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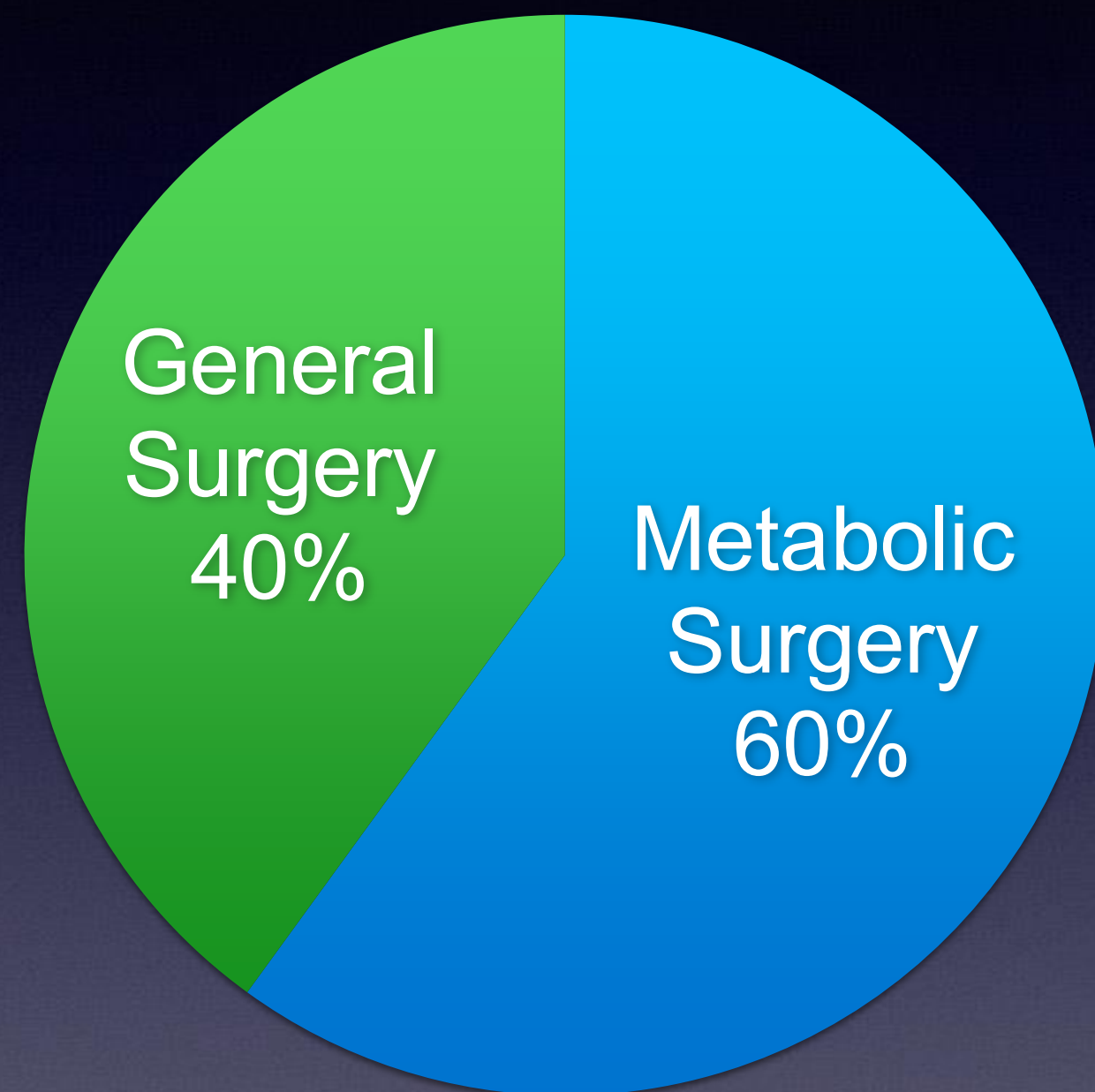


Revisions after RYGB: SADI/DS?

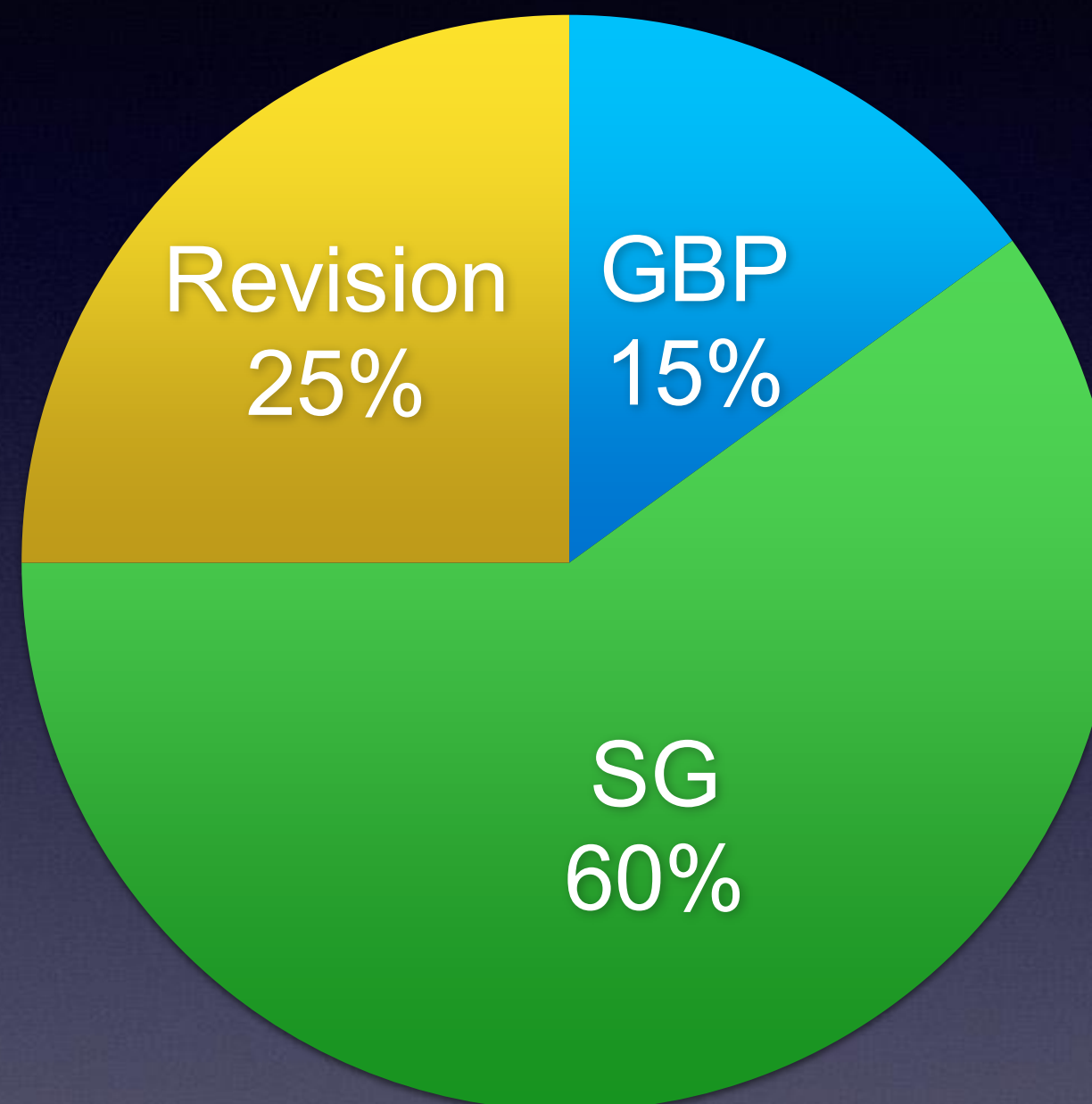
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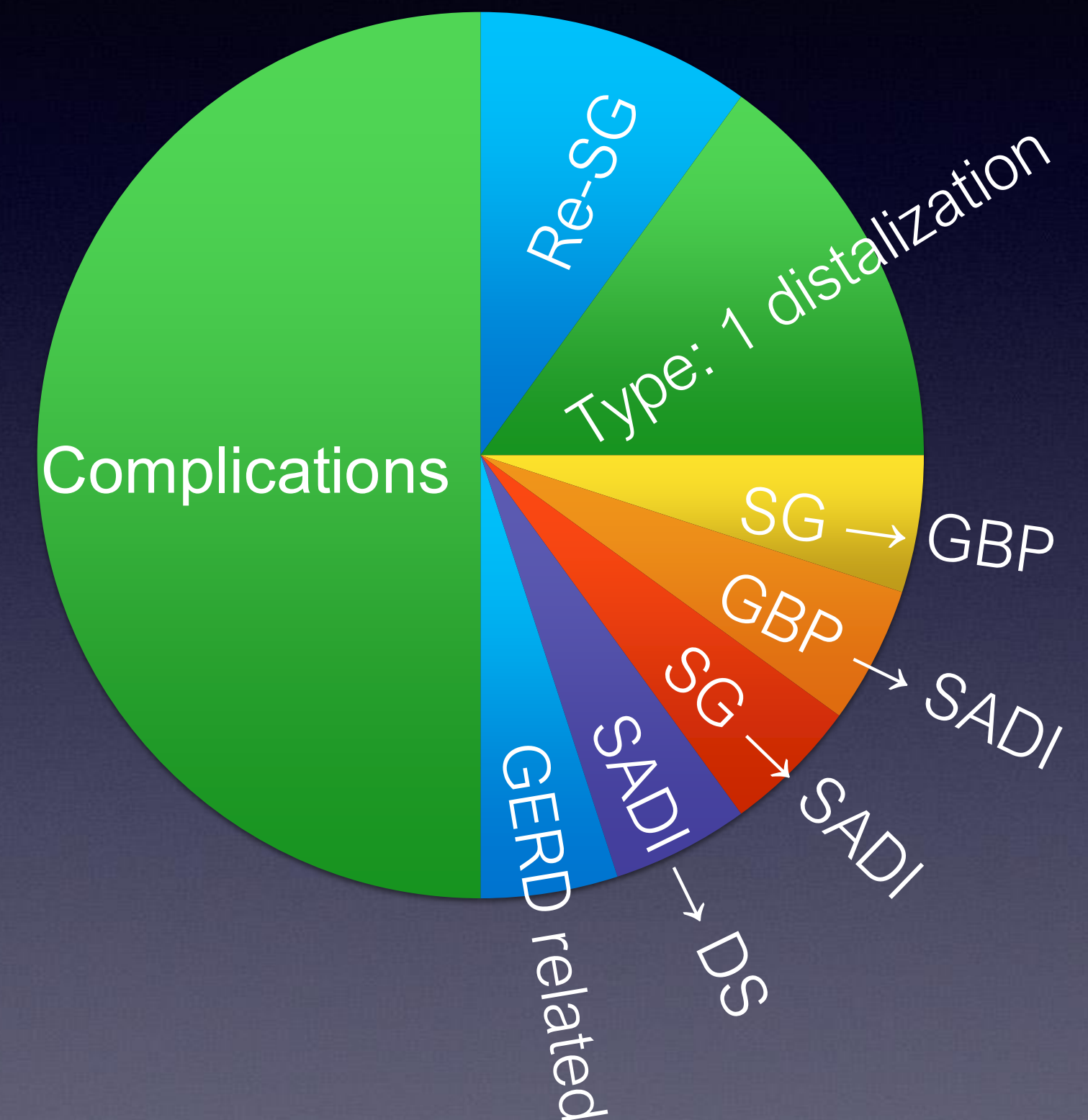
Practice



