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Original article

Clinical outcomes of duodenal switch with a 200-cm common channel: a matched, controlled trial

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Abstract

Background: Biliopancreatic diversion with duodenal switch (BPD-DS) with a 100-cm common channel has been our treatment of choice for morbid obesity since the early 1990s. This procedure offers excellent long-term weight loss but can be associated with significant side effects.

Objectives: To assess the effect on clinical and nutritional parameters of increasing the common channel to 200 cm.

Settings: University-affiliated tertiary care center.

Methods: Patients who underwent a BPD-DS with a 200-cm common channel (study group, n = 36) were matched 1:1 for age, sex, body mass index (BMI), and main co-morbidities with patients who underwent a BPD-DS with a 100-cm common channel (control group). The strict alimentary limb was 150 cm in both groups.

Results: The mean age was 55 ± 9 versus 53 ± 7 years ($P = .3$), with 50% women and a BMI of 49 ± 8 kg/m^2 versus 50 ± 6 kg/m^2 ($P = .9$). Follow-up rate was 97%, with a minimum follow-up of 3 years. There were no significant differences in the remission rate of major co-morbidities between the 2 groups. At 3 years, the excess weight loss was 61 ± 22% versus 68 ± 18% ($P = .18$) and the total weight loss was 33 ± 11% versus 38 ± 9% ($P = .055$) in the study group versus control group, respectively. The study group had a lower incidence of severe protein deficiency (11% versus 19%, $P = .3$) and hyperparathyroidism (17.1% versus 35.3%, $P = .17$); required a lower amount of vitamins A and D ($P < .05$); and had a decreased number of daily bowel movements (2.0 versus 2.9, $P = .03$).

Conclusion: In this population, BPD-DS with a 200-cm common channel offered similar remission rate of co-morbidities compared with standard BPD-DS. It was associated with similar weight loss at nadir, followed by a more significant weight regain. It might yield a lower rate of nutritional complications. Long-term randomized data are needed to detect other potential advantages. (Surg Obes Relat Dis 2016;12:1014–1022.)

Keywords: Bariatric surgery; Biliopancreatic diversion; Duodenal switch; Metabolic surgery

Obesity has become a major public healthcare problem over the last 20 years, in part related to associated co-morbidities and decreased quality of life. In cases of severe obesity, bariatric surgery has been found to produce the best

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long-term weight loss and resolution of co-morbidities [1–5]. Among these surgeries, biliopancreatic diversion with duodenal switch (BPD-DS) is recognized as one of the most potent procedure offering the best long-term weight loss and improvement of co-morbidities [6]. However, these come with the necessity for lifelong vitamin and mineral supplementation to avoid deficiencies, as well as some side effects such as increased bowel movements. Fat malabsorption from the short common channel also results in decreased liposoluble vitamin absorption. Vitamin D deficiency affects calcium metabolism and, if left untreated, can create secondary hyperparathyroidism and loss of bone mass [7]. In our 10-year data for BPD-DS, 10% of patients developed protein denutrition after BPD-DS and 5% required readmission to correct this condition [6]. Most patients evolved favorably with nutritional counseling and supplementation, but .6% of patients required a surgical revision, usually a lengthening of the common channel [6]. Other deficiencies can develop but are usually treated with increased oral supplementations on an outpatient basis. Long-term follow-up and adjustment of iron, calcium, vitamin D, and vitamin A supplementations are, however, mandatory. This emphasizes the importance of proper selection and long-term follow-up after BPD-DS.

To reduce these nutritional deficiencies, we have been performing BPD-DS with a 200-cm common channel in selected cases (study group). The length choice was based on our experience with lengthening of the common channel for correcting protein denutrition.

The aim of this study is to assess the effects of a BPD-DS with a 200-cm common channel on nutritional parameters, weight loss, and remission of co-morbidities in patients with a minimum follow-up of 3 years.

Materials and methods

All patients who had a BPD-DS with a common channel of 200 cm, strict alimentary limb of 150 cm, and total alimentary limb of 350 cm (study group) between June 2008 and December 2011 were included in the study for a minimum follow-up of 3 years. All surgeries were performed in a single institution, a university-affiliated tertiary care center specialized in metabolic surgery. Data were extracted from a prospectively maintained electronic database and reviewed retrospectively.

