

Original article

Bariatric surgery in morbidly obese patients with inflammatory bowel disease: A systematic review

Saeed Shoar, M.D.^{a,*}, Sayed Shahabuddin Hoseini, M.D.^b, Mohammad Naderan, M.D.^b,
Habibollah Mahmoodzadeh, M.D.^a, Fung Ying Man, M.D.^c, Nasrin Shoar, M.D.^d,
Motahar Hosseini, M.D.^e, Shahram Bagheri-Hariri, M.D.^f

^aDepartment of Surgery, Imam Khomeini Hospital Complex, Tehran University of Medical Sciences, Tehran, Iran

^bSchool of Medicine, Tehran University of Medical Sciences, Tehran, Iran

^cCollege of Medicine, Saint George's Medical School, Grenada

^dSchool of Medicine, Kashan University of Medical Sciences, Kashan, Iran

^eDepartment of Surgery, Saint Agnes Hospital, Baltimore, MD

^fDepartment of Emergency Medicine, Imam Khomeini Hospital Complex, Tehran University of Medical Sciences, Tehran, Iran

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Abstract

Backgrounds: With increased prevalence of obesity, the number of inflammatory bowel disease (IBD) patients suffering from morbid obesity has raised. It is not clear yet if bariatric surgery is a safe and effective option in this population.

Objectives: Our systematic review aims to summarize the available literature on the safety and efficacy of bariatric surgery in morbidly obese patients with IBD.

Setting: University hospital, Iran.

Methods: A PubMed/MEDLINE search was performed to identify studies reporting the outcome of morbidly obese IBD patients. Postoperative outcome of IBD patients after bariatric surgery were pooled for early and late complications, change of IBD status, and medication alteration.

Results: A total of 7 studies reported post-bariatric surgery outcomes of 43 morbidly obese IBD patients (31 females, 11 males) with an age ranging from 30 to 64 years and a body mass index from 35.7 to 71 kg/m². Of these, 25 suffered Crohn's disease (CD) (58.2%) and 18 were ulcerative colitis (UC) patients (41.8%). The small bowel was the most common involved gastrointestinal segment in 27.3% of patients. CD patients more commonly underwent sleeve gastrectomy (72%), while UC patients similarly underwent sleeve gastrectomy and Roux-en-Y gastric bypass (44.4%). After a follow-up of 8 to 77 months, IBD patients lost up to 71.4% ± 5.9% of excess weight and 14.3 kg/m² ± 5.7 kg/m² of body mass index. There were 9 early (21.4%) and 10 late (23.8%) postoperative complications related to the bariatric procedure. IBD remitted in 20 patients (47.6%), improved in 2 patients (4.8%), but exacerbated in 7 patients (16.7%).

Conclusions: Although available data on morbidly obese patients with IBD is scarce, bariatric surgery seems to be a safe and effective option for these patients with no added morbidity or mortality. Further studies are necessary to confirm this data. (Surg Obes Relat Dis 2017;13:652–660.) © 2017 American Society for Metabolic and Bariatric Surgery. All rights reserved.

Keywords:

Bariatric surgery; Inflammatory bowel diseases; Morbid obesity; Review

*Correspondence: Saeed Shoar, M.D., Department of Surgery, Imam Khomeini Hospital Complex, Tehran University of Medical Sciences, No. 54, Poorsina Street, Keshavarz Biv, Tehran, Iran.
E-mail: ssht84@yahoo.com

Along with the increasing rate of obesity worldwide, obese patients with inflammatory bowel diseases (IBD) are increasingly seen in bariatric settings [1–3]. Although the

risk of surgery in IBD patients has decreased over time [4], obesity adds technical challenges due to its anatomic complexity [5].

Although obesity might precipitate the IBD flare-up through a proinflammatory status [6], available pharmacologic treatments for IBD could worsen obesity owing to their adverse anabolic effects [7,8]. Bariatric surgery is the standalone treatment for morbid obesity. However, there is scarce evidence to determine the safety and feasibility of bariatric surgery for treatment of morbid obesity in IBD patients. Additionally, it has been rarely discussed if the weight loss induced by bariatric surgery would alter IBD status.