Metabolic Surgery



Revision Surgery



Conversions of Roux-en-Y gastric bypass to duodenal switch (SADI-S and BPD-DS) for weight regain

Rena C. Moon¹ · Layth Alkhairi¹ · Alyssa Jameson Wier¹ · Andre F. Teixeira¹ · Muhammad A. Jawad¹ 

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Abstract

Background Duodenal switch is a choice of conversion when patients fail to lose or regain weight after Roux-en-Y gastric bypass (RYGB). This study aims to evaluate the effectiveness and safety of duodenal switch as a secondary operation for patients who presented with insufficient weight loss or weight regain after a RYGB.

Methods A retrospective chart review was performed on 15 patients who underwent a conversion of RYGB to single anastomosis duodeno-ileal bypass with sleeve (SADI-S) or biliopancreatic diversion with duodenal switch (BPD-DS) due to weight regain between December 31, 2013 and October 31, 2018. For the body mass index (BMI) analysis, the multilevel model for change was used.

Results Of 15 patients, 10 underwent a conversion to SADI-S, and 5 underwent a conversion to BPD-DS. Also, 7 patients underwent the conversion in two-stages, while 8 did as single-stage. One patient had a duodenal stump leak after SADI-S, and another patient had a sleeve leak after BPD-DS. One patient underwent a reoperation to increase the common channel 20 months after the conversion to BPD-DS due to malnutrition. There was no mortality. Mean percentage of total weight loss (TWL) was 18.4% at 6 months, 25.0% at 12 months, 26.4% at 18 months, and 25.7% at 24 months after the conversion. The rate of decrease in BMI was slower in SADI-S patients than in BPD-DS patients ($p < 0.01$), adjusting for preoperative BMI.

Conclusion Conversions of RYGB to SADI-S and BPD-DS can provide significant additional weight loss. However, complications and malnutrition can develop after the conversion, and further research is needed for evaluating safety.

Keywords Conversion · Weight regain · Gastric bypass · Duodenal switch · SADI-S · BPD-DS

Roux-en-Y gastric bypass (RYGB) is one of the most common bariatric procedures today due to its effectiveness and remission in comorbidities associated with obesity [1]. Nevertheless, some patients do not reach and maintain weight loss goals and undergo a reoperation after a RYGB [2]. Weight regain, weight loss failure, or percentage of excess weight loss (EWL) of less than 50% is reported in 15–35% of RYGB patients [3–5]. Many patients in this category undergo a secondary bariatric operation for further weight loss. Long-limb RYGB, salvage banding, and duodenal

switch are all possible revisional procedures if the patient proves to be a viable candidate [6, 7]. The overall goal of these procedures is to limit portion intake and absorption [8]. These procedures come with complications and risks, making some more effective and safer than others. Operations such as long-limb RYGB result in further weight loss but have high rates of long-term nutritional complications that may require the use of supplemental nutrition or even additional operations [8, 9]. Salvage banding can be used as a revisional procedure that controls the size of the pouch and stoma using a band. Although this procedure does not affect absorption, erosion, band slipping, and band failure are not uncommon and require further operations [10]. Duodenal switch is another procedure that has shown more significant weight loss than any other bariatric procedure at a 5-year follow-up [1]. As a secondary operation, it has the potential to be successful in long-term weight loss; but there is limited data on long-term complications [11–13]. This study aims to evaluate the effectiveness and safety of single anastomosis

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15 patients - 20% complications
Duodenal stump leak -1
Sleeve leak - 1
↑ common channel - 1

Table 3 Mean levels of hemoglobin, protein, albumin, calcium, AST, and ALT before and after the conversion of Roux-en-Y gastric bypass to duodenal switch

Test	Reference range	Preop ($n = 15$)	6 months ($n = 7$)	1 year ($n = 4$)	2 year ($n = 2$)	Abnormal		
						Preop	1 year	2 year
Hemoglobin (g/L)	Male 132.0–171.0 Female 117.0–155.0	128.3 (16.8)	116.6 (14.4)	107.3 (8.7)	106.0 (1.4)	25%	75%	100%
Protein (g/L)	61.0–81.0	69.9 (4.9)	64.3 (8.5)	65.8 (4.6)	70.0 (2.8)	None	25%	None
Albumin (g/L)	36.0–51.0	40.4 (2.7)	39.6 (15.4)	37.0 (1.6)	38.5 (2.1)	14%	25%	None
Calcium (mmol/L)	2.15–2.55	2.31 (0.08)	2.01 (0.46)	2.21 (0.14)	2.19 (0.02)	13%	50%	None
AST (ukat/L)	0.17–0.60	0.33 (0.07)	0.49 (0.23)	0.42 (0.09)	0.41 (0.10)	None	None	None
ALT (ukat/L)	0.10–0.68	0.34 (0.16)	0.53 (0.34)	0.38 (0.16)	0.28 (0.11)	None	None	None

AST aspartate aminotransferase, ALT alanine aminotransferase

Table 4 Mean levels and percentage of abnormal levels of vitamins, parathyroid hormone, and ferritin levels following conversions from Roux-en-Y gastric bypass to duodenal switch

Test	Reference range	6 months ($n = 7$)	1 year ($n = 4$)	2 year ($n = 2$)	Abnormal		
					6 months	1 year	2 year
Vitamin A (umol/L)	0.7–2.3	1.2 (0.4)	0.9 (0.4)	1.0 (0.3)	None	25%	None
Vitamin D, 25-hydroxy (nmol/L)	74.9–249.6	78.5 (44.2)	65.0 (21.5)	43.7 (22.9)	33%	75%	100%
Vitamin E, alpha tocopherol (umol/L)	1.2–3.9	1.9 (0.5)	1.6 (0.1)	1.5 (0.1)	17%	None	None
Vitamin B ₁₂ (pmol/L)	155.7–698.1	894.4 (517.1)	547.0 (253.7)	412.2 (238.5)	57%	25%	None
PTH, intact (ng/L)	15–65	52.4 (17.0)	51.0 (14.4)	80 (16.0)	20%	33%	50%
Ferritin, serum (pmol/L)	33.7–337.1	74.2 (44.8)	29.2 (12.6)	10.1 (4.7)	14%	50%	100%

PTH parathyroid hormone





Duodenal Switch Conversion in Non-responders or Weight Recurrence Patients

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Abstract

Introduction Several modalities have been proposed to tackle insufficient weight loss and weight regain after bariatric surgery; we aimed to evaluate efficacy and safety of duodenal switch conversion as a salvage procedure.