A total of 36 patients were identified. Patients were matched 1:1 for age, sex, body mass index (BMI), and major co-morbidities (type 2 diabetes [T2D], hypertension, dyslipidemia, and sleep apnea) with a group of patients who had a standard BPD-DS with a 100-cm common channel, strict alimentary limb of 150 cm, and total alimentary limb of 250 cm (control group). Primary endpoint of the study was to assess long-term weight loss and remission rate of major co-morbidities (type 2 diabetes, hypertension, sleep apnea, and dyslipidemia). Secondary endpoints were to evaluate the changes in blood parameters, the daily doses of vitamin and mineral supplements, number of daily bowel movements, and incidence of protein denutrition. Ethics review board approval was obtained for this study and patients were contacted to undergo a clinical follow-up and additional bloodwork.

Patient selection

Patient selection followed the standard National Institutes of Health recommendations [8]. All patients were assessed by a bariatric surgeon, dietician, nurse specialized in bariatric surgery, and social worker. They all had an electrocardiogram, lung radiograph, bloodwork, sleep apnea testing, and consultation with a pneumologist to rule out sleep apnea. Vitamin or mineral supplements were prescribed when deficiencies were discovered before surgery. Consultation with a psychiatrist was requested when patient had a history of psychiatric disease. Standard preoperative education specific to BPD-DS was given to all patients. A BPD-DS with a 200-cm common channel was usually offered based on preoperative conditions, such as age older than 60 years or increased risk of postoperative malnutrition (see Results).

Surgical technique

All patients followed our routine preoperative preparation, including a liquid diet for 2 days before surgery, thromboprophylaxis (subcutaneous standard or low-molecular-weight heparin), and antibioprophylaxis (cephazolin 2 g IV at the time of induction). Our surgical technique for standard BPD-DS has been reported before [9]. A 34F bougie is used to localize the lesser curve of the stomach, and a sleeve gastrectomy is done slightly lateral to that bougie to create a sleeve with an estimated volume of 250 mL. Care is taken to avoid making the sleeve too tight along that bougie. A cholecystectomy is done routinely. Study patients had a 200-cm common channel and a regular alimentary limb of 150 cm (study group), whereas patients in the control group had a standard 100-cm common channel with a 150-cm strict alimentary limb (control group). Standard postoperative orders have been used in both groups including ulcer prevention, thromboprophylaxis, and feeding protocol. Patients were discharged when tolerating a soft diet, with similar vitamin and mineral daily supplementations: vitamin A 20,000 U, vitamin D 50,000 U, calcium carbonate 1000 mg, multivitamin Centrum Forte™, and ferrous sulfate 300 mg.

Follow-up

Patients were followed at the clinic at 3, 6, 9, 12, 18, and 24 months postoperatively and yearly thereafter. Blood analyses were performed at each visit, including a complete blood cell count, electrolytes, urea and creatinine, calcium,

parathyroid hormone (PTH), vitamin D, vitamin A, serum iron, total iron binding capacity, ferritin, phosphate, calcium, magnesium, glycated hemoglobin, international normalized ratio, fasting blood glucose, and lipid profile. Supplementations were adjusted over time according to these results.

Definition of co-morbidities remission

A complete remission of diabetes was defined by normal levels of glycated hemoglobin (<6%) and fasting blood glucose (<6.0 mmol/L) in the absence of antidiabetic medications. Hypertension was considered in remission when blood pressure was in a normal range (≤120/80 mm Hg) off antihypertensive medication. Remission of dyslipidemia was defined as a normal lipid profile without medication (total cholesterol/high-density lipoprotein [HDL] ratio <4.44). Sleep apnea was considered subjectively in remission for patients off pressure airway support without sleep apnea symptoms [10].

Statistical methods

The ideal weight was calculated for a BMI of 22.5 kg/m^2. The excess weight loss (EWL) was calculated according to this formula: (initial weight – current weight) / (initial weight – ideal weight (based on a BMI of 22.5 kg/m^2). BMI was calculated by dividing the patient's weight in kilograms by the square of the height in meters. The data are reported as the mean with standard deviation for continuous data or as percentages for categorical variables. Statistical analyses were performed using a Student's t test for continuous variables, and the χ^2 test for categorical variables, except when a low number of observations required Fisher's exact test. $P < .05$ was considered statistically significant.

