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Original article

Revisional bariatric surgery can improve refractory metabolic disease

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Abstract

Background: It remains unclear if patients undergoing revisional surgery for inadequate weight loss/recidivism can achieve improvement of refractory metabolic syndrome (MetS).

Objective: We aimed to evaluate metabolic outcomes after reoperative bariatric surgery for unsatisfactory weight loss in patients with refractory MetS.

Q4 Setting: ■■■

Methods: We retrospectively reviewed all revisional bariatric surgery cases performed for inadequate weight loss/recidivism at our center and analyzed all cases in which the patient had ongoing uncontrolled diabetes or MetS.

Results: In total, 121 reoperative bariatric cases for inadequate weight loss/recidivism were identified. Of those, 31.4% (N = 38) had MetS and 33.9% (N = 41) were diabetic at the time of primary bariatric surgery. At revisional surgery, 15 (39.5%) patients still met criteria for MetS and 7 (17.1%) had hemoglobin A_{1c} (HbA_{1c}) ≥ 6.0%. Of those with refractory MetS (N = 15) at revisional surgery, a mean percent excess weight loss (%EWL) of 59.4 ± 21.2% at mean 40.1 ± 29.9 months follow-up corresponded to a mean decrease in triglyceride of 65.2 mg/dL, mean increase in high-density lipoprotein cholesterol (HDL) of 12.1 mg/dL, and mean decrease in plasma glucose of 58.8 mg/dL. Mean percent total weight loss was 27.3%. One patient still met criteria for MetS. Of those with HbA_{1c} ≥ 6.0% at reoperative surgery (N = 7), a mean %EWL of 63.0 ± 22.9% at mean 51.6 ± 36.6 months follow-up corresponded to a mean decrease in HbA_{1c} of 1.6%. Three patients still had HbA_{1c} ≥ 6.0%, but only 1 had HbA_{1c} ≥ 6.5%.

Conclusion: Although further research is needed, this report suggests that revisional bariatric surgery is capable of treating both inadequate weight loss and refractory metabolic disease. (Surg Obes Relat Dis 2015;0:00–00.) © 2015 American Society for Metabolic and Bariatric Surgery. All rights reserved.

Keywords:

Re-operative; Revision; Conversion; Weight regain; Weight loss; Metabolic syndrome; Diabetes; Bariatric surgery

The World Health Organization estimates that > 1.1 billion adults worldwide are overweight, with some 312

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million considered obese. By 2015, this number is projected to increase to 2.3 billion overweight and 400 million obese. Obesity is associated with myriad health problems that contribute to an overwhelming burden of illness. Hypertension, hypercholesterolemia, cardiovascular disease, stroke, diabetes, arthritis, obstructive sleep apnea, and malignancy are just a few examples of obesity-related disease that cost an estimated \$190.2 billion annually in the United States [1].

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It is well accepted that bariatric surgery is capable of improvement of obesity-related metabolic diseases such as type 2 diabetes mellitus, dyslipidemia, hypertension, and metabolic syndrome (MetS) [2–5]. Despite the initial success with weight loss, however, some patients regain weight over time. This weight recidivism can be attributed to many causes, including anatomic failure, psychosocial and behavioral factors, or poor eating habits. Sometimes the cause of the weight regain is unclear, but, like any other chronic disease for which therapy fails over time, further treatment or escalation of therapy is indicated [6]. Today metabolic and bariatric surgeons are treating increasing number of patients presenting with weight regain, most of whom are seeking revisional surgery.

Two of the most common operations being revised are the vertical banded gastroplasty (VBG) and Roux-en-Y gastric bypass (RYGB). Initially described by Mason [7], the vertical banded gastroplasty (VBG) was a popular procedure in the 1980s. It is estimated that as many as 54% of patients will require revisional surgery after a VBG over a 12-year period [8]. The common indications cited for revisional surgery are gastroesophageal reflux disease, dysphagia, and recurrent morbid obesity. Though not as common as with the VBG, patients who have undergone a Roux-en-Y gastric bypass will also seek revisional surgery for weight regain. An estimated 20%–35% of patients having undergone RYGB will have significant weight regain at 10 years follow-up [9]. Other primary bariatric operations that require reoperative surgery for weight recidivism are sleeve gastrectomy, laparoscopic adjustable gastric band, and several other types of gastroplasties or malabsorptive procedures.