Material and Methods Data from patients who underwent duodenal switch conversions ($n=50$) were retrospectively studied. Excess weight loss % and total body weight loss % were compared between primary procedure and duodenal switch conversion. Overall complication, emergency department visits, readmissions, reoperation, and mortality rates were described, analyzed, and compared to the current literature.

Results Every excess weight loss % and total body weight loss % comparison at 6, 12, and 24 months, demonstrated a statistically significant superiority in weight loss after duodenal switch conversion ($p<0.05$). The mean operative time of adjustable gastric band, sleeve gastrectomy, Roux-en-Y gastric bypass (1 and 2 stages) conversions to duodenal switch were 208, 146, 187, and 152 min, respectively, while the mean length of stay was 3.38 days. No statistically significant differences were perceived regarding the primary procedure. The overall complication rate was 18% (9 patients); 3 patients (6%) had 1 emergency department visit; readmissions accounted for 12% of cases (6 patients); the reoperation rate was 10% (5 patients); no fatal outcomes were recorded.

Conclusion Duodenal switch conversions are an effective salvage procedure for insufficient weight loss and/or weight regain after adjustable gastric band, sleeve gastrectomy, and Roux-en-Y gastric bypass; it is also safe, associated to low readmission, reoperation, and mortality rates.

Keywords Duodenal switch · Conversion · Weight loss failure · Weight recurrence

Introduction

Obesity prevalence has increased since 1980 and has become a worldwide concern. Currently, approximately one-third of the population are diagnosed with obesity or overweight [1]. High body mass index (BMI) and visceral adiposity are risk factors that hold an important epidemiological association with coronary artery disease, diabetes, hypertension, and specific types of cancer. Joining efforts to mitigate obesity consequences, recent studies have demonstrated the importance of pharmacological and surgical interventions allied to behavioral and lifestyle modifications [1]. At present, metabolic and bariatric surgery (MBS) remains the most efficacious and a safe treatment for obesity; however, patients may experience weight regain rates that range from 3 to 35.1% of cases [2]. Several modalities have been proposed to tackle this complication including lifestyle and dietary modifications, pharmacologic therapy, endoscopic interventions, and

Key Points

- AGB, SG, and RYGB have been associated with IWL and/or WR.
- DS conversions may be and safe and effective salvage procedure.
- Superior WL is achieved with DS conversion without added complication risks.

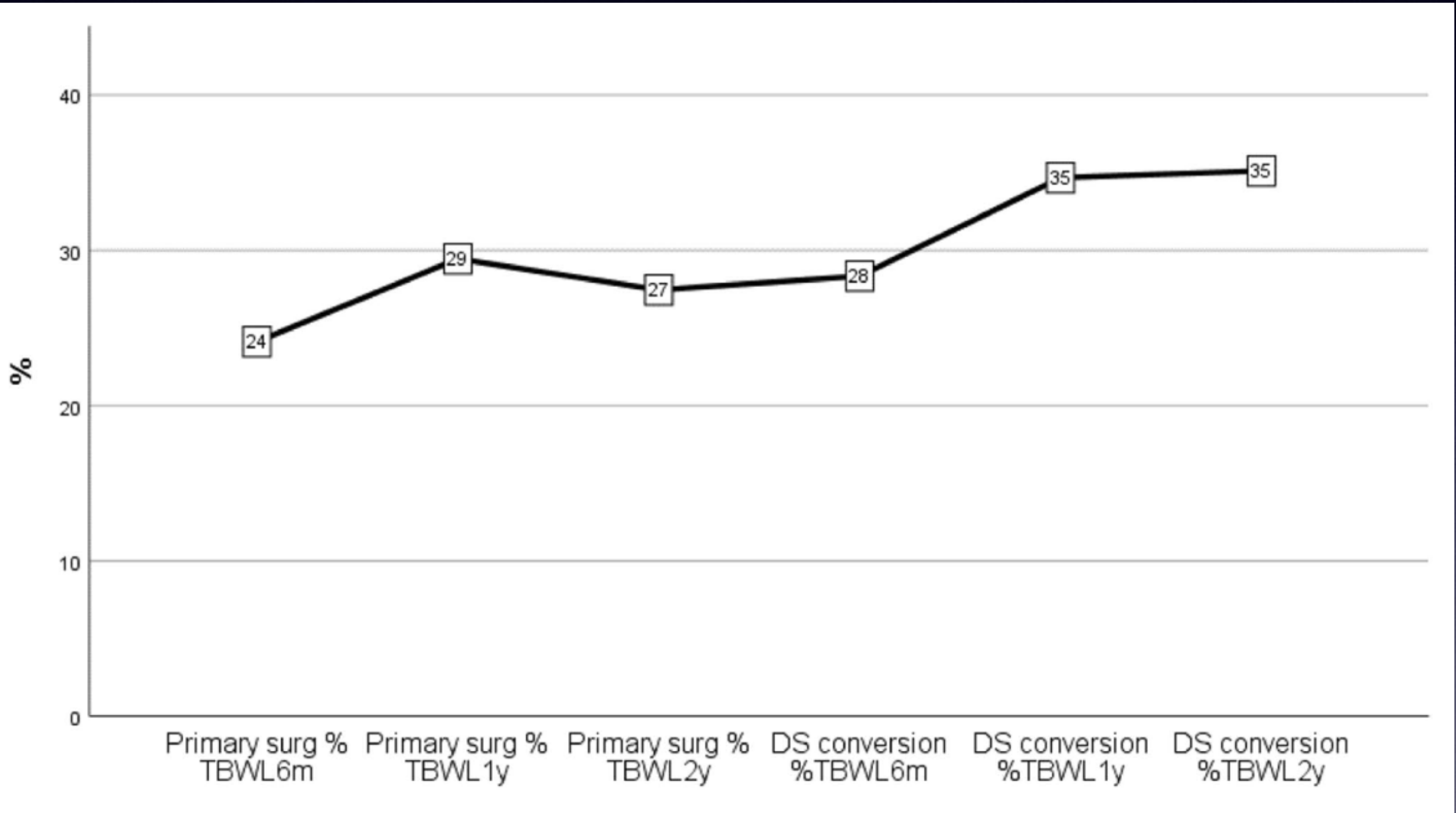
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GBP conversions
7 two-stage
8 single-stage



Original article

Long-term results of conversion of Roux-en-Y to biliopancreatic diversion with duodenal switch

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Jean-Baptiste Finel, M.D., Philippe Topart, M.D.*

