

Outcomes and Complications after Biliopancreatic Diversion Based on Age

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Abstract

Objectives: Although many risk factors affecting outcomes have been identified, the effect of age on weight loss and perioperative complications was not adequately investigated. Advanced age has been reported to be independently associated with increased complications and inferior weight loss outcome. This study was designed to compare the perioperative complications, and weight loss result after biliopancreatic diversion based on age.

Methods: Data of all patients who underwent robotically-assisted laparoscopic biliopancreatic diversion between 2008 and 2011 were reviewed. The patients were divided into the following three age groups for comparison: age 20-35 years (group A), age 36-50 years (group B), and age 51-72 years (group C).

Results: A total of 107 patients were included, with no significant differences in gender, and preoperative BMI among the groups. The oldest group (C) had a statistically significant higher number of preoperative comorbidities, compared with those in groups A and B. No statistically significant differences were found in the mean operative-time or length of stay. There were no intraoperative or 30-day major complications. Percentage of excess weight loss at 1,3,6,9,12, and 18 months postoperatively are comparable among groups. No mortality occurred in this series.

Conclusions: Despite a higher number of preoperative comorbidities, older patients perform as well as their younger counterparts with respect to perioperative complications and weight loss outcome.

Keywords: Age; Weight loss; Perioperative complications; Biliopancreatic diversion

Introduction

Although several risk factors affecting the outcomes of bariatric procedures have been identified, the effect of age on weight loss and perioperative complications has not been adequately investigated. Increasing age and preoperative BMI are known to be independently associated with an increased risk of complications [1,2]. Consequently, many surgeons are hesitant to offer bariatric surgery to older patients with significantly higher BMI because of considerably greater medical comorbidities and mixed reports regarding efficacy of bariatric surgery in the elderly. In 2004, Sugerma et al. [3] reported an inferior weight-control efficacy in elderly population compared with their younger counterparts after bariatric surgery [3]. In contrast, several studies in gastric bypass and gastric banding have found bariatric surgery to be equally safe and effective in the elderly [1,4-7].

The United Nations project that, by 2050, the number of people over 60 will reach 21%, compared with 10% in 2000 [8]. To anticipate this change, bariatric surgery needs to be equipped to deal with an aging and obese population. We designed a study to compare the perioperative complications and weight loss outcome following biliopancreatic diversion with duodenal switch in a high-BMI morbidly obese population stratified by age.

Materials and Methods

A prospectively maintained database of 107 patients who underwent robotically-assisted laparoscopic biliopancreatic diversion with duodenal switch (R-LBPD/DS) between December 2008 and July 2011 was reviewed. Data collected included the following: age; gender; preoperative; postoperative weight at 1-,3-,6-,9-,12-,18-month intervals; operative time; conversion rate; perioperative complications; length of stay (LOS); and 30-day readmission rate. Variables were compared based on the patient age [ages 20-35 years, n=26 (group A), ages 36-50 years, n=45 (group B), and ages 51-72 years, n=36 (group C)]. Statistical analysis was conducted using the T-test and analysis of variance (anova) with p-value <0.05 is considered statistically significant.

Surgical technique

The patient is positioned supine with the left arm tucked to the body. All pressure points are carefully padded and protected to avoid soft tissue and nerve injuries. Pneumoperitoneum is established using a Verees needle (*Auto-Suture*, Norwalk, CT). A 5-mm port (Ethicon Endosurgery, Cincinnati, OH) is used to enter the abdominal cavity in the left upper quadrant. Five additional ports are carefully inserted. A Flex liver retractor (Snowden-Pencer/Cardinal Health, Dublin, OH) is placed through a 5-mm right flank port under direct visualization. Dissection along the greater curvature is started 6 cm from the pylorus to the Angle of His using a Harmonic™ ultrasonic dissector (Ethicon Endosurgery, Cincinnati, OH). A green load 60-mm Echelon linear stapler (Ethicon Endosurgery, Cincinnati, OH) is applied from the dissection point toward the incisure angularis, followed by sequential applications of blue load 60-mm staplers superiorly alongside the lesser curvature. A 42-French bougie is used to guide the vertical sleeve gastrectomy. The staple line is routinely imbricated using an Endo Stitch™ device (*Covidien*, Norwalk, CT) and 2-0 Surgitek® sutures (Medical Engineering Corporation, Racine, WI). Duodenal dissection is started approximately 3 cm distal to the pylorus. A Penrose drain is placed to elevate the duodenum anteriorly following adequate retroduodenal plane dissection. Duodenal transection is performed using a blue load Echelon 60™ linear stapler.

