Weight Gain: Here we go again! Patient Selection & Solutions

Duodenal Switch Revisions

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Bariatric surgery: trends in utilization, complications, conversions and revisions

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Abstract

Background Sleeve gastrectomy (SG) increased in popularity after 2010 but recent data suggest it has concerning rates of gastroesophageal reflux and need for conversions. This study aims to evaluate recent trends in the utilization of bariatric procedures, associated complications, and conversions using an administrative claims database in the United States.

Methods We included adults who had bariatric procedures from 2000 to 2020 with continuous enrollment for at least 6 months in the MarketScan Commercial Claims and Encounters database. Index bariatric procedures and subsequent revisions or conversions were identified using CPT codes. Baseline comorbidities and postoperative complications were identified with ICD-9-CM and ICD-10 codes. Cumulative incidences of complications were estimated at 30-days, 6-months, and 1-year and compared with stabilized inverse probability of treatment weighted Kaplan–Meier analysis.

Results We identified 349,411 bariatric procedures and 5521 conversions or revisions. The sampled SG volume appeared to begin declining in 2018 while Roux-en-Y gastric bypass (RYGB) remained steady. Compared to RYGB, SG was associated with lower 1-year incidence [aHR, (95% CIs)] for 30-days readmission [0.65, (0.64–0.68)], dehydration [0.75, (0.73–0.78)], nausea or vomiting [0.70, (0.69–0.72)], dysphagia [0.55, (0.53–0.57)], and gastrointestinal hemorrhage [0.43, (0.40–0.46)]. Compared to RYGB, SG was associated with higher 1-year incidence [aHR, (95% CIs)] of esophagogastroduodenoscopy [1.13, (1.11–1.15)], heartburn [1.38, (1.28–1.49)], gastritis [4.28, (4.14–4.44)], portal vein thrombosis [3.93, (2.82–5.48)], and hernias of all types [1.36, (1.34–1.39)]. There were more conversions from SG to RYGB than re-sleeving procedures. SG had a significantly lower 1-year incidence of other non-revisional surgical interventions when compared to RYGB.

Conclusions The overall volume of bariatric procedures within the claims database appeared to be declining over the last 10 years. The decreasing proportion of SG and the increasing proportion of RYGB suggest the specific complications of SG may be driving this trend. Clearly, RYGB should remain an important tool in the bariatric surgeon's armamentarium.

Table 4 Revision types and volume comparison for SG, RYGB, and AGB

Revision type		Number of revisions (% of total volume)
Primary SG		136,483 (100)
SG Revisions	SG Revisions	200 (0.15)
	SG to RYGB	819 (0.60)
	SG to BPD/DS	74 (0.05)
Primary RYGB		111,595 (100)
RYGB Revisions	RYGB Revisions	193 (0.17)
	RYGB to SG	39 (0.03)
	RYGB to BPD/DS	6 (0.01)
Primary AGB		63,646 (100)
AGB Revisions	AGB Revisions	399 (0.63)
	AGB to SG	2220 (3.49)
	AGB to RYGB	1092 (1.72)
	AGB to BPD/DS	19 (0.03)

Sleeve gastrectomy (SG), Roux-en-y gastric bypass (RYGB), Biliopancreatic diversion with duodenal switch (BPD/DS), Adjustable gastric banding (AGB)

Obesity Surgery, 8, 267–282

Biliopancreatic Diversion with a Duodenal Switch

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Background: This paper evaluates biliopancreatic diversion combined with the duodenal switch, forming a hybrid procedure which is a combination of restriction and malabsorption.

Methods: The evaluation is of the first 440 patients undergoing this procedure who had had no previous bariatric surgery. The mean starting weight was 183 kg, with 41% of our patients considered super morbidly obese (BMI > 50).

Results: There was an average maximum weight loss of 80% excess weight by 24 months post-

BPD without some of the associated problems. This operation is now used by us for all our bariatric patients, both in primary surgical procedures and reoperations.

The difficulty of establishing an operation that has both long- and short-term success is well known. Bariatric surgery is either restrictive or malabsorptive in nature, each with its own advantages, disadvantages and complications. While

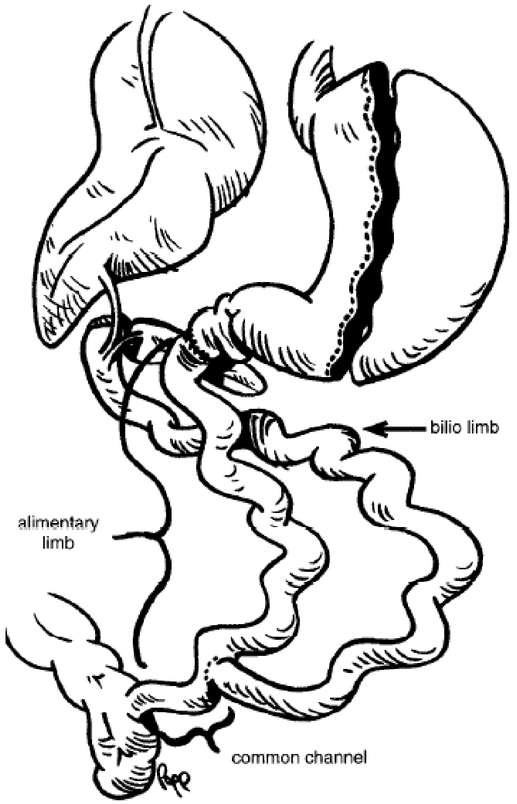

Figure 2. Biliopancreatic diversion with duodenal switch procedure.