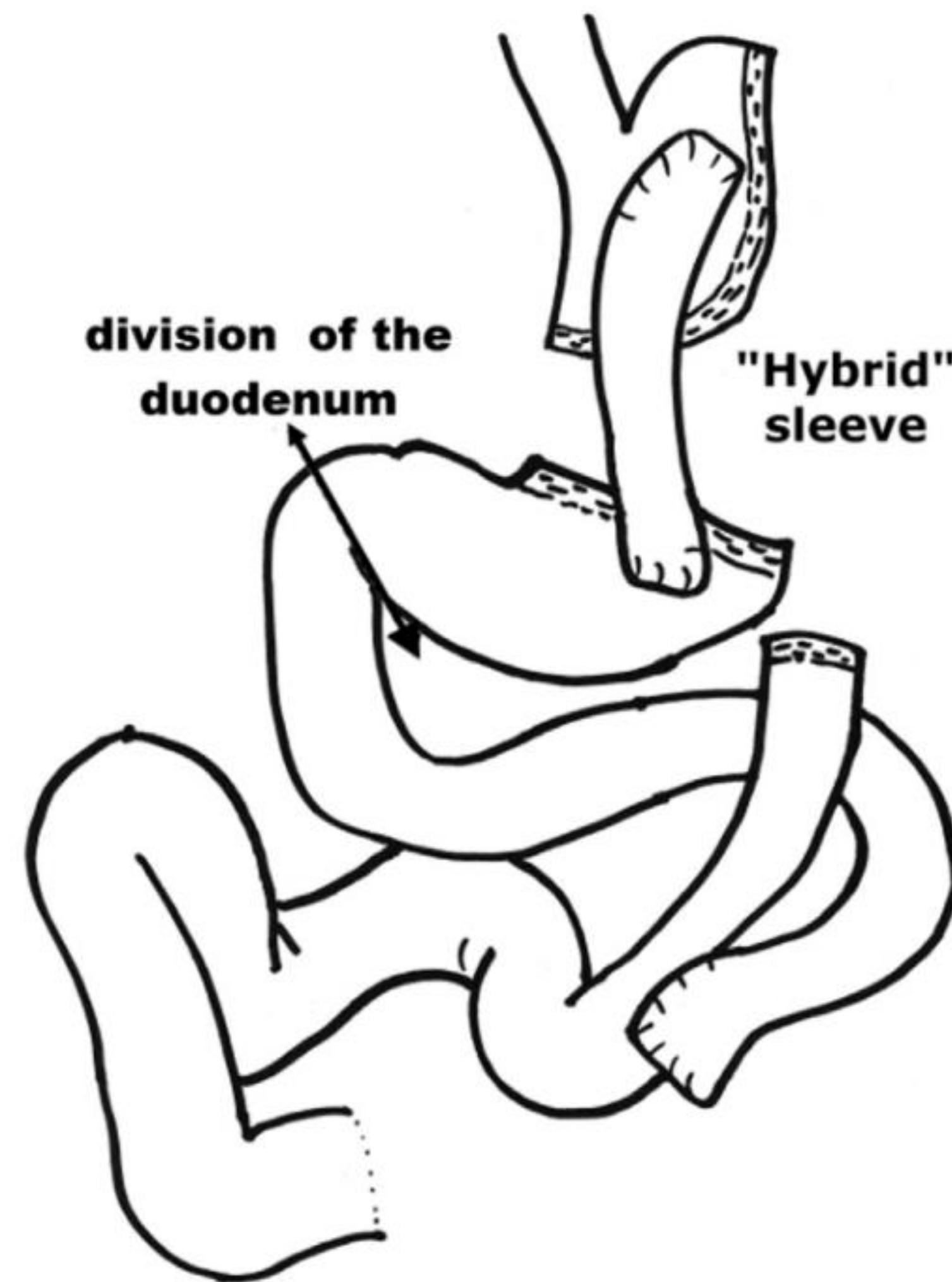
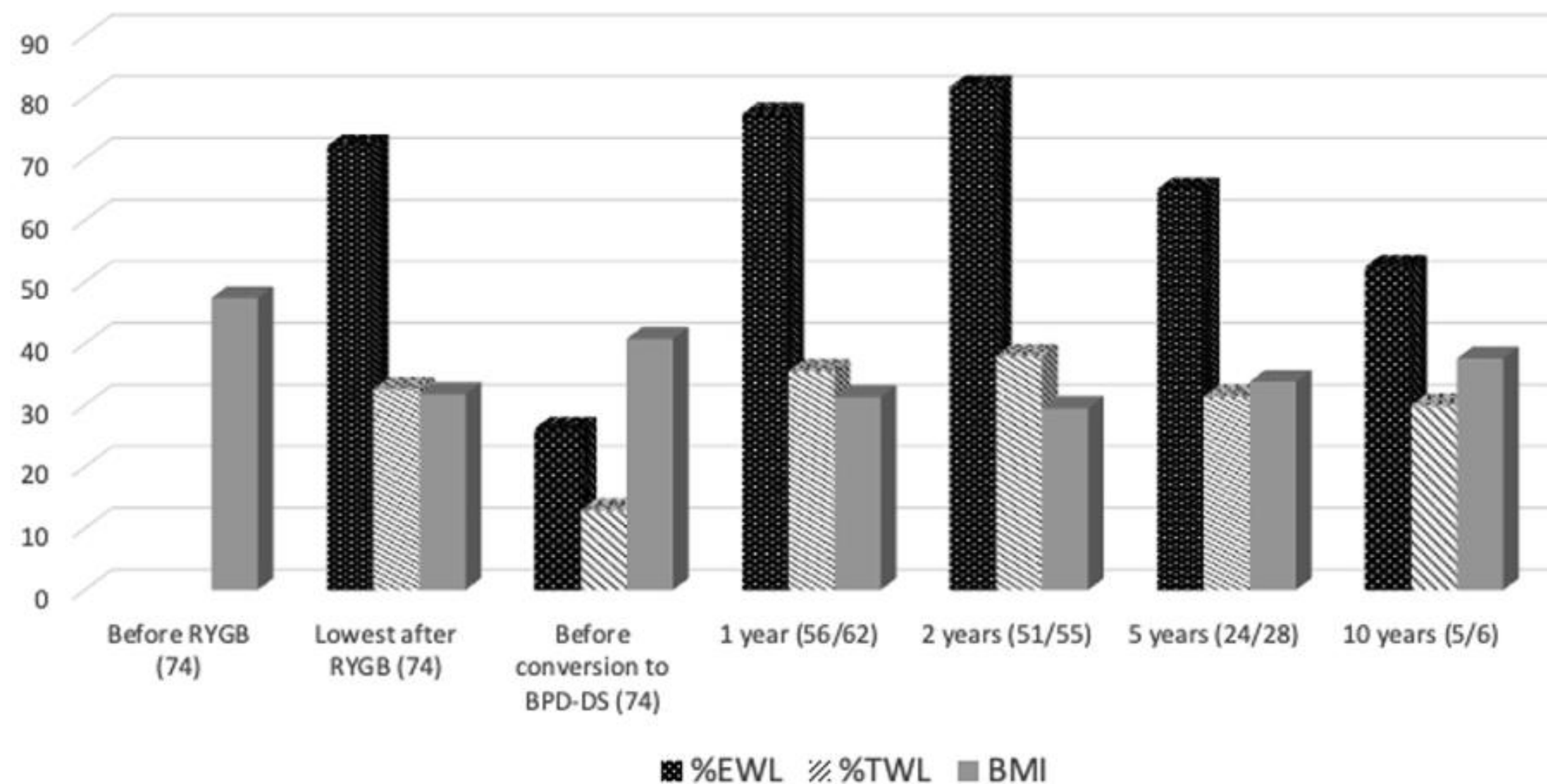
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Received 18 September 2023; accepted 25 December 2023

Abstract

Background: Despite the fact Roux-en-Y gastric bypass (RYGB) is one of the most efficient bariatric procedures, postoperative weight regain still can be seen.

Objectives: To retrospectively assess the early outcomes and up to 10-year weight results of the con-



Fresno Medical Education Program

%TWL: 35.9% ± 11.9%

Advanced Laparoscopic Surgery Associates Medical Group



ORIGINAL CONTRIBUTIONS

Mid-term Results of Laparoscopic Conversion of Gastric Bypass to Duodenal Switch for Weight Regain: the Review of the Literature and Single-Center Experience

Tugrul Demirel¹

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Abstract

Background Weight regain after Roux-en-Y gastric bypass (RYGB) is a nightmare for the patients and the surgeons and is mostly regarded as “irreversible.” However, conversions to duodenal switch (DS) have been done previously with promising success. The current paper reports a single center’s mid-to-long-term follow-up outcomes.

Methods The data from all patients undergoing a conversion of RYGB (and one anastomosis gastric bypass (OAGB)) to DS were reviewed retrospectively. The demographic, operative, and weight loss parameters were analyzed, including age, duration of surgery, weight loss, body mass index (BMI), and morbidity/mortality.

Results Seventeen patients were operated on between January 2013 and December 2021. The mean BMI was 45 kg/m² (33–70) before conversion. The overall average %EWL was 74.4%, the least was 52% at 6 months, and the most was 91% at 24 and 36 months. All comorbidities resolved after conversion. One patient had a gastro-gastrostomy leak needing prompt surgical repair on the same day of diagnosis. Three patients had other complications: a duodenal stump leak, an intrabdominal abscess, and an ileus. All resolved without surgery. One sudden death happened on the 5th postoperative day.

Conclusion Laparoscopic conversion of gastric bypass operations to DS is a complicated procedure that may have severe complications despite excessive patience and expertise but can be performed in a single step. The mid-to-long-term outcomes are promising for weight loss and control of associated co-morbidities.

Keywords Gastric bypass failure · Weight regain · Roux-en-Y gastric bypass · Duodenal switch · One anastomosis gastric bypass

Introduction

Roux-en-Y gastric bypass has been the most preferred bariatric surgery in the last three decades. However, according to the most recent worldwide survey, it has been downgraded as the second-ranked bariatric surgery [1]. Despite its high success rate in the short to mid-term, this decline should be related to considerable failure rates of 20% in morbidly obese patients, which may rise to 58% in super obesity when body mass index (BMI) goes beyond 50 kg/m² [2]. Weight regain after RYGB is a significant problem for patients and surgeons. A wide variety of surgical revisions of RYGB have been proposed so far, such as increasing the restriction by trimming [3] or banding [4] the gastric pouch, sleeve reduction of the gastro-jejunostomy anastomosis [5], and endoscopic approaches emerging in the last decade [6], all have unpromising outcomes to achieve durable control of weight beyond the very short term. Increasing malabsorption by

Key Points.

