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Original article

Does preoperative diabetes mellitus affect weight loss outcome after biliopancreatic diversion with duodenal switch?

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Abstract

Background: Preoperative type 2 diabetes mellitus (T2 DM) has previously been reported as an independent predictor for suboptimal (≤40%) weight loss after Roux-en-Y gastric bypass in patients with T2 DM compared with patients who do not have T2 DM. This association has not been shown to apply to patients who undergo biliopancreatic diversion with duodenal switch (BPD/DS). BPD/DS is currently the most effective bariatric operation to treat T2 DM.

Objectives: We designed a study to determine if the reported suboptimal weight loss seen in patients with T2 DM undergoing Roux-en-Y gastric bypass is also seen in those undergoing BDP/DS.

Setting: Independent, university-affiliated teaching hospital.

Materials and Methods: Retrospective chart review of a prospectively maintained database was performed on data on 152 patients who underwent robotically assisted laparoscopic BPD/DS from 2008 to 2012. Patients were divided into 2 groups: those with a preoperative diagnosis of T2 DM (Group 1, n = 51) versus those without a preoperative diagnosis of T2 DM (Group 2, n = 101). Perioperative complications and postoperative weight loss between the 2 groups were compared.

Results: At 1 month postoperatively, Group 1 had a higher percentage of excess weight loss (%EWL) of 20.9% compared with Group 2 of 17.9% ($P < .05$). At 3, 6, 9, 12, and 18 months postoperatively, both groups had statistically comparable %EWL ($P > .05$). Thirty-day perioperative complications were higher in Group 1 compared with those in Group 2 (7.8% and 3.9%, respectively). Reoperation rates were similar in both groups (1.9%). No mortality was recorded in this series.

Conclusion: Patients with diabetes had a similar weight loss outcome after BPD/DS compared with those who did not have diabetes. (Surg Obes Relat Dis 2015;▮:00–00.)

Keywords: Bariatric surgery; Biliopancreatic diversion; Duodenal switch; Diabetes mellitus; Weight loss outcomes

Bariatric surgery has been proven to be significantly more effective than purely conventional medical therapy at initial weight loss and long-term weight maintenance. Multiple procedures have been performed to achieve these goals, which include Roux-en-Y gastric bypass (RYGB) and biliopancreatic diversion (BPD) with and without duodenal switch (BPD/DS). BPD was first described by Scopinaro in 1979: He performed a distal gastrectomy with a 250-mL pouch and a distal small bowel bypass with a 200-cm alimentary limb and 50-cm common channel [1]. In 1993, Marceau, from Québec, Canada, modified the operation by performing a vertical sleeve gastrectomy (VSG) and duodenal switch and increasing the length of the common channel to 100 cm [2]. BPD/DS is currently the

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most effective and durable bariatric operation for weight loss [3,4].

In recent years, numerous factors have been postulated to be associated with suboptimal weight loss after bariatric surgery. In multiple RYGB studies, preoperative diabetes mellitus (DM) has been shown to negatively affect weight loss outcome [5–9]. Several possible explanations have been provided in the literature. It is unclear if a similar phenomenon is also seen in patients who undergo BPD/DS. We designed a study to evaluate if suboptimal weight loss was seen in patients with type 2 DM (T2 DM) undergoing BPD-DS.

Materials and methods

A prospectively maintained database of all patients who underwent consecutive robotically assisted or laparoscopic BPD/DS (n = 152) at our institution between 2008 and 2012 was reviewed. Our bariatric surgeon (senior author) performed 234 operations during the study period, with approximately 65% of them being BPD/DS procedures. The remainder of the patients underwent laparoscopic RYGB and VSG; we did not routinely offer laparoscopic adjustable gastric banding in our bariatric center during the study period. All the 152 study patients who underwent BPD/DS were operated on by a single, fellowship-trained bariatric surgeon. All patients met the National Institute of Health (NIH) consensus guidelines (body mass index [BMI] over 40 kg/m^2 or 35–40 kg/m^2 with obesity related co-morbidities) [10].

DM was defined as blood glucose (HgA1c) levels >7. Patients who were on antidiabetic medications, such as oral agents or as subcutaneous insulin injections, were classified in the DM group. In our bariatric center, selection criteria for BPD/DS include BMI ≥ 50 kg/m^2 (super-obese category); severe DM defined as HgA1c >10 despite maximum medical therapy using insulin and oral antidiabetic agents; absence of prior major abdominal operations that may potentially cause technical limitations in performing or completing BPD/DS; and, ultimately, the patient's preference. Patients who met these criteria were given a strong recommendation to undergo BPD/DS, whereas those who did not meet the criteria were given alternative options of undergoing RYGB or VSG. Patients with severe diabetes (HgA1c above 10) were recommended to undergo BPD/DS despite their lower BMI (35–50 kg/m^2). All patients underwent preoperative counseling with the bariatric surgeon and extensive education with a bariatric dietician. They were also evaluated and cleared by a psychiatrist and other medical services, when indicated. A quiz was conducted to ensure that all patients fully understood the operation and the commitments required postoperatively. Appropriate informed consent was obtained from all patients.

In this study, patients were divided preoperatively into 2 groups based on presence or absence of T2 DM. Group 1 had a diagnosis of T2 DM preoperatively (n = 51), and Group 2 did not (n = 101). Approximately 50% of patients in the DM group required subcutaneous insulin injection (at least 10 units of regular insulin daily) in addition to oral antidiabetic medication (metformin 500–1000 mg once or twice daily) for management of T2 DM. The average length of time between the T2 DM diagnosis and the BPD/DS was 5 years. Perioperative complications and postoperative weight loss between the 2 groups were compared. All patients were seen in our bariatric office for postoperative follow-up at 1 week, 1 month, 3 months, 6 months, and 1 year thereafter.

Operative technique

All BPD/DS procedures were performed laparoscopically with the assistance of a DaVinci robotic system. A single dose of prophylactic antibiotic, subcutaneous heparin, and sequential compressive stockings/device were administered preoperatively. After gaining access into the peritoneal cavity, the left lobe of the liver was retracted superiorly using a 5-mm Flex (Cardinal Health, Dublin, OH) retractor. The greater omentum was dissected off the greater curvature of the stomach all the way to the left crus of the diaphragm. A VSG was performed over a 42-French bougie using multiple firings of Echelon Flex power endopath linear staplers (Ethicon, Albuquerque, NM). The gastric staple line was imbricated with a running suture by using an Endostitch (Covidien, Dublin, Ireland). The junction between the first and second portions of the duodenum was mobilized, and a retroduodenal window was created. The Echelon stapler was used to transect the duodenum. An appendectomy was routinely performed as a part of standard BPD/DS operation, to avoid potential future appendicitis. Starting from the ileocecal valve, 100 cm of ileum was measured in a retrograde manner and marked to be the common channel. Another 150 cm of small intestine was measured to be the alimentary limb and divided. The ileum was then approximated to the proximal duodenal stump to create an end-to-side duodenoileal anastomosis. A posterior layer suture of the duodenoileal anastomosis was placed laparoscopically, and the robotic system was used to complete a 2-layer hand-sewn duodenoileal anastomosis. A nasogastric tube was used to guide the creation of the anastomosis. A leak test using methylene blue was performed. The resected stomach was removed through a supraumbilical port. The fascia was closed, and the ports were removed. Most patients were discharged by postoperative day 3 after tolerating a noncaloric liquid diet.

Results

In this study, 152 obese patients who underwent laparoscopic/robotic assisted BPD/DS between 2008 and 2012