Few studies have reported outcome of bariatric surgery in morbidly obese patients with IBD [4–5,9–12]. This is the first systematic review to summarize the existing literature on the outcome of IBD patients undergoing bariatric surgery for morbid obesity, their surgical challenges, and their postoperative outcomes.

Methods

Study design

A systematic review article was designed according to the preferred reporting items for systematic reviews and meta-analyses to analyze the existing literature concerning bariatric surgery in IBD patients. Two independent reviewers screened

the retrieved papers for eligibility and extracted relevant data. Any conflict was resolved by a third researcher.

Search strategy

A comprehensive literature review was performed through June 2016 searching PubMed/MEDLINE, ISI Web of Science, and Scopus databases. We used the following combinations of keywords: “bariatric surgery” OR “sleeve gastrectomy” OR “gastric bypass” OR “gastric banding” OR “Roux-en-Y” OR “duodenal switch” OR “RYGB” AND “inflammatory bowel disease” OR “Crohn’s disease” OR “ulcerative colitis” OR “IBD” OR “UC”. A manual search was also performed on the bibliography list of the relevant studies to supplement the electronic search (Fig. 1).

Eligibility criteria and study inclusion

English language studies reporting the outcome of a bariatric procedure in a human patient suffering from IBD were eligible to be included in this systematic review. Review articles and commentaries were excluded.

Data extraction

Study characteristics (study type, publication year, sample size, gender distribution, population age, and preoperative body mass index [BMI], type of IBD, and follow-up),

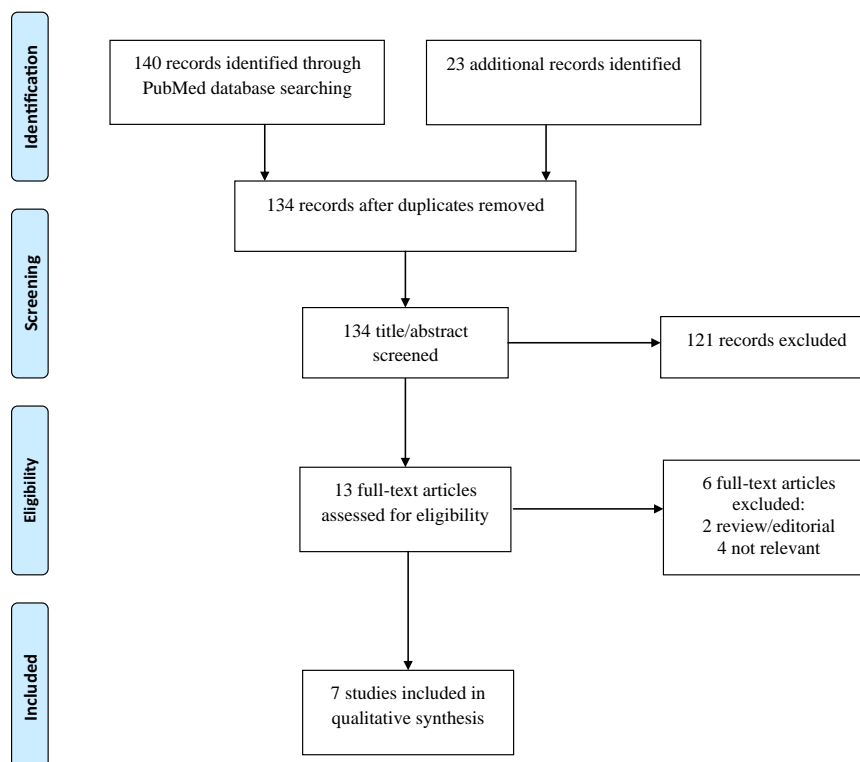


Fig. 1. PRISMA flowchart for identification and selection of eligible studies according to our inclusion and exclusion criteria. AGB = adjustable gastric banding; CD = Crohn’s disease; RYGB = Roux-en-Y gastric bypass; SG = sleeve gastrectomy; UC = ulcerative colitis.

patients clinical and surgical features (IBD duration, involved segments of the gastrointestinal [GI] tract, pre-operative status of IBD and its treatment, IBD relapse, and IBD complications before bariatric surgery), and outcomes after the bariatric surgery (weight loss, IBD status change or alteration in the medication, postoperative surgical and IBD-related complications, and mortality) were extracted for each study and synthesized qualitatively.