- Weight gain is not rare after gastric bypass, especially in super obesity.
- Conversion to DS is the most efficient method for sustainable weight loss.
- Measuring the whole small bowel improves the efficacy and quality of life.
- Laparoscopic conversion of gastric bypass to duodenal switch is applicable with significant complications but effective by means of control of obesity and systemic comorbidities.

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Screenshot



Table 4 The average limb lengths of patients’ in gastric bypass and duodenal switch configurations. Abbreviations: *PS* previous surgery, *CL* common limb, *TBL* total bowel length, *BP limb* biliopancreatic limb, *Exl. B%* excluded bowel percentage, *Neo-Roux L* the new roux limb length in revisional duodenal switch configuration, *Neo-CL* the

	Average Limb lengths of previous Gastric Bypass					Average Revisional DS configuration				
	Roux limb	CL	BP limb	TBL	% EBL	Neo-Roux L	Neo-CL	Neo-BPL	TBL	% EBL
<i>Average</i>	121 cm	654 cm	67 cm	829 cm	8%	222 cm	72 cm	521 cm	815 cm	63.4%
<i>Min</i>	55 cm	20 cm	25 cm	485 cm	3.7%	160 cm	50 cm	270 cm	480 cm	56%
<i>Max</i>	580 cm	1120 cm	235 cm	1280 cm	30.7%	350 cm	100 cm	810 cm	1260 cm	69.6%

AL = 35–40% of the total bowel length
CL = 10%
Roux= 30%

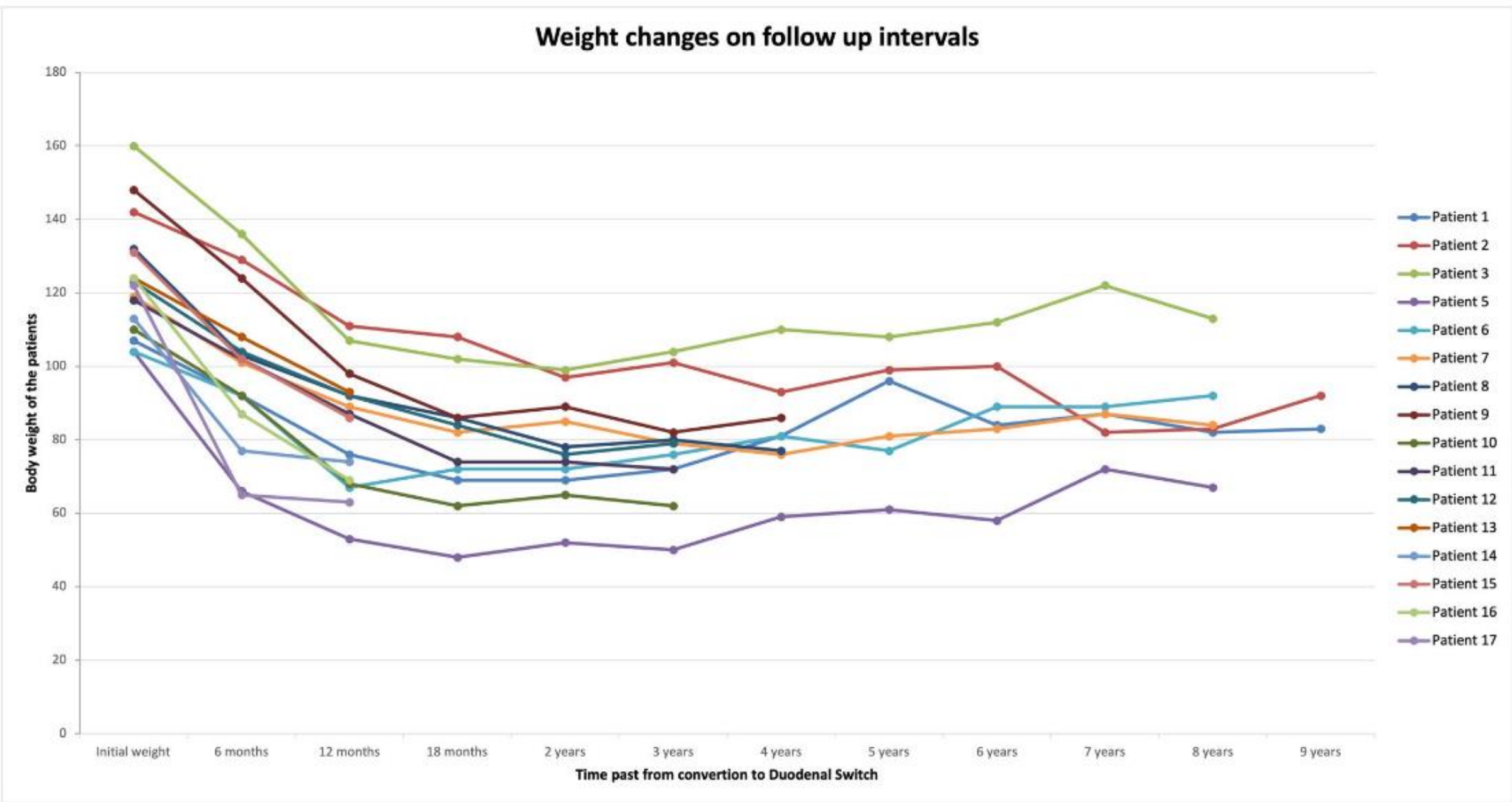


Table 8 The data summary of the significant reports and our results. *FU* follow-up, *G-GA* gastrogastrostomy anastomoses, *F-J* feeding jejunostomy, *OmP* omentoplasty, *TBL* total bowel length, *%EWL* percentage excess weight loss, *Lap.* laparoscopic, *Neo-JJ* neo jejunojejunostomy (the roux limb is anastomosed to the biliopancreatic limb forming a new jejunojejunostomy), *UnT* the jejunostomy of gastric bypass is kept untouched, *CEEA* circular end-to-end anastomoses. *The highest %EWL values are listed in the follow-up periods of all series, *n* number of patients involved. †Although the longest duration of follow-up should be 72 months according to the first patient, only follow-ups up to 24 months are provided in the Halawani paper. ‡A sudden death on the 5th post operative day. No available post-mortem analysis

Author		<i>n</i>	longest FU	Tech- nique	Roux limb	G-GA	Bougie size	F-J/OmP	Surgery time	Hospital stays	TBL measure- ment	Morbid- ity	Mortality	%EWL*	Albumin	Revision for mal- absorp- tion	Dumping
Kesh- ishian	2004	31	30	Open	Neo-JJ	CEEA/ Linear	39 F	Yes/No	210 (138–342)	No data	Yes	12.7%	No	75%	No data	No	61% (n:19/31)
Parikh	2007	12	37	Lap./ Open	Neo-JJ	CEEA	60F	No/No	275 (172–428)	3.8 (2–8)	No	41.0%	No	63%	No data	No	No data
Green- baum	2011	32	24	Open	Neo-JJ	CEEA/ Linear	48F–58F	Yes/Yes	No data	6.3 (3–17)	Yes	32.0%	No	77%	3.8 (1.7–4.5)	3% (one patient)	No data
Topart	2016	14	61	Lap.	UnT	No GG	No data	No/No	181 (150–240)	13.8 (3–77)	No	28.5%	No	73.5%	3.9 (3.4–4.4)	No	No data
Surve	2016	32	39	Lap.	Resected/ JJ UnT	Handsewn/ CEEA	40F	No/No	155 (117–194)	3.4 ± 1.8	No	25.0%	No	56%	No data	No	No data
Halawani	2017	9	42	Lap.	UnT	Handsewn (Robotic)	32F	No/No	403 (229–515)	4.8 (3–6)	No	0.0%	No	64%	No data	No	No data
Moon	2020	15	24†	Lap.	UnT	Handsewn	40F	No/No	No data	3	No	20.0%	No	63%	3.9	6.6 % (one patient)	No data
Demirel	2023	17	108 months	Lap.	UnT	Handsewn	42 F	No/No	278 (167–566)	5 (4–7)	Yes	25.0%	One ‡	91%	3.4 (2.9–4.7)	No	23.5% (n:4/17)

FU follow-up; *G-GA* gastrogastrostomy anastomoses; *F-J* feeding jejunostomy; *OmP* omentoplasty; *TBL* total bowel length; *%EWL* percentage excess weight loss; *Lap.* laparoscopic; *Neo-JJ* neo jejunojejunostomy (the roux limb is anastomosed to the biliopancreatic limb forming a new jejunojejunostomy); *UnT* the jejunostomy of gastric bypass is kept untouched; *CEEA* circular end-to-end anastomoses; *n* number of patients involved

*The highest %EWL values are listed in the follow-up periods of all series

†Although the longest duration of follow-up should be 72 months according to the first patient, only follow-ups up to 24 months are provided in the Halawani paper

‡A sudden death on the 5th post operative day. No available post-mortem analysis

RESEARCH

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Recurrent Weight Gain after Sleeve Gastrectomy: Is Conversion to Duodenal Switch Superior to Roux-en-Y Gastric Bypass?

