanna E. Kapeluto, M.D., André Tchernof, Ph.D., Daiana Masckauchan, M.D., Simon Biron, M.D., Simon Marceau, M.D., Frédéric-Simon Hould, M.D., Stéfane Lebel, M.D., Odette Lescelleur, M.D., François Julien, M.D., Laurent Biertho, M.D.

Surgery for Obesity and Related Diseases

DOI: 10.1016/j.soard.2020.06.052

ELSEVIER

Surgery for Obesity and Related Diseases ■ (2020) 1–12

SURGERY FOR OBESITY AND RELATED DISEASES

Original article

Ten-year remission rates in insulin-treated type 2 diabetes after biliopancreatic diversion with duodenal switch

Jordanna E. Kapeluto, M.D.[a,b], André Tchernof, Ph.D.[c,d], Daiana Masckauchan, M.D.[a], Simon Biron, M.D.[a], Simon Marceau, M.D.[a], Frédéric-Simon Hould, M.D.[a], Stéfane Lebel, M.D.[a], Odette Lescelleur, M.D.[a], François Julien, M.D.[a], Laurent Biertho, M.D.[a,*]

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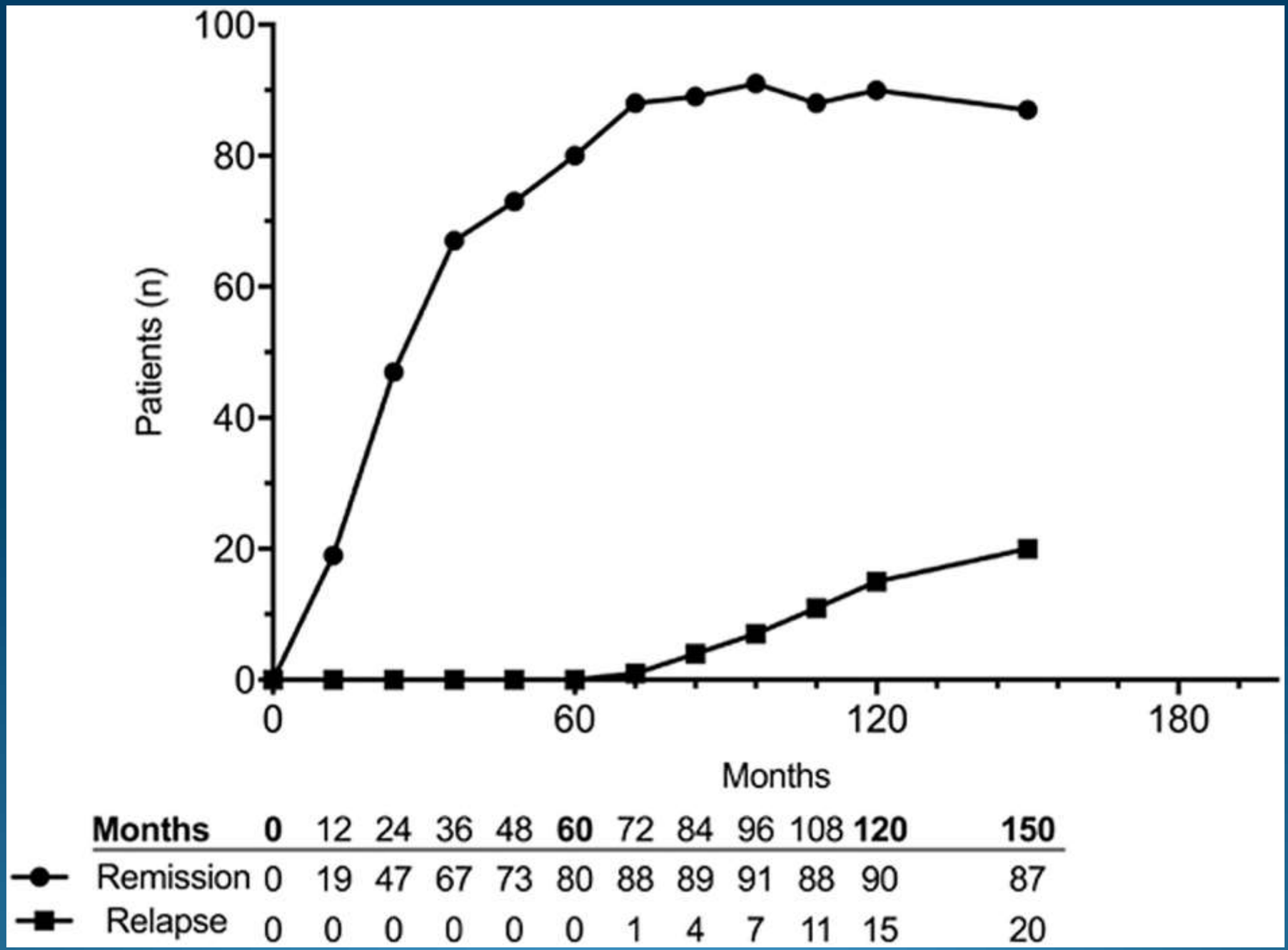
Received 29 March 2020; accepted 27 June 2020

Fig. 2



Months	0	12	24	36	48	60	72	84	96	108	120	150
Remission	0	19	47	67	73	80	88	89	91	88	90	87
Relapse	0	0	0	0	0	0	1	4	7	11	15	20

Surgery for Obesity and Related Diseases DOI: (10.1016/j.soard.2020.06.052)

Summary

- Sleeve gastrectomy results at 10 years = 40-60% EWL
- Much Better results on adolescents
- Poorer results on older patients and BMI>50kg/m2
- Barrett's esophagus and esophageal adenocarcinoma incidence are not different at 10 years
- Most cohort studies fail to recognized the multistage approach
- Options for revisions are variable and numerous
- Hypoabsorptive surgery as a second stage results in better weight loss and type-2 diabetes resolution

When NOT to do a Sleeve

- When retatrutide will be approved
- BMI>50kg/m2, if not planned as a 2 stages
- Barrett's esophagus
- If not a candidate to Hypoabsorptive surgery as a second stage for better weight loss and type-2 diabetes resolution