Results

The 2 groups were similar in terms of age, sex, initial BMI, and major co-morbidity rate (Table 1). The mean age of this specific population was 12 years older than our regular bariatric patients, combined to a higher percentage of co-morbidities. The mean follow-up was 50.8 ± 11.9 (36–77) months in the study group and 57.1 ± 11.5 (36–80) months in the control group. In the study group, 1 patient refused to participate to the study and 1 could not be reached. All other patients were available for follow-up, for a follow-up rate of 97% (70/72 patients). A 200-cm common channel BPD-DS was selected in these patients for the following reasons: older age in 15 patients, long-standing diabetes in 13, cardiac insufficiency in 2, rheumatoid arthritis in 2, osteoporosis in 3, atrial fibrillation in 1, neurologic or genetic syndrome in 3, liver cirrhosis in 3, psychiatric condition in 1, patient's concerns about malabsorptive risks in 3, and surgeon's concerns about medical compliance in 4. One patient in the study group required a surgical reversal of his duodenal switch for the management of an internal hernia with small bowel necrosis. The patient was kept in the study group in an "intention to treat" design.

Table 1
Demographic data

Parameters	Study group	Control group	*P*
Number of patients	36	36	
Age (yr)	54.8 ± 8.6	52.7 ± 6.8	.3
Sex ratio (male/female)	12/24 (50%)	12/24 (50%)	1
BMI (kg/m^2)	49.3 ± 7.6	50.1 ± 5.7	.6
Weight (kilograms)	133.2 ± 23.5	130.5 ± 21.5	.6
Co-morbidities (n, %)			
Type 2 diabetes	26 (72)	25 (69)	.8
Hypertension	30 (83)	30 (83)	1
Dyslipidemia	21 (58)	22 (61)	.8
Sleep apnea	23 (64)	24 (67)	.4

BMI = body mass index.

Data are reported as a mean ± standard deviation or as the number (percentage). Study group: Biliopancreatic diversion with a 200-cm common channel; control group: biliopancreatic diversion with a 100-cm common channel.

Weight loss and co-morbidities

Excess weight loss is reported in Fig. 1. At the last follow-up visit, the average EWL was 60.7 ± 22% in the study group and 67.9 ± 18% in the control group ($P = .2$). The total weight loss was 33 ± 11% versus 38 ± 9% ($P = .03$) in the study versus control group. BMI at that time was 34.1 ± 7.4 kg/m^2 versus 31.8 ± 6.1 kg/m^2 ($P = .2$). Success rate, defined as an EWL >50%, was achieved in 35 (96%) and 34 (94%) patients in study versus control groups at their nadir weight. Weight regain occurred between years 2 and 3 in both groups but was more significant in the study group (10.8 ± 7.1 kg versus 7.4 ± 6.2 kg weight regain [$P = .03$]). At the last follow-up visit, the success rate was 75% (n = 27) versus 86% (n = 31) in study versus control groups ($P = .2$).

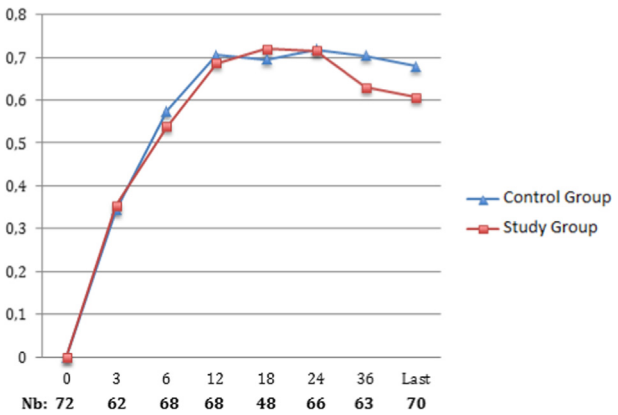

Fig. 1. Mean excess weight loss (%) over time (mo). Control group: biliopancreatic diversion with a 100-cm common channel. Study group: biliopancreatic diversion with a 200-cm common channel.