Agustina A Pontecorvo¹ · Jorge Cornejo¹ · Steven Bowers¹ · Enrique F Elli¹

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Abstract

Background Rates of conversion procedures after Sleeve Gastrectomy have been reported to reach up to 12.2% in 10 years of follow-up. The aim of this study was to compare perioperative outcomes and weight changes in patients who underwent either conversion from SG to Roux-en-Y Gastric Bypass (C-RYGB) or Duodenal Switch (C-DS).

Methods This study was a nonrandomized, controlled, retrospective review of 100 patients who underwent conversion of LSG due to recurrent weight gain at our institution from May 2015 to November 2024. Perioperative and postoperative variables were examined.

Results Of 481 SGs, 100 patients (90 C-RYGB; 10 C-DS) underwent conversion due to recurrent weight gain. The C-DS group had a higher preoperative BMI compared to C-RYGB (57.2 kg/m² vs 38.9 kg/m², *p* < 0.001). Additionally, C-DS showed shorter operative time (142.5 min vs 193.8 min, *p* = 0.02) and similar length of hospitalization than C-RYGB. There was no significant difference in late reoperation rate between groups (13 [14.4%] C-RYGB vs 2 [20%] C-DS). The C-DS group had significant differences in %TWL at 6-, 12- and 24-month follow-up with values of 21% vs 15.5%, 30% vs 18.2% and 33% vs 19% over C-RYGB, respectively. Excess preoperative BMI at the time of conversion was associated with a greater weight loss (each 1 kg/m² increase yielded 0.7% greater %TWL). However, no significant correlation was found between these two variables (*p* = 0.24, R² = 0.05).

Conclusions C-DS appears to be safe and feasible for the surgical management of recurrent weight gain after LSG. In addition, C-DS provides a significantly higher %TWL on 6, 12 and 24 months compared to C-RYGB.

Keywords

Severe obesity · Conversion · Sleeve gastrectomy · Roux-en-Y gastric bypass · Recurrent weight gain

Introduction

Sleeve gastrectomy (SG) continues to be the most frequently performed bariatric procedure in the United States [1–4]. According to the American Society for Metabolic and Bariatric Surgery's 2022 report, SG accounted for 57.4% of all

metabolic and bariatric surgeries performed during that year. This trend has remained stable over the past decade, with SG consistently representing the predominant procedure since 2013 [4]. The overall weighted mean percentage of total weight loss (%TWL) was 24.4%. Remission rates for type 2 diabetes mellitus (T2DM) and hypertension (HTN) were 45.6% and 41.4%, respectively [5]. SG demonstrates a favorable safety profile, with a reported reoperation rate of 0.9%, markedly lower than that observed with Roux-en-Y gastric bypass (RYGB), which reaches 6.9% [6].

Long-term weight loss outcomes following sleeve gastrectomy (SG) are not consistently optimal, with a subset of patients requiring conversion procedures [7]. Rates of conversion after SG have been reported to reach up to 12.2% at 10 years of follow-up [8]. While RYGB is generally favored for managing gastroesophageal reflux disease (GERD) and other postoperative complications following SG, such as intrathoracic sleeve migration (ITSM) or sleeve

Key points

- C-DS is a safe and feasible option for managing recurrent weight gain after SG.
- C-DS is associated with significantly greater reductions in BMI, higher % and improved resolution of associated medical problems.
- The greater weight loss reduction in the C-DS group may be explained by a higher preoperative weight of these patients at the time of revision.
- Each 1 kg/m² increase in BMI was associated with a 0.7% greater %TWL.

Extended author information available on the last page of the article

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	C-RYGB (<i>n</i> = 90)	C-DS (<i>n</i> = 10)	<i>p</i> -value
Gender (%)			0.76
F	78 (86.7)	9 (90)	
M	12 (13.3)	1 (10)	
Age, in years			
Mean (SD)	53.2 (± 12.1)	45.8 (± 8.8)	0.06
Weight before Sleeve gastrectomy, kg			
Mean (SD)	128.7 (± 27.2)	164.7 (± 28)	< 0.01
Time from Sleeve to conversion, months			
Mean (SD)	71.1 (± 37.1)	64.8 (± 28.4)	0.30
Previous history of AGB	18 (20)	2 (20)	1.00
Comorbidities (%)			
GERD	76 (84.4)	8 (80)	0.72
Diabetes Mellitus	19 (21.1)	3 (30)	0.52
Hypertension	42 (46.7)	6 (60)	0.42
Hyperlipidemia	33 (36.7)	30 (36)	0.67
Obstructive Sleep Apnea	40 (44.4)	7 (70)	0.12

AGB: Adjustable Gastric Banding, SD: Standard Deviation
**p*–value considered significant <0.05

	C-RYGB (<i>n</i> = 90)	C-DS (<i>n</i> = 10)	<i>p</i> -value
Hiatal Hernia Repair (%)	71 (78.9)	1 (10)	< 0.01
Surgical Approach (%)			0.15
Robotic	65 (72.2)	10 (100)	
Laparoscopic	21 (23.3)	0 (0)	
Open	4 (4.4)	0 (0)	
Operative time (minutes)			
Mean (SD)	193.8 (± 68)	142.5 (± 50.6)	*0.02
LOS (in days)			
Mean (SD)	2.5 (± 1.8)	2.7 (± 1.3)	0.68
Early Readmission (%)	4 (4.4)	0 (0)	0.44
Early Reoperations (%)	2 (3.3)	0 (0)	0.55
Late Readmission (%)	5 (5.6)	1 (10)	0.57
Late Reoperations (%)	13 (14.4)	2 (20)	0.70

SD: Standard Deviation **p*–value considered significant <0.05

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DS: Greater weight loss and resolution of comorbidities

