

Outcomes of Bariatric Surgery in Patients with Inflammatory Bowel Disease

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Abstract

Background Obesity has become prevalent in patients with inflammatory bowel disease (IBD). Bariatric surgery can be considered to be contraindicated in IBD patients. We aimed to evaluate feasibility, safety, and efficacy of bariatric surgery in IBD patients.

Methods We retrospectively identified all morbidly obese patients with a known diagnosis of IBD, who underwent bariatric surgery between January 2005 and December 2012. Postoperative outcomes and status of IBD in patients on maintenance therapy for their disease were assessed.

Results We identified 20 IBD patients including 13 ulcerative colitis (UC) and 7 Crohn's disease (CD) patients with a mean age of 54.0 ± 10.5 years, BMI of 50.1 ± 9.0 kg/m², and duration of IBD of 11.3 ± 5.2 years. Eleven patients were on medication for IBD at baseline. Bariatric procedures included sleeve gastrectomy ($N=9$), gastric bypass ($N=7$), gastric banding ($N=3$), and one conversion of band to gastric bypass. There were no intraoperative complications, but two conversions to laparotomy due to adhesions. Mean BMI change and excess weight loss at 1 year was 14.3 ± 5.7 kg/m² and 58.9 ± 21.1 %, respectively. Seven early postoperative complications occurred including dehydration ($N=5$), pulmonary embolism ($N=1$), and wound infection ($N=1$). During a mean follow-up of 34.6 ± 21.7 months, five patients developed complications including pancreatitis ($N=2$), ventral hernia ($N=2$), and

marginal ulcer ($N=1$). Nine out of ten eligible patients experienced improvement in their IBD status.

Conclusions Bariatric surgery is feasible and safe in morbidly obese patients suffering from IBD. In addition to being an effective weight loss procedure, bariatric surgery may help mitigate symptoms in this patient population.

Keywords Bariatric surgery · Inflammatory bowel disease · IBD · Crohn's disease · Ulcerative colitis · Gastric bypass · Sleeve gastrectomy · Weight loss

Introduction

The prevalence of obesity has risen in patients with inflammatory bowel disease (IBD) especially over the past two decades [1, 2]. A recent large multi-center pediatric IBD registry enrolling 1598 children aged 4–16 years old found the prevalence of overweight/obese status to be 23.6 % among confirmed cases of Crohn's disease (CD) or ulcerative colitis (UC) [2].

Obesity also presents major obstacles to an already difficult nature of surgical management of IBD patients by adding technical complexity mainly due to anatomic challenges especially in the pelvic portion of planned surgeries for which preoperative weight loss may be beneficial [3]. In addition, these high-risk patients are at an even higher risk of postoperative complications due to their obesity-related medical comorbidities. In turn, bariatric surgery is shown to be safe and the most effective treatment for morbid obesity and obesity-related comorbidities [4–6].

Furthermore, obesity is associated with an increase in pro-inflammatory state mediated by known cytokines such as tumor necrosis factor α , as well as adipokines such as leptin, adiponectin, and resistin, or neuropeptides such as substance

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P, which are all molecules either produced within adipocytes or within macrophages and lymphocytes that infiltrate the mesenteric fat [7–9]. Moreover, these molecules are all shown to be overexpressed in the mesenteric and visceral fat of IBD patients [10, 11]. Given that IBD and obesity may share a common systemic chronic inflammatory response due to increased inflammatory mediators, thus there may be a plausible advantage of obesity surgery to alleviate severity of IBD. On the other hand, major gastrointestinal surgery and the intentional malabsorptive state achieved by some bariatric procedures such as gastric bypass may negatively influence IBD patients especially those with known CD [12, 13].

Nevertheless, there is limited literature regarding the outcomes of obesity surgery in patients with IBD and the evidence on this topic is drawn mainly from case reports and small case series [14]. Hence, we aimed to evaluate the feasibility, safety, and efficacy of bariatric surgery in IBD patients.