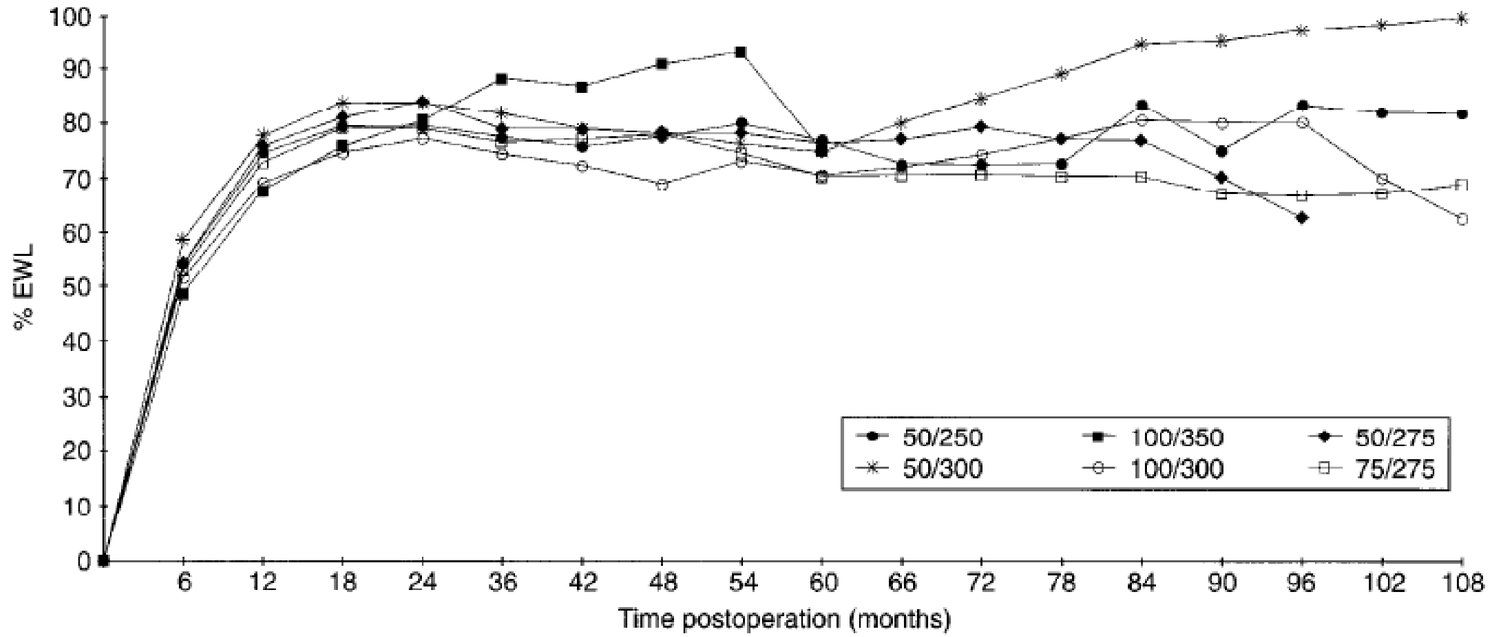

Figure 3. Percent excess weight loss with time.