Table 2
Changes in major co-morbidities after surgery

Parameters	Effect	Study group	Control group	*P*
Type 2 diabetes	Remission	18 (69.2%)	18 (72.0%)	.8
	Improved	7 (19%)	7 (19%)	
	Unchanged	1 (3%)	0	
	Undetermined	0	0	
Hypertension	Remission	13 (43.3%)	12 (40.0%)	.8
	Improved	10 (28%)	13 (36%)	
	Unchanged	5 (14%)	2 (6%)	
	Undetermined	2 (6%)	3 (8%)	
Dyslipidemia	Remission	16 (76.2%)	18 (81.8%)	.7
	Improved	0	0	
	Unchanged	5 (14%)	4 (11%)	
	Undetermined	0	0	
Sleep apnea	Remission	16 (69.6%)	17 (70.8%)	.9
	Improved	5 (14%)	4 (11%)	
	Unchanged	2 (6%)	2 (6%)	
	Undetermined	0	1 (3%)	

Data are reported as the number (percentage).
Study group: biliopancreatic diversion with a 200-cm common channel; control group: biliopancreatic diversion with a 100-cm common channel.

The effect of surgery on co-morbidities is reported in Table 2. Overall, there was no significant difference in the remission rate of associated morbidities between the 2 groups. In addition, the remission rate for type 2 diabetes, according to the severity of the disease, was not statistically different between the 2 groups. A complete remission was obtained in 7 of 13 (53%) patients on insulin in both groups and 9 and 10 of 10 (90% and 100%) patients on oral medications in the study versus control groups.

The mean number of daily vitamin supplementation required at the last follow-up visit is detailed in Table 3. The mean dose of vitamin A was significantly lower in the study group (16,000 ± 9000 U versus 24,000 ± 13,500 U, $P = .004$). The mean dose of vitamin D was also significantly lower in the study group (39,800 ± 34,000 U versus 65,500 ± 46,300 U, $P = .009$).

Changes in biochemical parameters

Postoperative changes in the mean level of glycated hemoglobin (HbA_{1c}), total cholesterol/HDL ratio, and albumin are reported in Figs. 2, 3, and 4. Table 4 compares

Table 3
Mean number of tablets required at the last follow-up visit

Vitamin	Study group	Control group	*P*
Multivitamins	1.0 ± .3	1.0 ± .2	1
Sulfate iron	1.0 ± .8	1.2 ± .6	.2
Calcium carbonate	2.9 ± 1.4	3.0 ± 2.0	.7
Vitamin D	.7 ± .7	1.3 ± .9	.01
Vitamin A	1.6 ± 1.0	2.4 ± 1.4	.02

Data are reported as a mean ± standard deviation. Study group: biliopancreatic diversion with a 200-cm common channel; control group: biliopancreatic diversion with a 100-cm common channel.

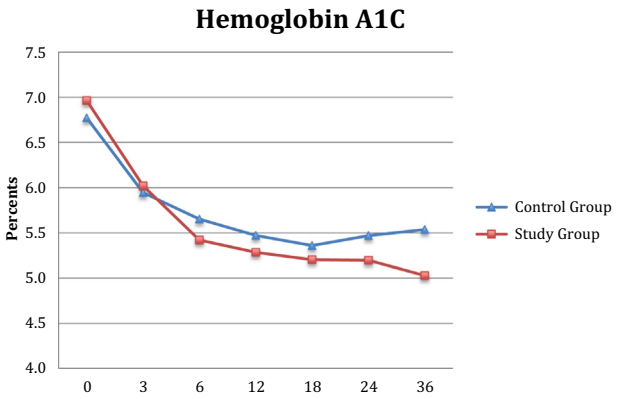

Fig. 2. Changes in the mean glycated hemoglobin level (%) over time (mo). Control group: biliopancreatic diversion with a 100-cm common channel. Study group: biliopancreatic diversion with a 200-cm common channel.

the mean level in some nutritional parameters before surgery, after 3 years, and at the last follow-up visit (mean follow up of 51 and 57 mo in study and control groups). There was no significant difference between the 2 groups except for a lower cholesterol/HDL ratio in the control group. In addition, there was a trend ($P = .06$) for lower mean HbA_{1c} and albumin levels in the control group. There was no significant difference in the mean PTH level between the 2 groups. However, the incidence of hyperparathyroidism (PTH >90 ng/L) was 17.1% (n = 6) in the study group and 35.3% (n = 12) in the control group ($P = .17$). The mean glycated hemoglobin at the time of last follow-up was 5.6% in study group versus 5.1% in the control group ($P = .06$). There was, however, no significant difference in T2D remission between the 2 groups (69% versus 72%, $P = .8$).

Vitamin D level was improved over preoperative values in both group and was within normal limits in all patients. The mean number of daily bowel movements was significantly reduced in the study group (2.0 ± .9 versus 2.9 ± 1.8, $P = .03$).