Methods

After an approval from the Cleveland Clinic Institutional Review Board and from a prospectively maintained database ($n=4125$ bariatric surgery cases), we identified morbidly obese patients with IBD, including UC ($N=13$) and CD ($N=7$), who underwent bariatric surgery between January 2005 and December 2012. We gathered perioperative variables including age, sex, body mass index (BMI), patient's state of IBD activity, and any previous surgical treatment prior to bariatric surgery, type of bariatric procedure, operative time, need for re-operation, length of hospital stay, and early (<30 days) or late (>30 days) complications.

Weight loss at 1 year of follow-up was represented as a change in BMI and mean excess weight loss. Improvement of IBD after bariatric surgery was arbitrarily defined as discontinuation or a significant reduction in maintenance IBD medications and/or subjective improvement of IBD-related symptoms including diarrhea, bloody stool, and abdominal pain. For the purpose of this study, major complications were defined as any complication that resulted in a prolonged hospital stay (beyond 7 days), anticoagulant administration, re-intervention, or re-operation; minor complications included everything not included in under major.

In assessing improvement of IBD symptoms, we excluded patients who had a cure (history of total procto/colectomy) or long-term remission for years prior to their bariatric surgery and were on no active maintenance therapy along with any mortality cases. For patients who were lost to follow-up to both bariatric and GI/colorectal services, follow-up information was gathered through phone calls. In this descriptive case series, data is represented as mean \pm standard deviation for continuous parameters and frequency percentages for categorical variables.

Results

We identified 20 IBD patients including 13 UC and 7 CD patients with a male-to-female ratio of 6:14, a mean age of 54.0 ± 10.5 years, BMI of 50.1 ± 9.0 kg/m², number of comorbidities of 6.7 ± 2.0 , and duration of IBD of 11.3 ± 5.2 years. Eleven patients were on medication for IBD at baseline. Ten patients had history of previous small and/or large bowel resection including five cases with total colectomy or proctocolectomy.

Bariatric procedures included laparoscopic sleeve gastrectomy (SG, $N=9$), Roux-en-Y gastric bypass (RYGB, $N=7$), adjustable gastric banding (AGB, $N=3$), and one revisional procedure. Bariatric procedures in patients with UC included RYGB ($n=7$), SG ($n=5$), and AGB ($n=1$). Procedures in patients with CD included SG ($n=4$), AGB ($n=2$), and one conversion of AGB to RYGB after 2 years. The mean operative time and length of stay were 147.0 ± 62.2 min and 2.7 ± 1.3 days, respectively. There were no intraoperative complications, but two conversions to laparotomy due to adhesions.

Mean BMI change at 1-year was 14.3 ± 5.7 kg/m² which was corresponded to a mean excess weight loss of 58.9 ± 21.1 %.

Seven early postoperative complications occurred including dehydration ($N=5$), pulmonary embolism ($N=1$), and wound infection ($N=1$). The latter two complications occurred in patients who converted to open surgery. During a mean follow-up of 34.6 ± 21.7 (range 12–77) months, five patients developed complications including pancreatitis ($N=2$), ventral hernia ($N=2$), and marginal ulcer ($N=1$). One unrelated late postoperative death occurred 6 years after bariatric surgery, which was due to a metastatic renal cell carcinoma.

In total, two patients experienced acute flare-up of UC early after bariatric surgery. Nine out of ten eligible patients (excluding the mortality) experienced improvement in their IBD status. Summary of the respective change in BMI, the baseline and postoperative state of the IBD activity, and postoperative adverse events for all subjects is depicted in Table 1.

Discussion

To our knowledge, this report is one of the largest series describing the feasibility, safety, and the outcomes of bariatric surgery in morbidly obese IBD patients. We found that nine out of ten IBD patients who were on pharmacotherapy to control their active IBD experienced significant improvement of their IBD-related symptoms throughout the follow-up, which includes two patients who experienced acute flare-up of their UC early after bariatric surgery. Most of them showed a major reduction in their maintenance medical therapy. Only one patient who initially experienced a decrease in both IBD medications and symptoms in the first 3 years following an

Table 1 Summary of the patient-specific characteristics and surgical outcomes of the study cohort