With inadequate weight loss or weight regain after their initial bariatric procedure, patients can also have persistent or recurrent MetS and type 2 diabetes mellitus. Return of MetS places patients at high risk for adverse cardiovascular events. Multiple studies have reported increased rates of death from cardiovascular events as well as an increase in all-cause mortality as a result of the MetS [10–12]. The aim of our study was to investigate the impact revisional bariatric surgery had on refractory MetS in patients who present with inadequate weight loss or weight loss recidivism after their primary bariatric operation.

Methods

After Institutional Review Board approval, we retrospectively reviewed all revisional bariatric surgery cases performed for inadequate weight loss or recidivism at our center between 2006 and 2013. These cases were identified from the prospectively maintained database of all bariatric procedures performed at our institution. We then identified all revisional cases in which the patient had ongoing uncontrolled diabetes or MetS based on the Adult Treatment Panel III (ATP3) criteria from the third report of the

National Cholesterol Education Program (Table 1). Pre- and postprocedural metabolic parameters analyzed were blood pressure (systolic and diastolic, mm Hg), triglyceride (TG, mg/dL), high-density lipoprotein (HDL, mg/dL), random plasma glucose (mg/dL), and hemoglobin A_{1c} (HbA_{1c}, %) based on the ATP3 criteria. Fasting plasma glucose was not uniformly available at follow-up. Remission of type 2 diabetes was defined as having an HbA_{1c} < 6.0% and being off all diabetic medications. Perioperative data included patient demographic characteristics, type of primary procedure, type of revisional procedure, perioperative complications, and duration of hospital stay. Demographic data utilized included age, sex, height, and weight before each procedure; number and types of previous abdominal surgery; and co-morbidities. At the last follow-up, weight loss was assessed by calculating percent total weight loss (%TWL) and percent excess weight loss (%EWL) ± SD. The %TWL was defined as the percent of weight loss at follow-up compared with the perioperative weight. The %EWL was defined as the operative weight minus the follow-up weight, divided by the excess weight, multiplied by 100. Excess weight was defined as the operative weight minus ideal weight based on a body mass index (BMI) of 25 kg/m². The change in BMI was also recorded.

Statistical analysis was performed using paired Student's *t* tests to compare parametric data between groups. A *P* value of ≤ .05 was considered significant. All data are reported as the mean values ± standard deviation of the mean unless specified otherwise.

Results

In total, 121 reoperative bariatric cases for inadequate weight loss or recidivism were identified during the study period. Of those, 31.4% (N = 38) had a diagnosis of MetS and 33.9% (n = 41) were diabetic at the time of their primary bariatric procedure. At the time of revisional surgery, 15 of 38 (39.5%) patients still met the ATP3 criteria for MetS and 7 of 41 (17.1%) patients had a HbA_{1c} ≥ 6.0%. Six patients underwent revision of VBG to a RYGB (Table 2). Four patients had their RYGB revised

Table 1
ATP III criteria for diagnosis of metabolic syndrome

| Risk factor (need 3 or more) | Defining level |
|------------------------------|--------------------|
| Waist circumference | |
| Men | > 102 cm (40 in) |
| Women | > 88 cm (35 in) |
| Triglyceride | ≥ 150 mg/dL |
| HDL-C | |
| Men | < 40 mg/dL |
| Women | < 50 mg/dL |
| Blood pressure | ≥ 130 / ≥ 85 mm Hg |
| Fasting glucose | ≥ 110 mg/dL |

ATP III = Adult Treatment Panel 3; HDL-C = high-density lipoprotein C.

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