10% CC, 40% Alimentary limb

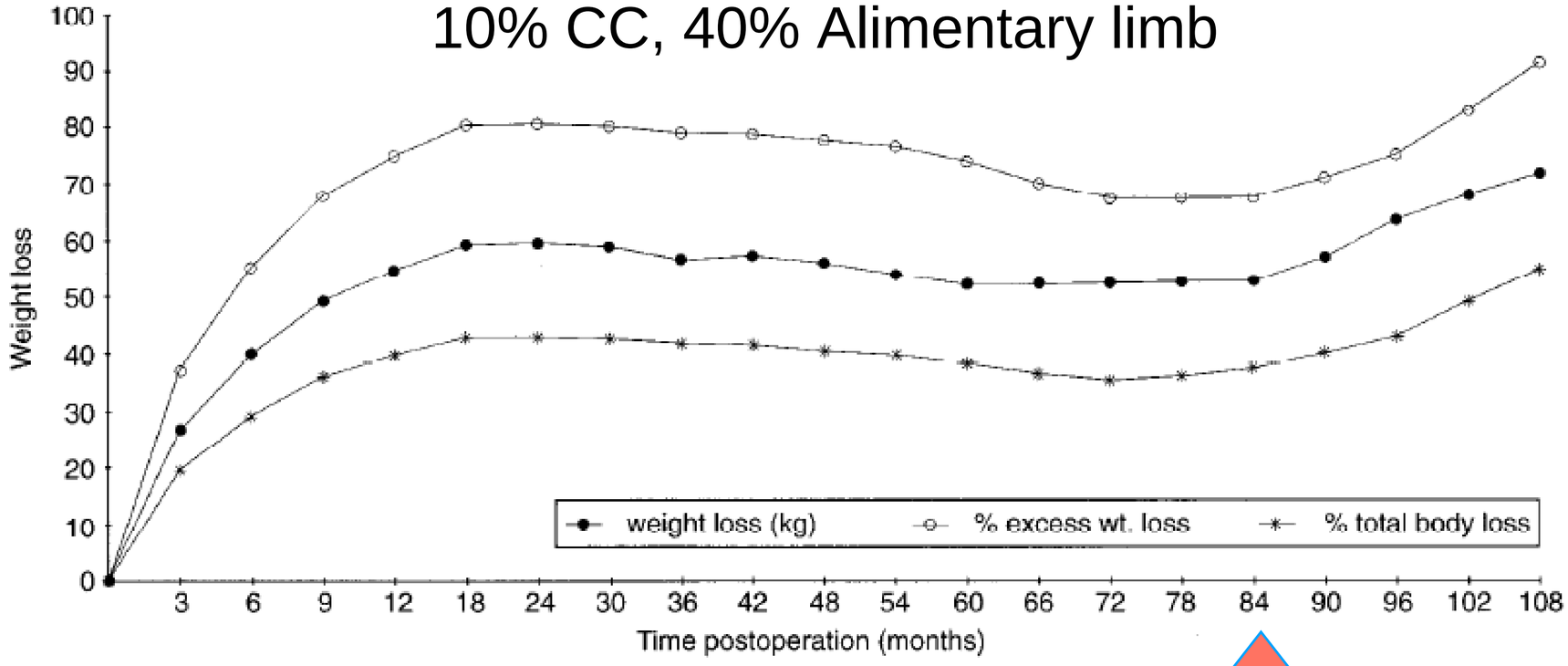

Figure 4. Weight loss in 400 primary bariatric surgery patients.

Table 12. Revisions

n	Reason	Procedure
8	Low protein and excess weight loss	Lengthen bowel
2	Excess diarrhea	Lengthen bowel
7	Poor weight loss	Shorten common channel

All revisions were performed along with hernia repairs, panniculectomy, or other surgery.

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Case Report

Laparoscopic Reoperative Sleeve Gastrectomy for Poor Weight Loss after Biliopancreatic Diversion with Duodenal Switch

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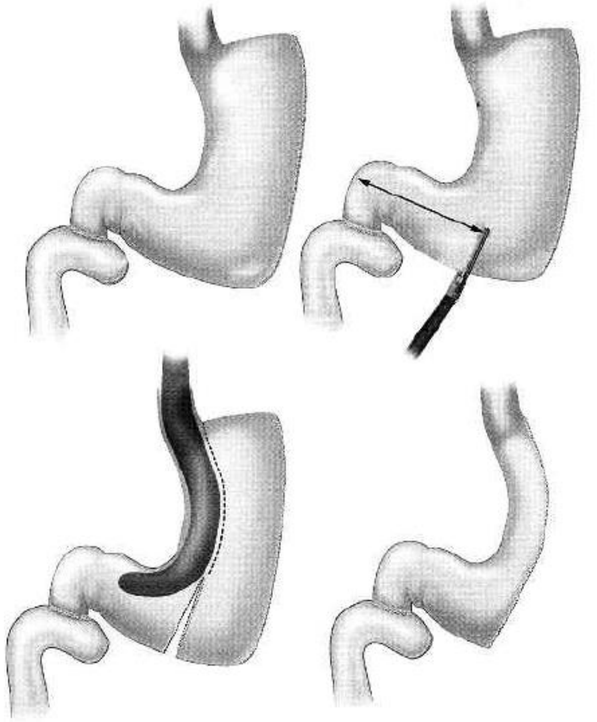

Figure 4. Reduction of the sleeve gastric pouch volume was done by successive firing of EndoGIA linear cutting staplers starting 8 cm proximal to the pylorus towards the gastroesophageal junction. The antrum, pylorus, first part of duodenum and lesser curvature of stomach are spared, allowing normal gastric emptying and eating behavior. A 60-F bougie was inserted in the gastric pouch for calibration of the newly created pouch.

Revision of the Duodenal Switch: Indications, Technique, and Outcomes

Nahid Hamoui, MD, Brandon Chock, MD, Gary J Anthone, MD, Peter F Crookes, MD

BACKGROUND: Duodenal switch (DS) operation combines both restrictive and malabsorptive components and has become an accepted operation in selected patients with morbid obesity. Complications develop in some patients, which are refractory to dietary supplementation. We report a series of 33 patients who required partial revision of the DS.

STUDY DESIGN: During the 10-year period after September 1992, 701 patients had DS operation performed; of these, 33 (5 men and 28 women) patients required revision. Revision was performed by side to side enteroenterostomy 100 cm proximal to the original anastamosis. Outcomes measures reviewed include postoperative complications, nutritional parameters, and weight change.

RESULTS: Revision was performed a median of 17 (range 7 to 63) months after DS. Indications for revision included protein malnutrition (n = 20), diarrhea (n = 9), metabolic abnormalities (n = 5), abdominal pain (n = 3), liver disease (n = 2), emesis (n = 2), and gastrointestinal bleed (n = 1). Median body mass index at the time of revision was 28. Median serum albumin was 3.6 g/dL and improved to 4.0 g/dL postoperatively (p = 0.01). Complications occurred in 5 of 32 patients (15%) and included wound infection (n = 2), respiratory failure (n = 1), gastrointestinal bleed (n = 1), and small bowel obstruction (n = 1). There was no perioperative mortality. During a median followup period after revision of 39 months, the median weight gain was 18 pounds. Three patients requested repeat operation because of weight regain.