A mark is made 100-cm proximal to the terminal ileum (Common Channel), and a subsequent 150-cm of small bowel (alimentary limb)

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is measured from this point proximally. Appendectomy is routinely performed. The alimentary limb is then brought up towards the duodenal stump in an antecolic fashion. Endo Stitch™ is used to place the posterior layer of the duodeno-ileal (DI) anastomosis. Biliopancreatic limb is then divided from the alimentary limb, and then an ileo-ileal (II) anastomosis is created. Mesenteric defect is closed using Endo Stitch™ and 2-0 Surgitek® suture.

Following the passage of a 16-French nasogastric tube through an opening in the duodenal stump, the Da Vinci robotic system is brought into the field. Two robotic needle holders are inserted via existing ports. A 3-0 Vicryl on an SH needle is used to complete a two layered robotically-assisted duodeno-ileal anastomosis. Sixty ml of methylene blue is injected via the nasogastric tube after occlusion of alimentary limb using a laparoscopic bowel clamp. The stomach remnant is removed through the supraumbilical port.

Results

A total of 107 consecutive patients (female: male =83:24) were included in this study, without significant differences in gender distribution (p=0.39), preoperative weight (p=0.52), and BMI (Group A- 50.5 kg/m², group B- 49.6 kg/m², group C- 50.3 kg/m², p=0.84) (Table 1). A significantly higher number of preoperative comorbidities such as diabetes mellitus, hypertension, hyperlipidemia, obstructive sleep apnea, osteoarthritis, gastroesophageal reflux, venous insufficiency, depression, and urinary incontinence (n=7.3) was found in the oldest group, compared with groups A (n=5.4) and B (n=6.3) (p=0.0034). No statistically significant differences were found in the mean operative time (A=274, B=266, C=294 minutes, p=0.074), or length of stay (A=3.0, B=2.7, C=3.3 days, p=0.16). All study cases were successfully completed using the robotically-assisted laparoscopic approach. There were no intraoperative or 30-day major postoperative complications such as, anastomotic leak, hemorrhage, intestinal obstruction, inadvertent intra-abdominal organ injury, or thromboembolic event. A total of four patients developed minor complications: one in group C developed an incarcerated umbilical hernia requiring a laparoscopic repair; one in group A developed postoperative carpal tunnel syndrome exacerbation and another had an inadvertently sutured nasogastric tube during creation of the duodeno-ileal anastomosis, which required an endoscopic release. One patient in group C had to return to the operating room for a port site infection. Percentage of excess body weight loss (EBWL) at 1,3,6,9,12, and 18 months is comparable among groups, although group B trended toward a higher weight loss outcome at 18 months compared with that in groups A and C (88% versus 81 % and 80.3%, respectively, p=0.27) (Table 2 and Figure 1). No mortality during follow-up period occurred in this series.

Demographics	Group A (n=26)	Group B (n=45)	Group C (n=36)
Mean Age (years)	29.6 (range: 20-35)	43 (range: 36-50)	57.2 (range: 51-72)
Gender (Female:Male)	21:5	32:13	30:6
Mean BMI (kg/m ²)	50.5 (range: 39.9-70)	49.6 (range: 38.8-66.3)	50.3 (range: 48.8-68.8)
Mean Excess Body Weight (lbs)	186 (range:115-304)	179.2 (range: 95-266)	174.4 (range: 68-303)
Mean Total Number of Comorbidities (n)	5.4 (range: 2-7)	6.3 (range:2-12)	7.3 (range: 3-12)

Table 1: Patient demographics

Patients	1 month	3 months	6 months	9 months	12 months	18 months
Group A Age 20-35	17.0	37.8	55.7	70.6	79.2	76.0
Group B Age 36-50	19.6	36.6	54.7	64.5	75.5	92.3
Group C Age 51-72	19.3	35.0	53.3	65.0	74.8	84.9

Table 2: Postoperative excess weight loss after biliopancreatic diversion with duodenal switch