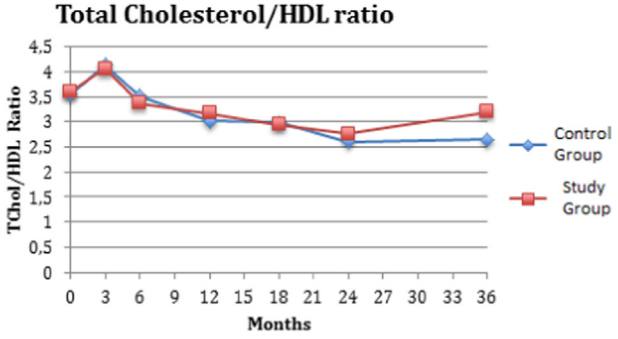

Fig. 3. Changes in the mean total cholesterol/HDL ratio over time. Control group: biliopancreatic diversion with a 100-cm common channel. Study group: biliopancreatic diversion with a 200-cm common channel. HDL = high-density lipoprotein; TChol = total cholesterol.

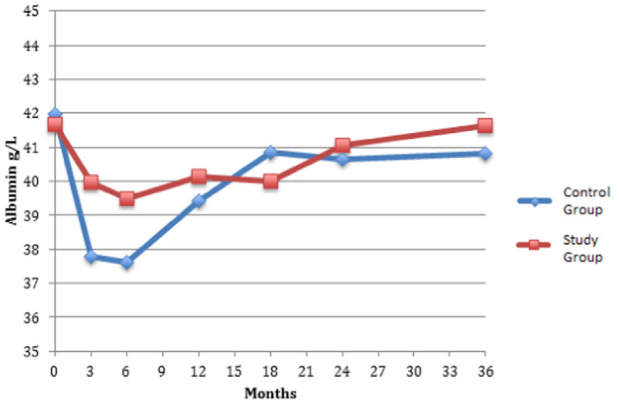

Fig. 4. Changes in the mean albumin level over time. Control group: biliopancreatic diversion with a 100-cm common channel. Study group: biliopancreatic diversion with a 200-cm common channel.

Protein deficiency

There was no significant difference in the incidence of protein deficiency between the 2 groups (defined as an albumin level <35 g/L). In the study group, 10 patients (28%) presented 13 episodes of hypoalbuminemia. Nine episodes were moderate (albumin level between 30 and 35 g/L) and 4 were severe (albumin level <30 g/L). In the control group, 11 patients (31%) presented a total of 14 episodes of hypoalbuminemia (moderate in 7 and severe in 7). The incidence of severe protein deficiency was not significantly different between the 2 groups (11% versus 19%, $P = .5$). The mean duration of severe protein denutrition episodes was 4.55 versus 7.26 months in the study versus control group, respectively ($P = .12$). Fig. 3 details the evolution of the mean albumin level over time. There was no significant change in the mean level of albumin after 200-cm common channel BPD-DS. In the control group, there was a significant drop in the mean albumin level at 3 and 6 months after surgery ($P < .01$ and $P = .05$; Fig. 3). Most episodes of protein denutrition occurred during the first 12 months. Beyond 1 year, 1 patient in study group and 3 in the control group presented an episode of protein denutrition. At the last follow-up visit, all patients had normal albumin level (>35 g/L). There was, however, a trend for a lower mean albumin level in the control group (41.1 ± 3.3 g/L versus 39.7 ± 3.2 g/L, $P = .06$).

Discussion

This study reports medium-term results of BPD-DS with a 200-cm common channel. This is our initial report with this technique. Initially, patients selected for a longer common channel were older with significant long-lasting co-morbidities. The rationale of increasing the common channel in this population was to try decreasing the incidence of protein denutrition in a higher risk population while maintaining good control of co-morbidities. Over time, we started offering this technique to patients who were candidates for a BPD-DS but were concerned about side effects associated with BPD-DS (nutritional deficiencies, gastrointestinal side effects). This technique was offered as a possible way to reduce some of the side effects after