CONCLUSIONS: Patients requiring revision of DS for malnutrition can be corrected by a technically simple procedure, but they are at considerable risk for complications. Although many patients are anxious about regaining their weight after reversal, they can be reassured that substantial weight gain is unlikely. (J Am Coll Surg 2007;204:603–608. © 2007 by the American College of Surgeons)

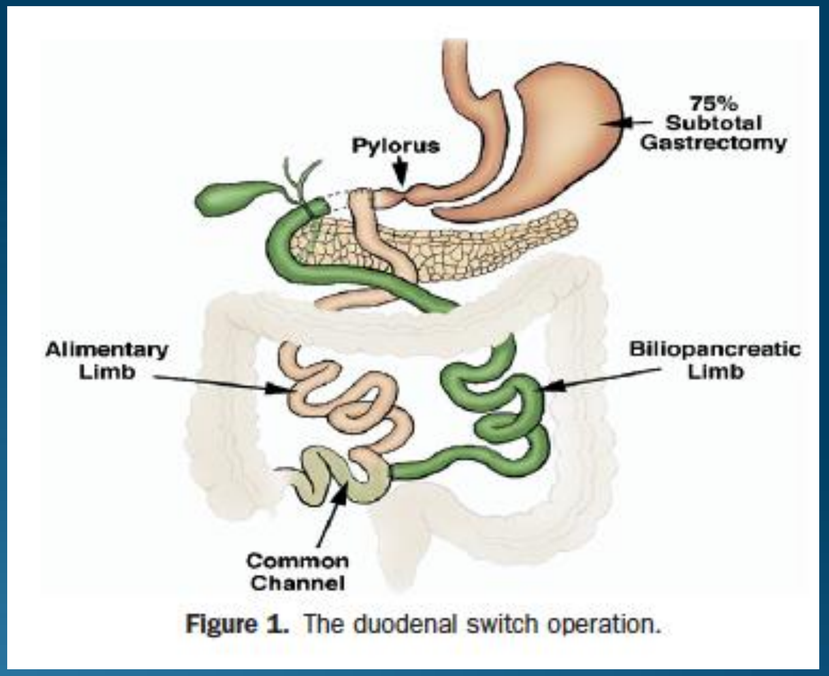

Figure 1. The duodenal switch operation.

33/701 patients over 10-year period

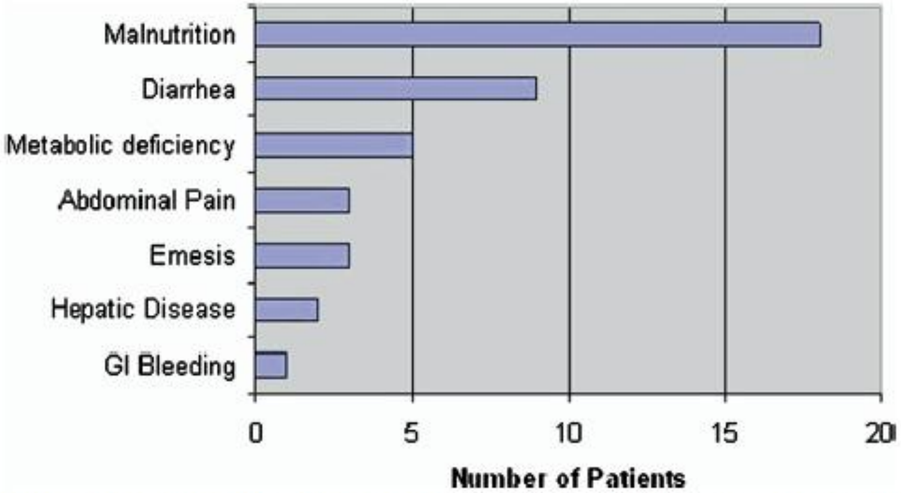

Figure 2. Indications for revision of the biliopancreatic diversion/duodenal switch. Several patients had more than one reason for revision.