Outcome measures

The primary endpoint of this systematic review was IBD status after bariatric surgery. Resolution was defined as lack of any IBD-related symptoms leading to medication cessation. Improvement referred to any decrease in dose of IBD medication. Flare-up was defined as an exacerbation of IBD-related symptoms or need to an increase in medication dosage. Secondary endpoints were weight loss and early/late complication after bariatric surgery.

Results

Characteristics of included studies (Table 1)

A total of 7 studies encompassing 147 patients were included into this systematic review [2,9–11,13–15]. Of these, 43 morbidly obese patients with IBD (31 females, 11 males) with an age range of 30–64 years and BMI range of 35.7–71 kg/m² were identified.

Two studies were retrospective reviews (21 patients, 48.8%) [9,11], 2 were prospective studies (16 patients, 37.2%) [10,13], 2 were case reports (2 patients, 4.6%) [14,15], and 1 was a retrospective case-control study (13 patients, 30.2%) [2].

Table 1
Characteristics of included studies

Author/year	Type of study	Sample size	Gender (F:M)	Age (yr)	BMI (kg/m ²)	Type of IBD	Type of BS
1 Aminian/2016	Retrospective review	20	14:6	54 ± 10.5	50.1 ± 9 (39–71)	13 UC/7 CD	9 SG/7 RYGB/3 AGB/1 AGB to RYGB
2 Colombo/2015	Prospective	6/101	4:2	47.17 ± 9.5 (30–54)	40.6 ± 3.74 (35.7–46.9)	1 UC/5 CD	1 Maclean gastroplasty/1 SG+end colostomy/2 SG/2 SG+ileocecal resection
3 Keidar/2015	Prospective	10	9:1	39.7 ± 11.9 (25–58)	42.6 ± 5.6 (37–57.6)	2 UC/8 CD	9 LSG/1 LAGB
4 Del Prado/2014	Retrospective review	1	N/A	N/A	N/A	1 UC	1 LAGB
5 Ungar/2013	Retrospective case-control	4/13	3:1	50.8 ± 15.6 (34–64)	45 ± 5.3 (40–51)	4 CD	4 LSG
6 Lascano/2006	Case report	1	0:1	39	57	1 UC	1 LRYGB
7 Moum/2010	Case report	1	1:0	40	45	1 CD	1 RYGB
Total	-	43	31:11	30–64	35.7–71	25 CD/18 UC	27 SG/10 RYGB: 6 GB

AGB = adjustable gastric banding; BMI = body mass index; BS = bariatric surgery; CD = Crohn's disease; IBD = inflammatory bowel disease; LAGB = laparoscopic adjustable gastric banding; LRYGB = laparoscopic Roux-en-Y gastric bypass; LSG = laparoscopic sleeve gastrectomy; N/A = not available; RYGB = Roux-en-Y gastric bypass; SG = sleeve gastrectomy; UC = ulcerative colitis.

Of 43 morbidly obese IBD patients, 25 had CD (58.2%) and 18 had UC (41.8%). Bariatric surgeries in IBD patients included 27 sleeve gastrectomies ([SGs], 62.8%), 10 Roux-en-Y gastric bypasses ([RYGBs], 23.2%), and 6 gastric bandings (14%).