Table 4
Long-term nutritional results

	Study group	Control group	*P*
Albumin			
Initial	41.66	41.99	.61
At 36 mo	41.62	40.80	.42
Last FU	41.14	39.71	.061
<35 at last FU	0	0	1
Calcium			
Initial	2.35	2.33	.41
At 36 mo	2.28	2.24	.20
Last FU	2.29	2.24	.06
<2.05 at last FU	1	0	.21
Vitamin D			
Initial	74.70	57.12	.01
At 36 mo	122.18	97.94	.08
Last FU	111.06	94.45	.11
<.55	1	7	.02
Parathormone			
Initial	37.93	34.41	.39
At 36 mo	71.41	74.59	.99
Last FU	72.31	92.31	.12
>80 at last FU	12	14	.62
Vitamin A			
Initial	2.13	2.14	.94
At 36 mo	2.22	2.06	.53
Last FU	2.17	2.03	.39
<1.0	0	0	1
Serum Iron			
Initial	12.44	13.36	.42
At 36 mo	15.68	14.42	.41
Last FU	16.29	14.18	.13
<10	3	6	0.28
Ferritin			
Initial	152.54	135.70	.54
At 36 mo	195.19	193.91	.78
Last FU	200.63	202.33	.94
<40	4	2	.39
Hemoglobin			
Initial	131.39	135.13	.22
At 36 mo	131.82	131.51	1.00
Last FU	132.19	131.11	.62
<110	2	1	.55
Glycated hemoglobin			
Initial	6.8	7.0	.56
At 36 mo	5.5	5.0	.09
Last FU	5.6	5.1	.06
>.06	7	5	.52
Total cholesterol / HDL			
Initial	3.60	3.55	.4
At 36 mo	3.20	2.65	.03
Last FU	3.20	2.89	.01

FU = follow-up; HDL = high-density lipoprotein.

Data are reported as the mean, comparing the preoperative results to the data at 36 mo, and at the time of last follow-up (Last FU). Study group: biliopancreatic diversion with a 200-cm common channel; control group: biliopancreatic diversion with a 100-cm common channel.

BPD-DS while maintaining good weight loss and remission of co-morbidities.

Variation in the length of the common channel has been described in the past. Hess et al. [11,12] have been using an adjusted length for every patient that corresponds to a total alimentary limb of 40% of the small bowel length and a common channel of 10% of the whole small bowel which represents, on average, a common channel of 50 to 100 cm and a strict alimentary limb of 175 to 250 cm.

McConnell et al. [13] compared different lengths of common channel (150 cm versus 80–90 cm) in BPD patients. They reported a lower percentage of excess weight loss in the group who received a longer common channel (44% versus 55% EWL). However, the follow-up period was longer in the long-limb group (49 versus 23 mo), which could potentially explain that difference. In another study, Hamoui et al. [14] evaluated long-term results of BPD-DS with 250 cm/75 cm alimentary/common channels (and 300 cm/100 cm later in their study) in relation to the patient's total small bowel length. They concluded that a biliopancreatic limb $>45\%$ of the total small bowel length improved weight loss only for patients with a BMI >60 kg/m^2. On the other hand, patients with an initial BMI <60 kg/m^2 did not experience a better weight loss and had more metabolic anomalies with these intestinal measures [14].

In this study, both groups were comparable in terms of demographic characteristics and obesity-related diseases. Nevertheless, this population is older by a mean 12 years, had a higher ratio of men, and a greater number of co-morbidities compared with our standard bariatric population. Long-limb BPD-DS was associated with a decreased number of bowel movements, which could improve the overall quality of life. However, we did not specifically study gastrointestinal side effects in this population. Long-limb BPD-DS was also associated with a significant decrease in vitamin A and D supplementation, which is likely related to an improved fat and fat-soluble vitamin absorption. In our series of BPDS-DS at 10 years of follow-up [7], we found an abnormal parathormone level in 40% of patients. In this study, we found a diminution in secondary hyperparathyroidism in the study group (17.1% versus 35.3% $P = .17$). This could potentially help maintain a normal bone density in the long term. In 2014, Currò et al. [13] drew a similar conclusion on the effect of the common channel length. In their hands, vitamin A and D deficiencies occurred more frequently with a 50-cm common channel versus 80-cm (67% versus 30%; $P = .047$).

After 3 years, the study group had a similar resolution rate of co-morbidities (type 2 diabetes, hypertension, dyslipidemia, and sleep apnea) and percentage of excess weight loss (61% versus 68%, $P = .18$). The EWL we reported here is lower than what we have reported after a standard BPD-DS (77% at 5 yr [7]). This could be related to the specific demographic data of this population. Also, the risk of protein denutrition might be lower, especially during the first postoperative year, and easier to manage, as shown by a shorter duration of the episodes of protein denutrition in the study group. However, these differences did not reach statistical significance. It is, however, commonly accepted that a longer common channel improves protein and fat absorption by increasing the contact length between nutrients and pancreatic lipases and proteases. In addition, the relationship between gastric resection and protein denutrition is often underestimated in BPD-DS. The gastric reservoir must be large enough to allow sufficient food and protein intake. If the SG is fashioned too tight (i.e., close to a 34F bougie), the combination of decreased protein intake and protein malabsorption will almost certainly yield to protein malnutrition.