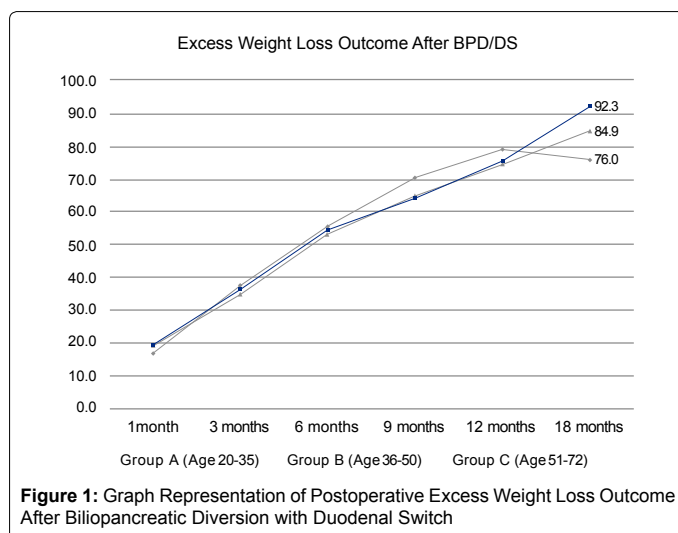


Figure 1: Graph Representation of Postoperative Excess Weight Loss Outcome After Biliopancreatic Diversion with Duodenal Switch

Discussion

Advanced age is considered a relative contraindication to bariatric surgery in many centers based on the assumption that the risk outweighs the long-term benefit in patients with fewer expected remaining years [2]. The life expectancy is steadily increasing, as is the quality of life in the advanced-aged cohort. The mean age of patients undergoing bariatric surgery in a meta-analysis by Buchwald et al has changed from 38.9 (range: 16.2-63.6 years) in 2004 to 40.0 (range 16-65 years) in 2007 [2]. Development of safer and less invasive bariatric procedures, which clearly provide superior short- and long-term outcomes, has created a surge of interest. The safety of bariatric surgery, specifically gastric bypass in the older population, has dramatically improved with a laparoscopic approach [9,10]. Excellent outcomes with acceptable postoperative complications after laparoscopic gastric bypass were seen in the older population, and this holds true, even when compared to those of the younger groups [11].

In the present study, the older group was found to have a predictable higher number of preoperative medical comorbidities. Despite this fact, the intraoperative and 30-day major postoperative complications were comparable with those of the younger patients. These findings are supported by the previously published report by Singhal et al. [12] in the elderly patients after laparoscopic gastric banding.

At 18 months postoperatively, patients in group B achieved higher excess weight loss than those in groups A and C, but the differences were not statistically significant. We may assume that younger patients may naturally have better exercise tolerance and more active lifestyles, although published data are lacking. In addition to reduction on physical activity with increasing age, older patients have decreased ability to liberate fatty acids from adipocytes and oxidize fat for fuel by respiring tissues [13,14]. Lipolytic capacity after sympathetic stimulation has also been shown to be attenuated with age [15]. These

factors may contribute to the slightly inferior weight loss outcome at 18 months in group C, compared to group B.

Conversely, the youngest group of patients however, may not have the discipline on nutritional/food intake management, as well as adherence to an exercise program postoperatively. A higher prevalence of undiagnosed eating disorder is also more commonly seen in the younger patients. In the present study, the youngest patients (group A) experienced the lowest excess weight loss at the end of the follow-up period compared to other groups.

Our study demonstrates that there is no significant difference in the perioperative complications and amount of weight loss achieved postoperatively at any time intervals among the three groups. We thus conclude that age should not be a limiting factor for bariatric surgery patient's selection, even in the complex laparoscopic biliopancreatic diversion with duodenal switch operation. Selection for metabolic surgery in the advanced age group should be based on a risk-benefit analysis similar to that used in any other general surgical procedures, in addition to the National Institute of Health guidelines for obesity surgery.

Conclusions

Despite a higher number of preoperative medical comorbidities that generally translates into a higher perioperative risk, older patients undergoing laparoscopic biliopancreatic diversion with duodenal switch perform as well as their younger counterparts with respect to perioperative complications, surgical outcomes, and weight loss results.

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