IBD type	Bariatric surgery	Preoperative BMI (kg/m ²)	Postoperative BMI (kg/m ²) ^a	Change in BMI ^b	IBD status at baseline	IBD status at last follow-up	Adverse events
UC	SG	42	30	12	Pharmacotherapy	↓ Meds; ↓ Symptoms	Dehydration; acute flare soon after surgery
CD	SG	39	22	17	Pharmacotherapy	↓ Meds; ↓ Symptoms	Dehydration; biliary pancreatitis
UC	RYGB	55	38	17	Pharmacotherapy	↓ Meds; ↓ Symptoms	None
CD	AGB	44	37	7	Pharmacotherapy	↓ Meds; ↓ Symptoms	None
UC	SG	41	29	12	Pharmacotherapy	↓ Symptoms	None
UC	RYGB	52	39	13	Pharmacotherapy	↓ Symptoms	Dehydration; acute flare soon after surgery
UC	RYGB	58	37	21	Pharmacotherapy	↓ Meds	Port site hernia
UC	RYGB	47	33	14	Pharmacotherapy	↓ Meds	Dehydration
UC	RYGB	45	25	20	Pharmacotherapy	↓ Meds	Conversion to open; wound infection; VH; MU
UC	AGB	44	36	8	Pharmacotherapy	↓ ^c	None
CD	SG	55	44	11	S/P Total Procto/colectomy	–	None
UC	SG	49	39	10	S/P Total Procto/colectomy	–	None
UC	SG	71	44	27	S/P Total Procto/colectomy	–	None
CD	SG	43	33	10	S/P Total Procto/colectomy	–	None
CD	AGB	59	44	15	S/P Total Procto/colectomy	–	None
UC	SG	42	25	17	Inactive	–	Dehydration
UC	RYGB	68	42	26	Inactive	–	None
UC	RYGB	47	37	10	Inactive	–	None
CD	AGB to RYGB	44	35	9	Inactive	–	Conversion to open; PE; pancreatitis
CD	SG	56	46	10	Pharmacotherapy	Death ^d	None

IBD inflammatory bowel disease, BMI body mass index, UC ulcerative colitis, CD Crohn's disease, SG sleeve gastrectomy, RYGB Roux-en-Y gastric bypass, AGB adjustable gastric band, VH ventral/incisional hernia, MU marginal ulcer

^aThis is a postoperative BMI calculated at 1 year after bariatric surgery

^bWeight loss is represented as a change in the BMI for each patient; the mean change in BMI for the study cohort was 14.3±5.7 kg/m²

^cThis patient experience a decrease in both IBD medications and symptoms in the initial 3 years following AGB, but developed acute flares subsequently which also coincided with weight regain. BMI 4 years following AGB was 50 kg/m²

^dThis patient died of a metastatic renal cell carcinoma subsequent to the bariatric surgery

adjustable gastric banding developed acute flares subsequently, and this coincided with a significant weight regain to a new BMI higher than the original value at the time of the index bariatric surgery.

Our results are consistent with a case report from Moum et al. of a 40-year-old woman with medically controlled ileocolic CD for 4 years, who had a BMI of 45 kg/m², type II diabetes mellitus, and hypertension. Eight months following a successful RYGB and a 13-point decrease in her BMI, her CD was in remission and her obesity-related hypertension and diabetes were resolved [15]. Another case report by Lascano et al. described a 39-year-old morbidly obese male with a longstanding history of UC. The patient's disease was controlled with oral mesalamine, mesalamine enemas, and azathioprine; however, he required varying doses of prednisone for acute flare-ups. After a laparoscopic RYGB, successful weight loss was achieved and concomitantly there was considerable symptomatic relief of UC-related diarrhea, resolution of frequent tenesmus, and of pyoderma gangrenosum [10]. Furthermore, a recent case series by Keidar et al. on ten IBD patients who underwent bariatric surgery reports 71 % improvement in IBD pharmacotherapy control following bariatric surgery and a 43 % rate of cessation of maintenance therapy during a median follow-up time of 46 months; one patient who was not on pharmacotherapy at baseline experienced mild exacerbation of the IBD requiring pharmacotherapy [16].