IBD characteristics in patients undergoing bariatric surgery (Table 2)

Duration of IBD before the bariatric procedure was reported by 6 studies (23 patients, 53.5%) [2,10,11,13–15] with a rough average of 11 years ranging from 1 to 24 years [10]. Of 43 patients with IBD (25 with CD [58.2%] and 18 with UC [41.8%]), GI involvement was specified in 5 studies (22 patients, 51.2%) [2,10,13–15]. Of these, the intestinal segment was the most common site of involvement (6 patients, 27.3%), followed by colitis (6 patients, 27.3%), ileocecal (5 patients, 22.7%), and ileocolonic segment (3 patients, 13.6%) (Table 3).

IBD treatment before the bariatric surgery was reported by 6 studies (42 patients, 97.7%) [2,9,10,13–15]. Of these, IBD was controlled by medication in 27 patients (64.3%), surgical resection in 5 patients (11.9%), and both medical and surgical approaches in 3 patients (7.1%). Seven patients (16.7%) were in an inactive state of IBD and not receiving any treatment at the time of bariatric surgery.

The most prevalent bariatric procedure for IBD was SG (24 patients, 55.8%) followed by RYGB (10 patients, 23.2%), and gastric banding (5 patients, 11.6%). CD patients underwent SG (16 patients, 72%), then adjustable gastric banding (AGB) (3 patients, 12%), RYGB (2 patients, 8%), SG+ileocecal resection (2 patients, 8%), SG+end colostomy (1 patient, 4%), and Mclean

Table 2
Clinical and surgical features in IBD patients undergoing bariatric surgery

Author/ year	Duration of IBD (yr)	Involved GI segments	Preoperative IBD Rx	BS type according to the IBD type					
				SG (24)	RYGB (10)	AGB (5)	SG+ ICR (2)	SG + end colostomy (1)	Maclean gastroplasty (1)
1 Aminian/ 2016	11.3 ± 5.2	N/A	11 medication, 5 resection, 4 inactive	4 CD/5 UC	1 CD/7 UC	2 CD/1 UC	–	–	–
2 Colombo/ 2015	11.5 ± 9.4 (1–24)	4 ileocecal, 1 rectum and perianal, 1 pancolitis	4 medication, 2 ileocecal resection and medication	1 CD/1 UC	–	–	2 CD	1 CD	1 CD
3 Keidar/ 2015	6.8	3 TI, 2 SB, 1 ileocecal, 1 ileocolonic, 1 sigmoiditis- ileitis, 1 pancolitis, 1 left colon	7 medication, 3 untreated	7 CD/2 UC	–	1 CD	–	–	–
4 Del Prado/ 2014	N/A	N/A	N/A	–	–	1 UC	–	–	–
5 Ungar/ 2013	11.5 ± 6.2 (5–20)	2 colonic, 1 ileal, 1 ileocolonic	3 medication, 1 medication/ileectomy, hemicolectomy	4 CD	–	–	–	–	–
6 Lascano/ 2006	20	1 colon	1 medication	–	1 UC	–	–	–	–
7 Moum/ 2010	5	1 ileocolonic	1 medication	–	1 CD	–	–	–	–
Total	1–24	Intestinal: 6 (27.3%) Ileocecal: 5 (22.7%) Ileocolonic: 3 (13.6%) Colonic: 6 (27.3%) Sigmoiditis: 1 (4.5%) Rectum: 1 (4.5%)	Medication: 27 (64.3%) Surgery: 5 (11.9%) Both: 3 (7.1%) None: 7 (16.7%)	16 CD/8 UC	2 CD/8 UC	3 CD/2 UC	2 CD	1 CD	1 CD

AGB = adjustable gastric banding; BS = bariatric surgery; CD = Crohn's disease; GI = gastrointestinal; IBD = inflammatory bowel disease; ICR = ileocecal resection; N/A = not available; Rx = treatment; RYGB = Roux-en-Y gastric bypass; SG = sleeve gastrectomy; SB = small bowel; TI = terminal ileum; UC = ulcerative colitis.