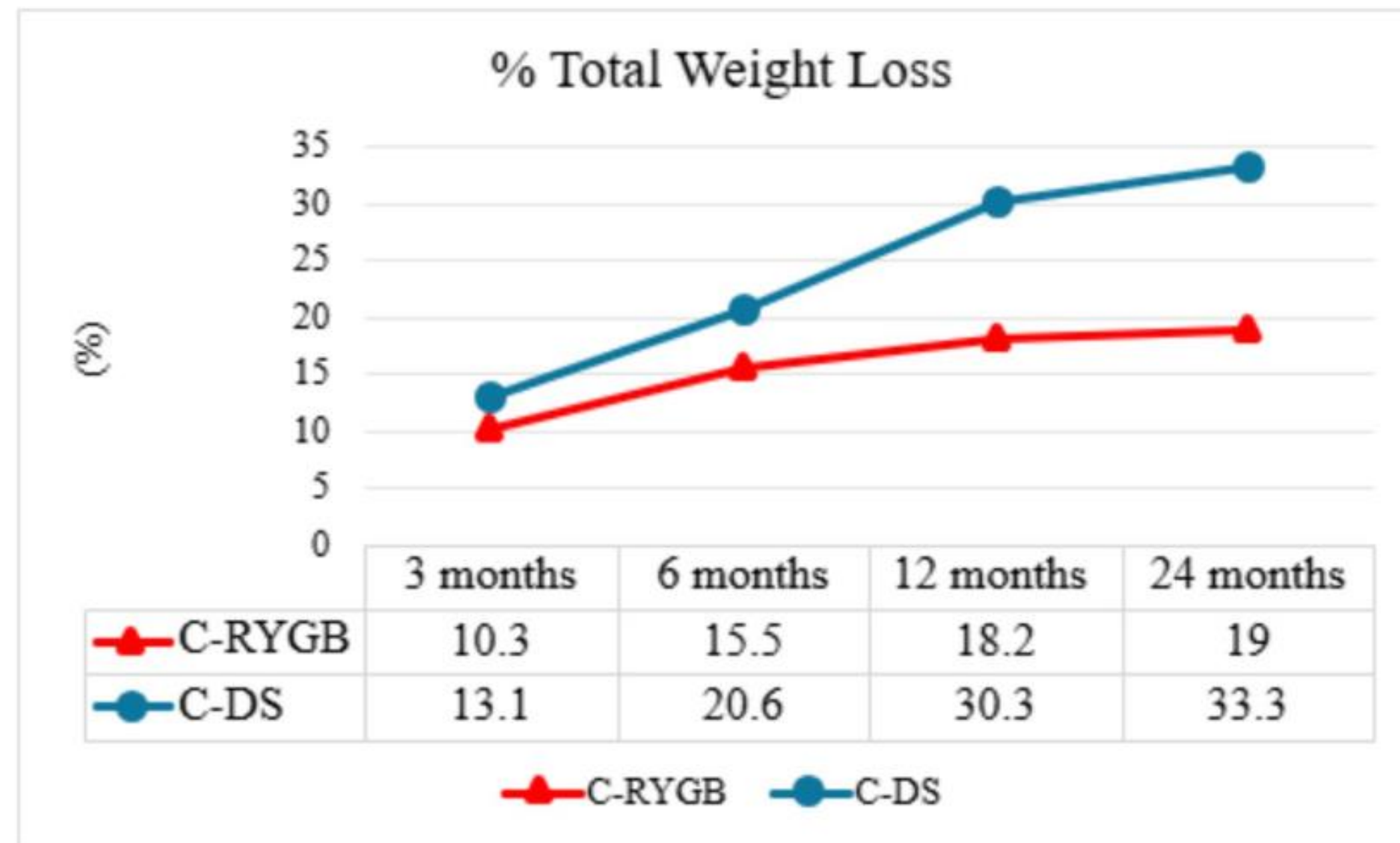


Table 4 Resolution of comorbidities

Resolution of Comorbidities	C-RYGB (<i>n</i> = 90)	C-DS (<i>n</i> = 10)
GERD (%)	60/76 (78.9)	6/7 (85.7)
Hypertension (%)	9/42 (21.4)	2/5 (40)
Diabetes Mellitus (%)	7/19 (36.8)	1/2 (50)
Hyperlipidemia (%)	12/33 (36.3)	3/3 (100)
Obstructive Sleep Apnea (%)	25/40 (62.5)	6/6 (100)

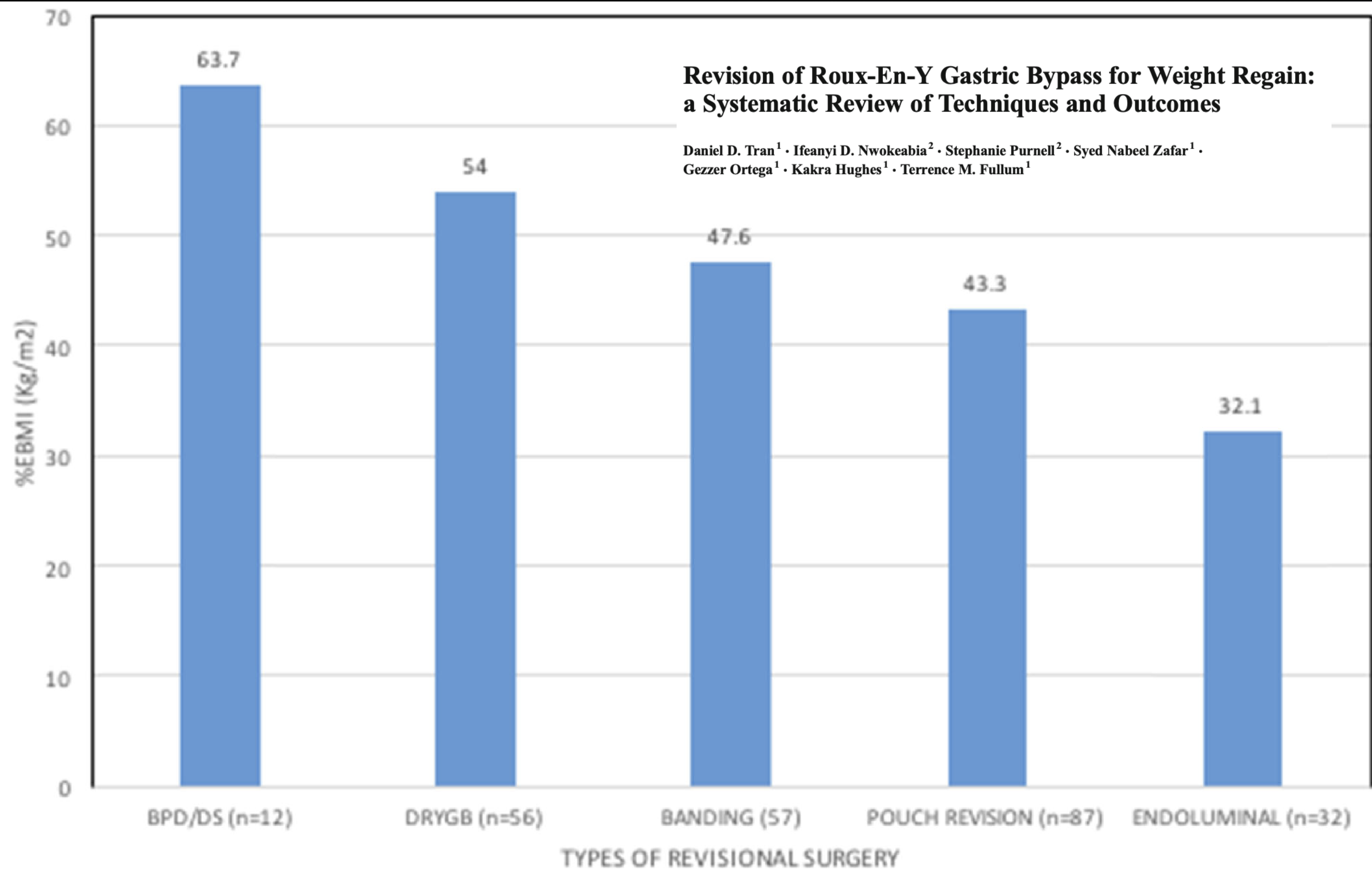
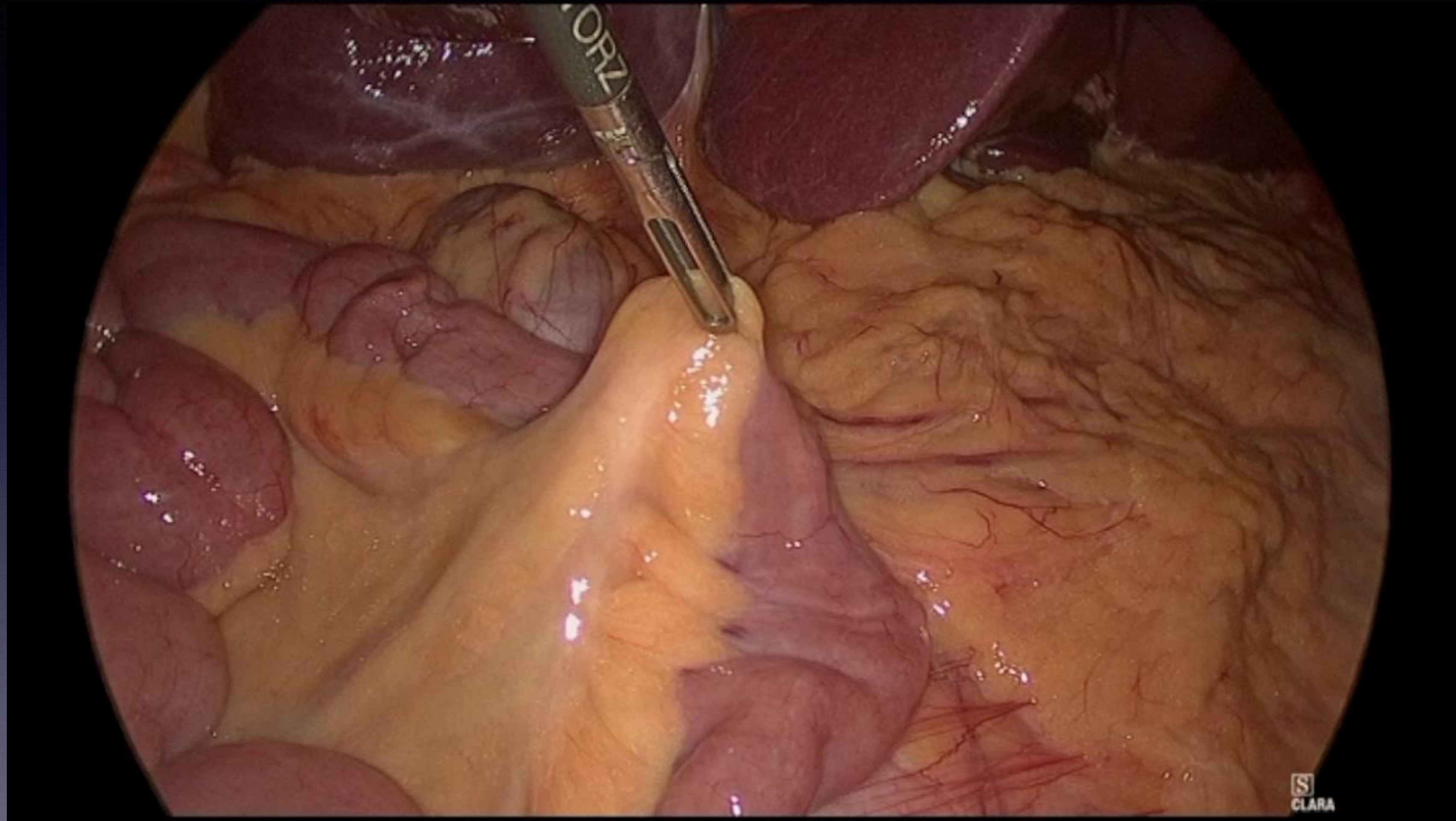
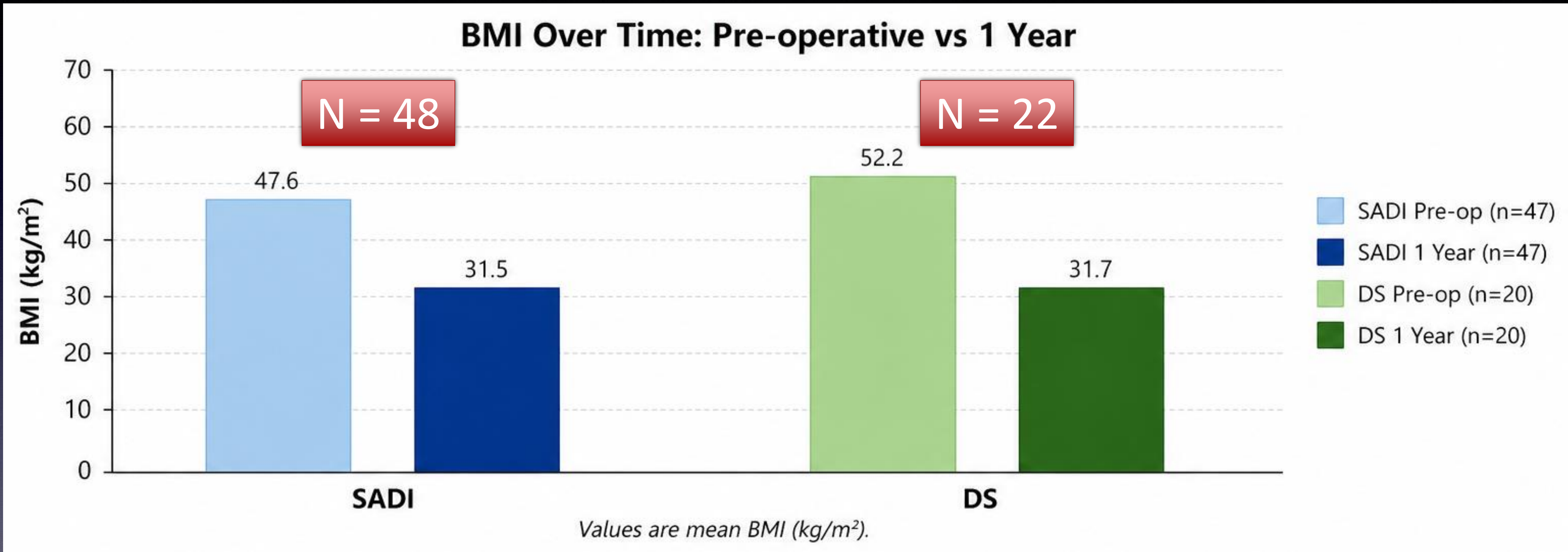