Kissing anastomosis, entero-enterostomy

Biliopancreatic limb and Alimentary limb

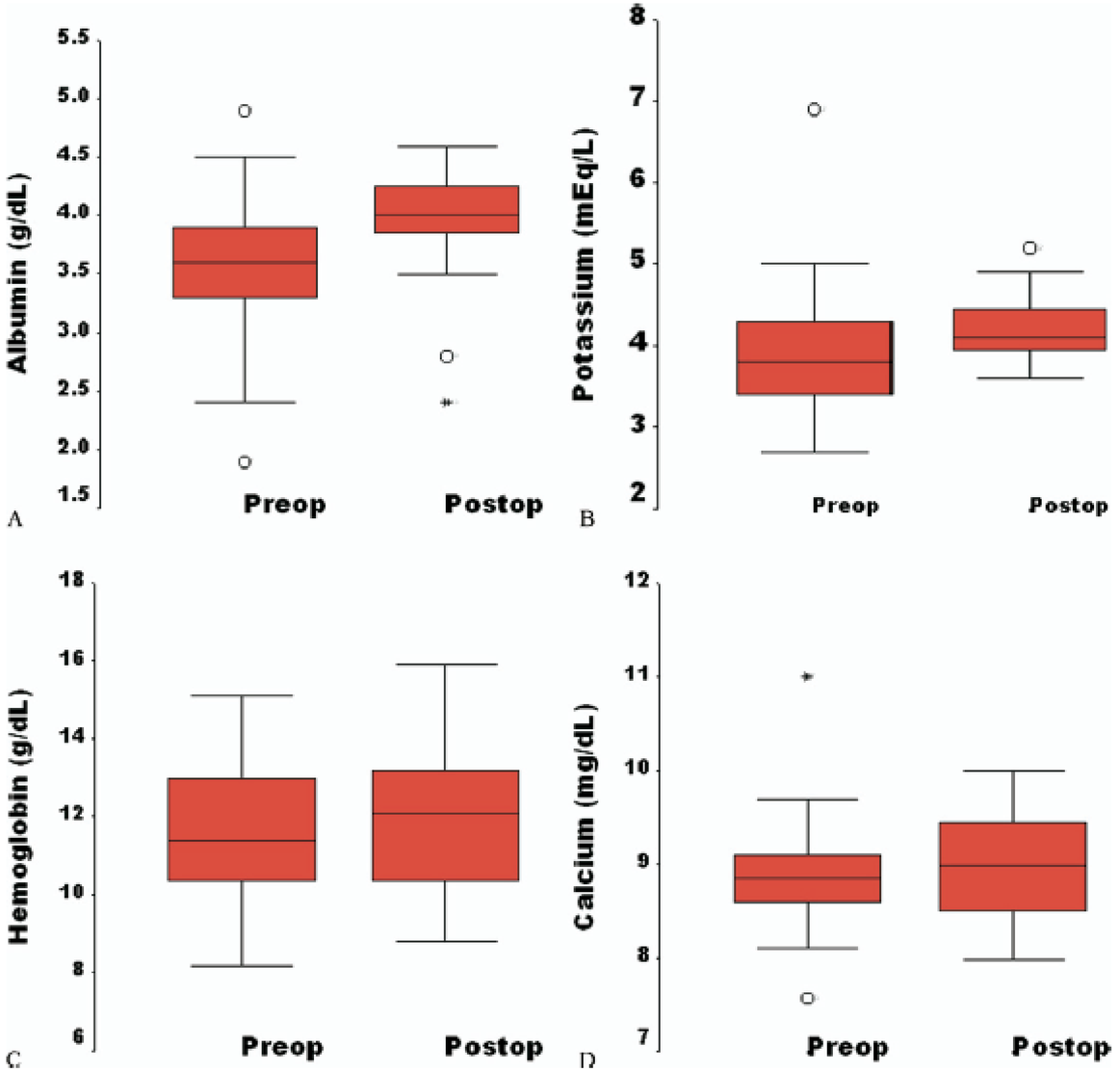

Figure 4. Median levels of (A) serum albumin, (B) potassium, (C) hemoglobin, and (D) calcium prior to revision of biliopancreatic diversion/duodenal switch and at time of latest followup. Shaded area represents interquartile range.

Review article

Revision and reversal after biliopancreatic diversion for excessive side effects or ineffective weight loss: a review of the current literature on indications and procedures

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Abstract

Background: Biliopancreatic diversion is a powerful bariatric procedure that relies on gastric restriction combined with a large malabsorptive component. This can lead to excessive side effects and/or weight loss. Despite this, long-term weight regain can also occur. Objectives: To determine the rate of and options for revision in patients who experience excessive side effects and weight loss. To explore the revisional procedures available to overcome weight regain.

Methods: A PubMed search was conducted of all reports published between 1979 and August 31, 2014. Series and case reports on revision or reversal after biliopancreatic diversion with duodenal switch (BPD/DS) or without (BPD) were included.

Results: Revision rates for excessive malabsorption ranges from .5%–4.9% and 3%–18.5% after BPD/DS and BPD respectively. Revisions increase common channel by up to 150 cm. Reversal is necessary in .2%–7% of cases, with an increased risk when the common channel is ≤50 cm. In most instances, reversal (of the malabsorptive component only) is indicated after the revision failure. A proximal, side-to-side anastomosis between the biliopancreatic and alimentary limbs is the preferred option. Most reoperations are performed within 2 years of the initial procedure and for protein malnutrition in about half of the cases. Revision for insufficient weight loss is reported in .5%–2.78% of cases. Except inadequate channel lengths, little is to be gained by common channel shortening. Additional gastric restriction, which results in an average 9–14 kg weight loss, is another option.

Conclusions: Biliopancreatic diversion can be relatively easily revised to control excessive side effects and protein malnutrition. Early diagnosis is essential and warrants a close nutritional monitoring. In case of weight regain, limited results can be obtained by reducing the gastric volume provided the lengths of the small bowel channels are adequate. (Surg Obes Relat Dis 2015;11:965–972.) © 2015 American Society for Metabolic and Bariatric Surgery. All rights reserved.