Table 3
Outcome of IBD patients undergoing bariatric surgery

Author/ year	Weight loss	BS Complications			IBD status after BS					F/u	Conclusion
		Early	Late	Mortality	Remit	Exacerbate	No change	Improved	Medication change		
Aminian/ 2016	14.3 ± 5.7 kg/m ² or 58.9 ± 21.1%	5 Dr, 1 PE, 1 WI	2 Pnt, 2 VH, 1 MU	1 unrelated	9	2 acute UC flare-up	9	N/A	N/A	34.6 ± 21.7 mo (12–77)	BS is safe and mitigate IBD
Colombo/ 2015	11.45 ± 2.8 kg/m ² or 28.14 ± 6.6%	–	1 Vomiting and dysp	–	5	1	–	–	Steroids discontinued (6), ↓ AZA (2)	57.8 ± 29.8 mo	BS is safe and effective and ↓ IBD Rx
Keidar/ 2015	71.4 ± 5.9 EWL%	1 SLL	4 VitD	NA	2	3	3	1	Inconclusive	3.1 ± 2 yr	BS is effective and safe
Del Prado/ 2014	N/A	NA	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	LAGB is safe
Ungar/2013	32.8 ± 4.3 kg/m ² or 60.2 ± 13.7 %EWL	1 SLB	N/A	N/A	4	–	–	–	N/A	1.9 ± 1.5 yr	SG is safe in CD
Lascano/ 2006	31 kg/m ² (80% EWL)	–	–	–	–	–	–	1 UC	↓ doses (1)	2 yr	BS is safe and effective in UC
Moum/ 2010	12.6 kg/m ²	0	0	0	–	1 (8 weeks after BS)	–	–	Starting medication (1)	8 mo	IBD flare-up after BS may be accidental
Total		9	10	0	20	7	12	2	↓: 7 ↑: 1	8–77 mo	Safe; ↓?

AZA = ; BS = bariatric surgery; CD = Crohn's disease; Dr = dehydration; dysp = dysphagia; %EWL = percentage excess weight loss; F/u = follow-up ; IBD = inflammatory bowel disease; LAGB = laparoscopic adjustable gastric banding; MU = marginal ulcer; N/A = not available; PE = pulmonary embolism; Pnt = pancreatitis; Rx = treatment; SG = sleeve gastrectomy; SLB = staple line bleeding; SLL = staple line leak; UC = ulcerative colitis; VH = ventral hernia; VitD = vitamin deficiency; WI = wound infection.

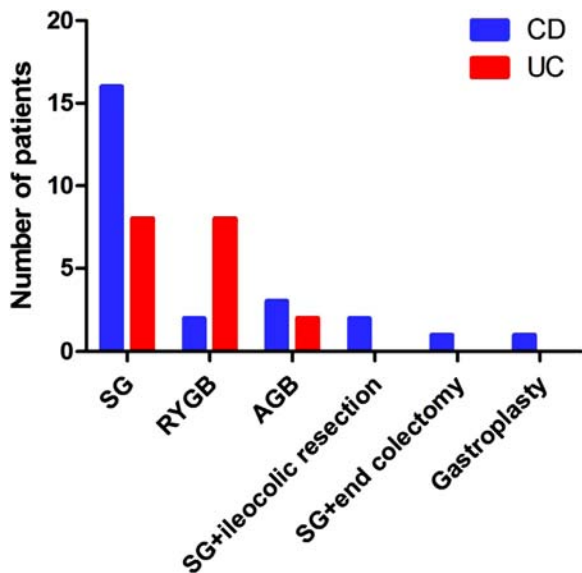


Fig. 2. Distribution of bariatric procedures according to the IBD type. AGB = adjustable gastric banding; CD = Crohn's disease; RYGB = Roux-en-Y gastric bypass; SG = sleeve gastrectomy; UC = ulcerative colitis.

gastroplasty (1 patient, 4%). Of 18 UC patients, SG (8 patients, 44.4%) and RYGB (8 patients, 44.4%) were the most common procedures followed by AGB (2 patients, 11.2%) (Fig. 2).