The mechanism with which bariatric surgery improves the IBD state is likely related to a chronic inflammatory state shared between obesity and IBD. Mechanistic studies have shown that adipose tissue, particularly visceral mesenteric adipose tissue, plays an important role in the pathogenesis of IBD and can result in more severe presentations [7]. Obesity and increased visceral fat are associated with an increase in pro-inflammatory cytokines (e.g., interleukin-6 and tumor necrosis factor- α), adipokines (e.g., leptin and resistin), and neuropeptides (e.g., substance P). Patients with active IBD also have elevated serum and/or tissue levels of these inflammatory mediators. Therefore, it is not surprising that reduction in obesity-induced inflammation after obesity surgery may be beneficial in improving or reversing the severity of IBD [7–11]. Bariatric surgery has also been shown to improve the long-term status and management of other inflammatory diseases such as psoriasis, gout, and systemic lupus erythematosus [17–19].

Our results also demonstrate excellent and acceptable weight loss following bariatric surgery in patients with IBD. The cohort, who was super-obese at baseline with a mean BMI of 50.1 kg/m², experienced a mean of 14.3 kg/m² decrease in the collective BMI at 1 year of follow-up. These results are again consistent with the recent study by Keidar et al., which showed a 71 % excess weight loss during a median follow-up of 46 months [16]. None of our patients developed

excessive weight loss, abnormally low BMI, or malnutrition, which could potentially be an important issue following bariatric surgery in patients with diseased bowels.

Furthermore, we showed that performing bariatric surgery in patients with IBD is feasible and safe. Even in patients with past history of open major bowel resections, laparoscopic procedures such as SG and AGB were feasible. Despite seven patients experiencing an early postoperative complication, which may appear to be high, only one patient (5 %) experienced a major complication. That patient with Factor V Leiden deficiency developed postoperative pulmonary embolism. This is within the expected range of 3.8–8.2 % for early major postoperative complications following bariatric surgery in the adult super-obese patients [20–22]. Some surgical complications which have commonly been reported following abdominal surgeries in patients with IBD such as gastrointestinal leak and wound infection have not frequently been seen in our bariatric surgical cases.

In a study by Blain et al., obese patients (BMI >30 kg/m²) with CD, who accounted for 3 % of the total cohort of 2065 subjects, were found to have a different disease course compared to CD patients with normal BMI [23]. Blain et al. reported that obese CD patients were significantly older at diagnosis, had a higher incidence of perianal disease (35 versus 24 %), experienced more disease relapses (OR=1.50), and more frequent hospitalizations (OR=2.35) [23]. Moreover, non-Crohn's-related gastrointestinal surgery and the intentional malabsorptive state achieved by some bariatric procedures such as RYGB and duodenal switch may negatively influence IBD patients especially those with known CD [12, 13]. Intestinal bacterial overgrowth that can develop as a consequence of diversionary bariatric procedures may be associated with acute CD flare-ups [24–26]. In addition, there is a potential risk of flare-up in patients with small bowel CD in the operated segment of small bowel after gastric bypass, with an increased risk of stricture, abscesses, and fistulas. Perhaps in terms of bariatric procedures, the “less-invasive” approach such as SG is a better choice for CD patients especially those suffering from small bowel disease particularly with previous resections.

Finally, we recognize that the retrospective nature, small sample size of the study, and the heterogeneity of the study cohort limit the conclusions that can be drawn. However, the evidence regarding the outcomes of obesity surgery in patients with IBD is lacking and is drawn mainly from case reports and small case series [14]. While our study represents one of the largest case series on this topic and remains consistent with a recent report by Keidar et al. [16], larger studies are needed to establish the role for routine bariatric surgery in morbidly obese IBD patients.

Conclusion

Bariatric surgery is feasible and safe in morbidly obese patients suffering from IBD. In addition to being an effective weight loss procedure, bariatric surgery may help mitigate IBD symptoms and in turn improve disease control in this patient population. Further and larger studies are needed to establish the role for bariatric surgery both as a therapeutic adjunct and/or prior to surgery for IBD in morbidly obese patients with either CD or UC.

Compliance with Ethical Standards

Conflict of Interest The authors declare that they have no conflict of interest.

Ethical Approval For this type of study, formal consent is not required.

Informed Consent Does not apply.

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