Keywords: Biliopancreatic diversion; revision; Reversal; Side effects; Malnutrition; Weight regain

Table 1
Incidence of revision and reversal after biliopancreatic diversion

	Surgery type	Nb patients	Initial BMI (kg/m^2)	AL/CC (cm)	Stomach size	Revision type	Incidence	Indication	Other
Baltasar [8]	BPD-DS	125	65% ≥50	250/75	40F bougie	"Conversion"	2.5%	Liver failure Protein malnutrition	2 deaths
Biertho [6]	BPD-DS	1000	51 ± 8	250/100	—	CC elongation by 100 cm	.5%	Protein malnutrition diarrhea	FU 2 yr 2 feeding jejunostomy
Clare [14]	BPD	504	—	250/50	200 mL	Reversal	7%	43% protein malnutrition	
Dolan [11]	BPD	73	44.8	250/50	—	CC elongation	5.5%	Excessive weight loss	Median FU 28 mo
	BPD-DS	61		250/50	—	CC elongation	4.9%		
Hamoui [10]	BPD-DS	701	47	250/100–75–50	—	CC elongation 100 cm	4.7%	60% protein malnutrition	At a median 17 mo
Hess [9]	BPD-DS	1000	50.9	250–325/50–100	40F	CC elongation Reversal	3% .6%	22/30 excessive weight loss malnutrition	FU 10 yr
Michielsen [12]	BPD	33	49.5	50% small bowel/50	—	—	3%	Bone disease	FU 6–36 mo
Marceau [2]	BPD-DS	1423	51.5 ± 9.9	250/100	65% sleeve	CC elongation Reversal	.7% .2%	Malnutrition/diarrhea	FU 7.3 yr
Scopinaro [13]	BPD	1639	47	250/50	200–500 mL	CC elongation 150 cm	4.7%	Excessive weight loss malnutrition	FU 19 yr
						Reversal	2.1%		
Marceau [7]	BPD	248	46.4 ± 8.7	250/50	—	CC elongation 50 cm	18.5%	Malnutrition diarrhea	FU 10 yr
						Reversal	2.7%		
	BPD-DS	438	49.5 ± 9.6	250/100	—	CC elongation	2%		
						Reversal	.5%		

FU = follow-up; CC = common channel; F = French units; BPD = biliopancreatic diversion (Scopinaro procedure); BPD-DS = biliopancreatic diversion with duodenal switch; BMI = body mass index.

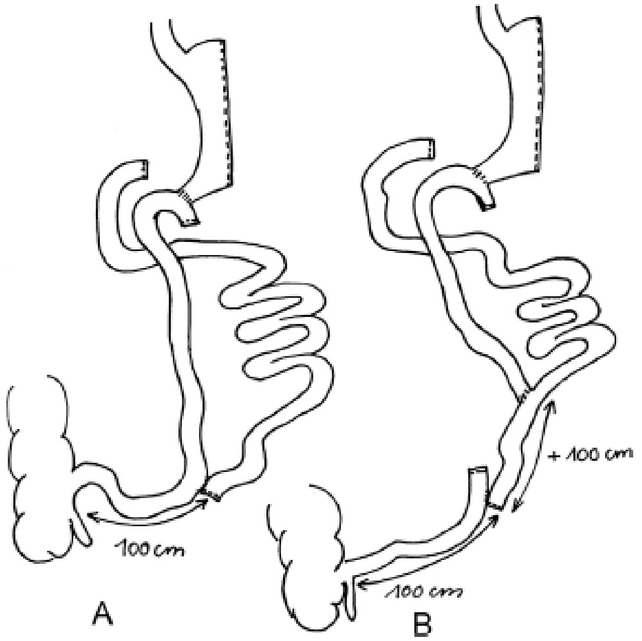

Fig. 1. Common channel elongation after biliopancreatic diversion with duodenal switch. (A) Initial procedure. (B) Revisional procedure.