Postoperative outcomes after bariatric surgery

IBD patients were followed between 8 to 77 months after the bariatric surgery. Postoperative outcomes were available for 6 studies (42 patients, 97.7%) [2,9,10,13–15]. IBD patients lost up to an average of $71.4\% \pm 5.9\%$ of excess weight and $14.3 \text{ kg/m}^2 \pm 5.7 \text{ kg/m}^2$ of BMI after bariatric surgery. There were 9 early (21.4%) and 10 late (23.8%) postoperative complications related to the bariatric procedure. Among 42 patients with reported outcomes, IBD remitted in 20 patients (47.6%), improved in 2 patients (4.8%), had no change in 12 patients (28.6%), and exacerbated in 7 patients (16.7%). Additionally, 4 studies (8 patients, 23.2%) reported changes in IBD medication after bariatric surgery. Of these, 7 patients (87.5%) were able to decrease their IBD medications, 6 patients (75%) discontinued corticosteroid, and 1 patient (12.5%) had to start IBD treatment.

Discussion

Obesity and IBD

Despite multidisciplinary weight loss programs implemented at multiple preventive levels, the prevalence of obesity has dramatically increased over the last decade. Current evidence regarding the impact of obesity on IBD severity is controversial [16,17]. Some authors have speculated that obesity is associated with increased morbidity, disease severity, and more frequent complications such as perianal fistula formation [17]. In contrast, other studies

showed that a high BMI might have a favorable effect on IBD prognosis, while a low BMI is associated with more severe diseases [18,19]. However, another study demonstrated no association between BMI and corticosteroid use, hospitalization, and need for surgery in IBD patients [16].

IBD increases the risk for cardiovascular morbidity [20], renal disorders [21], and liver dysfunction [22,23] and is associated with ischemic stroke [20,24] and diabetes [25,26]. On the other hand, obesity is a known risk factor for several metabolic conditions [27,28]. Additionally, obese patients might have a decreased tolerance for multi-drug regimens for induction or maintenance of IBD remission [3]. Although the relationship between IBD and obesity is not clearly explained, a connection might be built over the chronic activation of the innate immune system within the adipose tissue [17,29,30].

Surgery in patients with IBD

Although medical options for IBD treatment have expanded over time, surgery is still inevitable in some patients [31,32]. Minimally invasive techniques, single port laparoscopy, and transluminal endoscopic procedures have provided a wide range of surgical options for IBD management [33,34]. Moreover, published data support the feasibility and safety of laparoscopic surgery in well-selected complicated IBD cases [34].

In a retrospective review of the College of Surgeons National Surgical Quality Improvement Program database (2005–2008), Causey et al. found a prevalence of 16% in IBD patients who met the criteria of obesity with an increase during the study period [5]. Interestingly, the authors demonstrated that perioperative morbidity increases with an increase in patient BMI. Nevertheless, the safety and feasibility of a weight loss procedure in morbidly obese patients suffering from IBD is a distinct concern.

Bariatric surgery in IBD patients

There are few case reports and case series regarding obesity surgery outcomes in IBD patients with very short-term follow-up [2,9–13]. Although SG and AGB involve the upper segment, RYGB requires operation on the lower portion of the GI tract. The largest study on IBD patients undergoing obesity surgery by Aminian et al. included 20 patients with a mean follow-up of 34.6 ± 21.7 months [9]. Bariatric procedures included 9 laparoscopic SGs, 7 RYGBs, and 3 AGBs. Only 1 patient with CD underwent conversion of AGB to RYGB after 2 years. No intra-operative complications were reported, but 2 cases were converted to open surgery due to extensive adhesion. The authors concluded that bariatric surgery in morbidly obese patients with IBD is safe and feasible and could mitigate the IBD symptoms.

Our systematic review of 43 IBD patients undergoing bariatric surgery revealed that after 77 months of follow-up, patients might lose up to an average of $71.4\% \pm 5.9\%$ of excess weight. There were 9 early (21.4%) and 10 late (23.8%) postoperative complications related to the bariatric procedure.