Fig. 1 Weighted means of the % EBMIL (Kg/m²) at ≤1 year

SADI Conversion



GBP → SADI vs DS @ 1 year

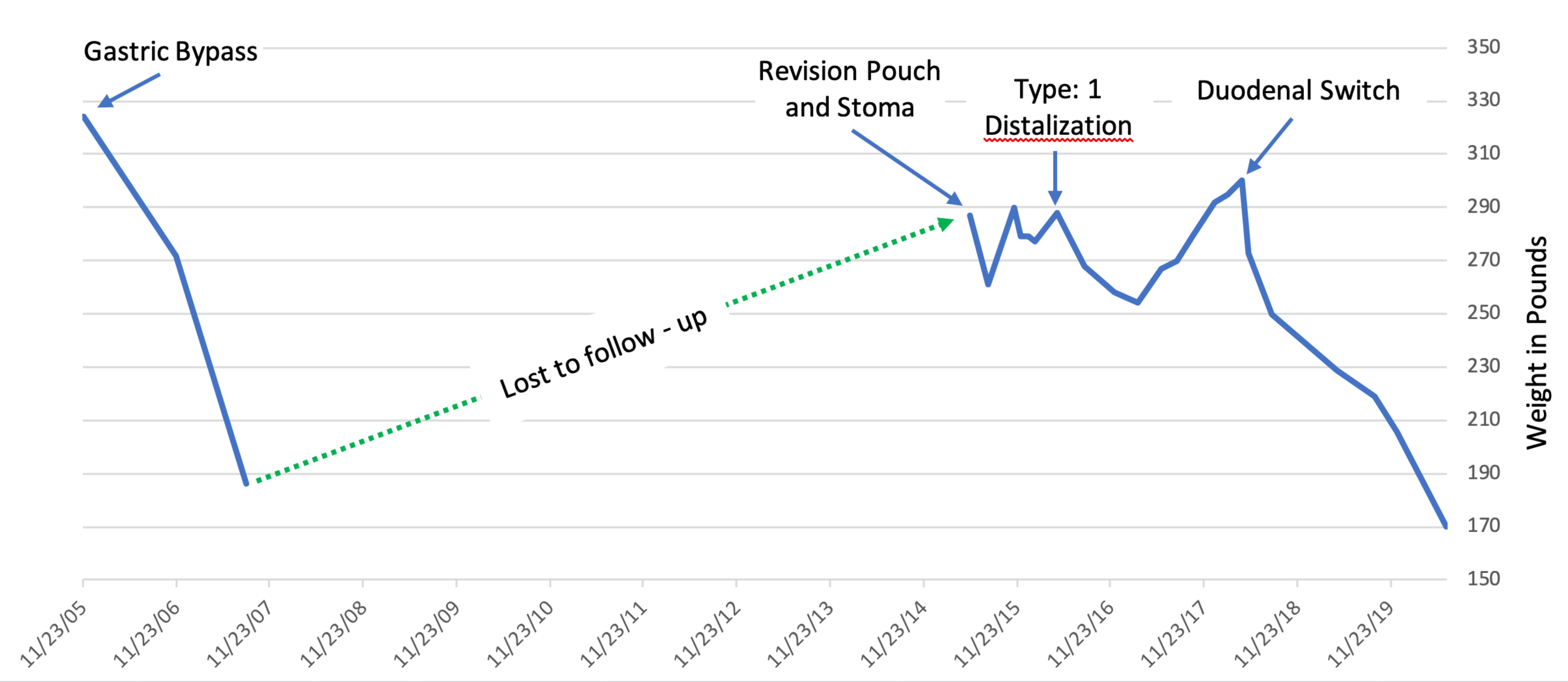


GBP → SADI vs DS @ 1 year

	SADI (48)	DS (22)
Readmission	7/48 (14.6%)	3/22 (13.6%)
Reoperation	5/48 (10.4%)	1/22 (4.5%)
Complications	8/48 (16.7%)	3/22 (13.6%)
△ BMI	-9.5	-9.9
% TWL	19.5%	21.1%
Mortality	0	0

Vitamin levels @ 1 year

	DS	SADI	
Vitamin A	21.75 ± 19.45 (n=4)	34.47 ± 12.92 (n=12)	0.2902
Vitamin D	23.34 ± 11.33 (n=9)	30.35 ± 13.50 (n=17)	0.1764
Vitamin K	40.10 ± 50.77 (n=2)	127.17 ± 25.69 (n=2)	0.2058
Hemoglobin	12.32 ± 2.04 (n=14)	12.68 ± 1.16 (n=24)	0.5522
Albumin	3.70 ± 0.52 (n=11)	3.82 ± 0.29 (n=14)	0.4997



Final Thoughts

- SADI/DS conversion from GBP best for weight loss
- Multi-stage to avoid complications
- Significant long-term nutritional issues
- Reliant on supplementation
- Under reported high incidence of additional surgery/reversal
- Best to start with SG for BMI > 50 kg/m²