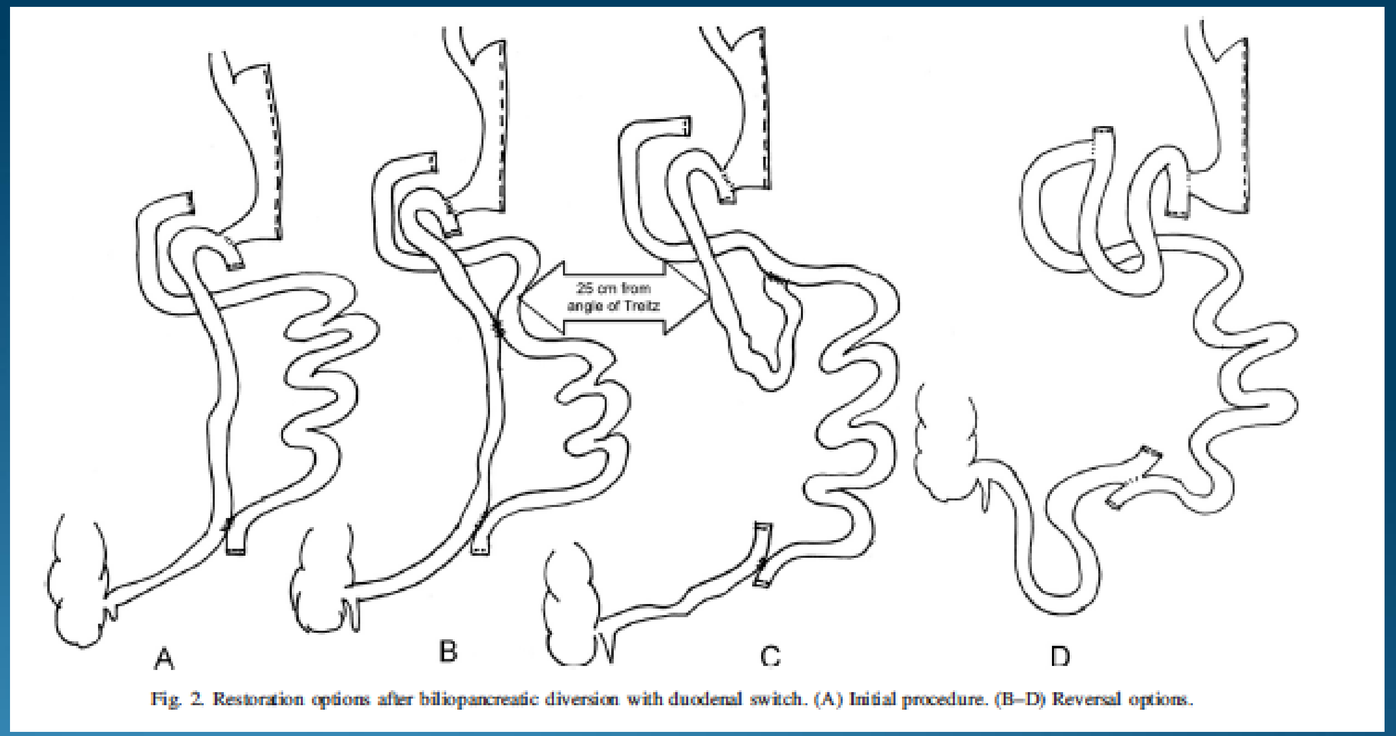

Fig. 2. Restoration options after biliopancreatic diversion with duodenal switch. (A) Initial procedure. (B–D) Reversal options.

Table 3
Incidence and outcomes of revisions for insufficient weight loss after biliopancreatic diversion

	Surgery	Number of patients	Initial BMI	AL/CC	Stomach size	Incidence	Type of revision	Outcomes
Dolan [11]	BPD	73	44.8	250/50	—	9.6%	CC shortening to 40 cm	—
	BPD-DS	61		250/50		13.1%		
Marceau [7]	BPD	248	46.4 ± 8.7	250/50	—	2.45%	—	—
	BPD-DS	438	49.5 ± 9.6	250/100	—	2.78%	—	—
Marceau [2]	BPD-DS	1423	51.5 ± 9.9	250/100	—	1.5%	—	14 kg
Slater [19]	BPD	79 failed LAGB	49 ± 8	250/50	200 mL	10.1%	CC shortening to 30 cm	No change
	BPD-DS				50F			
Slater [20]	BPD-DS	6	49	250/50	—	—	LAGB after CC shortening	−10 points BMI
Hess [9]	BPD-DS	1000	50.9	250–325/50–100	40F	.6%	CC shortening	<9 kg "effective"
						.5%	Resleeve	

BPD = biliopancreatic diversion (Scopinaro procedure); BPD-DS = biliopancreatic diversion with duodenal switch; LAGB = laparoscopic adjustable gastric banding; CC = common channel; F = French units; BMI = body mass index (kg/m^2).

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NEW CONCEPT

Conversion from Duodenal Switch to Single Anastomosis Duodenal Switch to Deal with Postoperative Malnutrition

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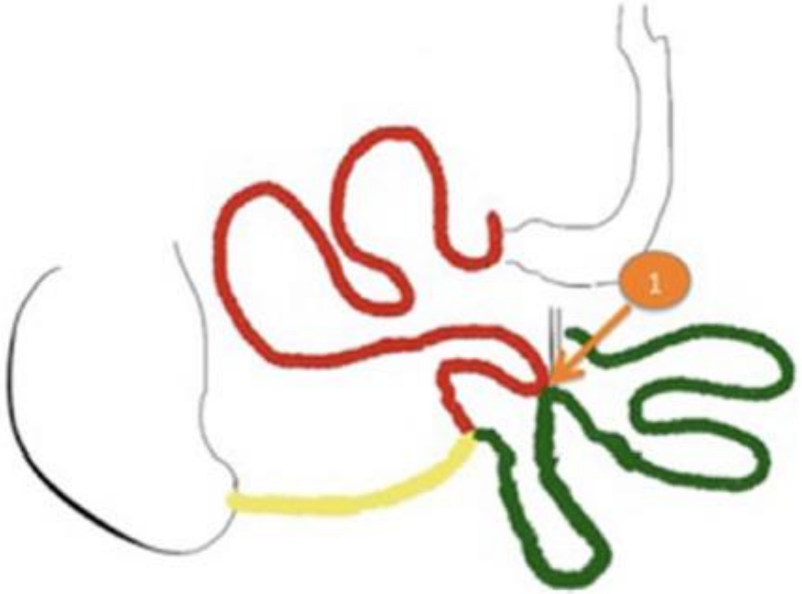