The limitations of this study must be recognized. The retrospective design of this study, the initial selection bias of patients in the study group, and the lack of randomization and long-term follow-up limit the conclusions of the study. Indeed, the procedure was offered in a selected population of older patients with a higher perceived risk of protein denutrition. Even though we tried to match the control group for as many co-morbidities as possible, it was not possible to obtain a perfect matching for these 2 populations. To limit that bias, we used a noninferiority design to look at the outcomes of the study population. This study brings evidence that a BPD-DS with 200-cm common channel is not inferior in many regards compared with our standard 100-cm common channel BPD-DS. The beneficial effects (quality of life, improved fat-absorbable vitamins and proteins) would be better perceived with a longer follow-up period in a randomized controlled trial.

Conclusion

This study suggests that at 3-year follow-up and for selected patients, BPD-DS with a 200-cm common channel offered similar remission rate of co-morbidities (T2D, hypertension, dyslipidemia and sleep apnea) compared with standard BPD-DS. It was associated with similar weight loss at nadir, followed by a more significant weight regain. It might yield a lower rate of nutritional complications. Vitamin A and D absorption was improved, which could result in a decreased risk of side effects and secondary hyperparathyroidism. Other beneficial consequences on protein absorption and quality of life might be found in a larger, randomized study. Follow-up at 5 and 10 years, however, is required to confirm the long-term benefits of this procedure.

Disclosures

The authors have no financial conflict to disclose.

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Editorial comment

Comment on: Clinical outcomes of duodenal switch with a 200-cm common channel: a matched-controlled trial

Reading this article made me recall the first time I attended an American Society for Metabolic and Bariatric Surgery (ASMBS) meeting 20 years ago. In actuality, it was an ASBS meeting as the M for metabolic had not yet been added. The meeting took place in Quebec City and was hosted by several of the authors of this paper. Young surgeons would be shocked, but there were few vendors, and the exhibit area was the size of a typical bedroom. Despite the growth, increasing acceptance, meaningful research, and development of game changing technology, debate about the ideal bariatric procedure remains, with arguments similar to 20 years ago. At that time, hot topics included the comparison between the vertical banded gastroplasty (VBG) and the Roux-en-Y gastric bypass (RYGB). Others at the meeting stated that both had shortcomings. Mal Fobi advocated that only a restrictive band along with a bypass could provide long-term control. Marceau et al. suggested that only a lengthy intestinal bypass combined with gastric resection would provide lasting weight loss and spoke about the advantages of the duodenal switch (DS) compared with the Scopinaro or biliopancreatic diversion (BPD).

Today, the names may have changed, but similar questions and debate remain. Instead of VBG, the current gastric-only procedure is the vertical sleeve gastrectomy (VSG). Yet we hear similar rumblings. Although VSG eliminates the restrictive band, there are increasing reports of gastroesophageal reflux. Although with resection, as opposed to partition, staple-line breakdown is not encountered, dilation of the gastric pouch is possible. In many individuals there seems to be a weight loss limit, with maximal weight loss at 7 to 9 months postprocedure. Weight regain is also a concern. As a result, there is increasing concern as to whether VSG, today's most common stapling procedure, will be adequate surgical therapy for many patients. The conversation continues with, "If VSG is not ideal, then what?" Similar to 20 years ago, advocates of the VSG suggest weight loss similar to RYGB without bypass of the proximal intestine, thus reducing the likelihood of poor absorption of divalent cations and fat-soluble vitamins. Antagonists suggest an increased chance of weight regain and reflux. Others suggest that both are flawed. RYGB utilizes the intestine and places patients at risk for marginal ulcer, stricture, and small bowel obstruction with little increased weight loss. VSG might not be adequate therapy for many and with time there may be increasing numbers of revisions.

Along these lines, several groups have advocated for more aggressive procedures, such as the DS. The DS combines a sleeve gastrectomy with a lengthy intestinal