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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;▮:00–00.)

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,