Fig. 3 The kissing X lateral anastomosis (1) between alimentary and biliary channels

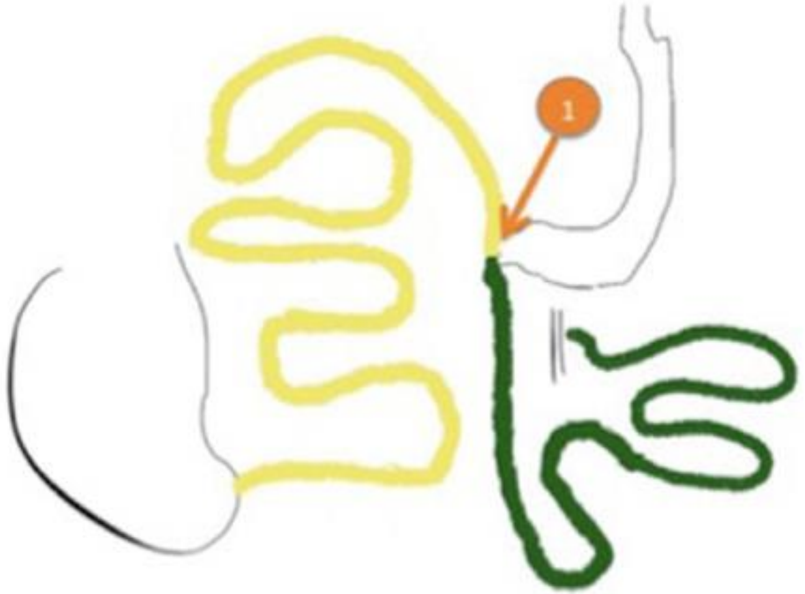

Fig. 5 The SADI-S operation; the same result is achieved after restoring ileal continuity (with an ileo-ileal anastomosis) (1) and with the division of the ileo-ileal anastomosis of the Roux-en-Y of a previous simplified DS

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ORIGINAL CONTRIBUTIONS

Management of Malnutrition and Hepatic Impairment After Duodenal Switch

Romulo P. Lind[1] · Marita Salame[2] · Michael Kendrick[2] · Muhammad Ghanem[1] · Muhammad A. Jawad[1] · Omar M. Ghanem[2] · Andre F. Teixeira[1]

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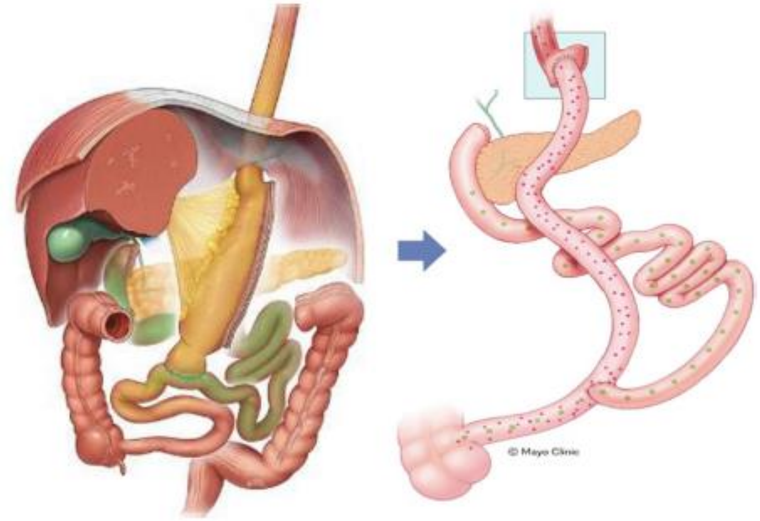
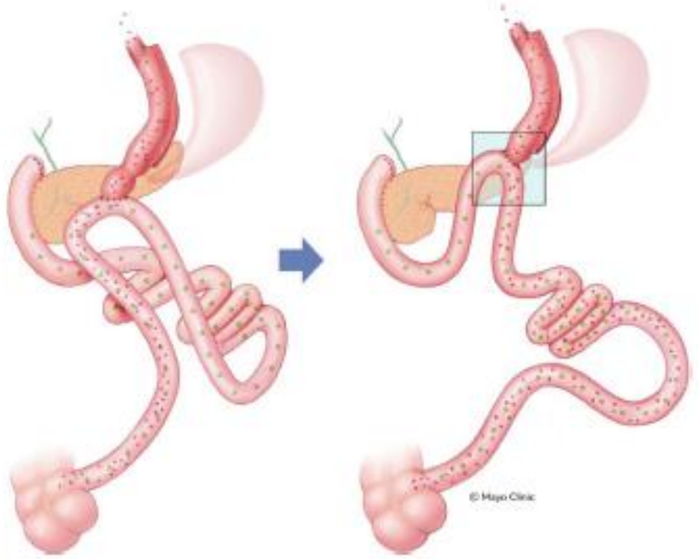


Fig. 3 SADI-S to Roux-en-Y gastric bypass conversion

Fig. 4 Lengthening of the common channel



- Elongations and intestinal reversals for malnutrition are the most frequent revisions
- Weight regain is possible, and most revision decreases the size of the stomach
- Decreasing the CC for weight regain is not a good option.