Weight loss and IBD severity

Although no exact mechanism has been explained for the impact of weight loss on IBD course, a beneficial effect might be seen in terms of obesity-related co-morbidity resolution. This, in turn, can improve IBD-related complications. As from our study findings, IBD remitted in 20 patients (47.6%), improved in 2 patients (4.8%), had no change in 12 patients (28.6%), and exacerbated in 7 patients (16.7%). Additionally, 7 patients (87.5%) were able to decrease their IBD medications, 6 patients (75%) discontinued corticosteroid, and 1 patient (12.5%) had to start IBD treatment. Although the incidence rate for IBD exacerbation has been estimated up to 946 per 1000 person-years [35], the underlying mechanism is poorly explained. The higher incidence of IBD exacerbation after bariatric surgery could result from surgical trauma to the GI tract.

Patients with active IBD show elevated levels of proinflammatory markers including tumor necrosis factor- α , interleukin-6, leptin, and neuropeptides [25,36]. Obesity also increases serum or tissue levels of these inflammatory mediators [16,30,37]. Additionally, co-occurrence of IBD and type 2 diabetes share a common trigger influenced by an inflammatory process, an imbalance in intestinal microbiota, and an interrelation between various signaling pathways such as JAK/STAT signaling network via STAT3 transcription factors and NF κ B [25]. Therefore, a reduction in obesity-related inflammatory status due to bariatric surgery-induced weight loss could potentially improve the severity of IBD.

Limitations and perspectives for future research

Few studies exist in the literature on the safety and efficacy of IBD in morbidly obese patients undergoing bariatric surgery. Hence, our systematic review pooled all the available data including case studies. Owing to the success of current medical treatments in inducing IBD remission, it is not uncommon to observe an ongoing increase in the prevalence of morbid obesity among IBD patients. Future studies should be designed using the available national databases on surgery quality improvement program for larger population of patients and longer follow-up.

Conclusions

Although few morbidly obese patients with IBD have undergone bariatric surgery so far, our systematic review

speculates that weight loss surgery can be a safe and effective option for these patients as it is in non-IBD morbidly obese patients. It seems that CD patients are more prevalently considered for nonintestinal bariatric procedures such as SG, while UC patients have comparable outcome for RYGB and SG.

Disclosures

The authors have no commercial associations that might be a conflict of interest in relation to this article.

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Editorial

Bariatric surgery in severely obese patients with inflammatory bowel disease: a systematic review

This article presents a meta-analysis of patients with inflammatory bowel disease (IBD) who underwent weight loss surgery. They found reliable information on 43 patients, 25 with Crohn's disease (CD) and 18 with ulcerative colitis (UC). Of these, 63% were treated with sleeve gastrectomy (SG), 23% with Roux-en-Y gastric bypass (RYGB), and 14% with adjustable gastric band (AGB). A total of 92% of the patients with CD had either SG or AGB, and 2 patients (8%) had RYGB. Of the patients with UC, 44% were treated with RYGB and 44% with SG, with 12% having AGB. The patients had an acute operative morbidity of 21% and late postoperative morbidity of 24%, with none of the morbidity being related to IBD. With a follow up of 8–77 months, weight loss averaged 71% of excess weight. Neither a good nor bad effect of the bariatric procedure on IBD could be determined from this paper.

What can we glean from this article? It is reasonable to cautiously proceed with bariatric procedures in severely obese patients with diagnosed IBD, provided their disease is stable or quiescent. It would seem prudent to apply gastric procedures (i.e., SG) in most patients, particularly those with CD because CD may involve various segments of the small bowel in the future.

There is some data which suggest that late onset CD is a more severe disease in the severely obese hypothetically from the chronic inflammatory state seen in those patients. These data are at present rudimentary, but they nevertheless support the possibility that weight reduction would produce some amelioration of the severity of CD [1]. No relationship between UC and obesity had been established.

Surgical procedures often performed in IBD patients such as total colectomy with ileoanal pull-through in patients with UC and ostomies in patients with UC and