Management of Overweight and Obesity in Patients With Inflammatory Bowel Disease

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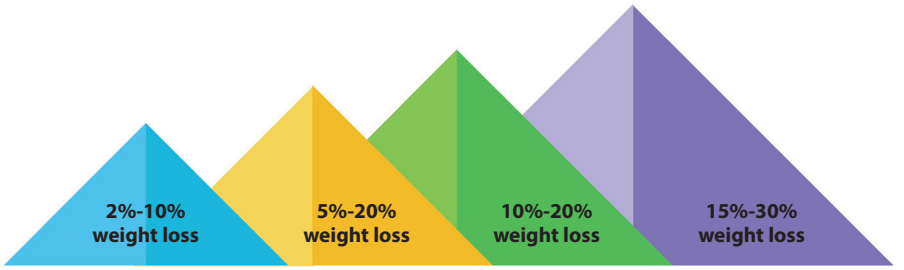
Abstract: Increasing evidence has linked obesity to complications of inflammatory bowel disease (IBD); however, data are limited on the efficacy and impact of weight management strategies on the disease course. There are a strikingly limited number of interventional studies on weight management in patients with IBD, and the recent nutrition and IBD guidelines published in the United States do not mention weight management strategies. Overweight and obesity management in patients with IBD should follow a stepwise approach to assessment and treatment, including lifestyle modification, anti-obesity medications such as glucagon-like peptide-1 agonists, endobariatric procedures, and bariatric surgery (if deemed appropriate). This article reviews the management of overweight and obesity in patients with IBD, examines the efficacy of currently available interventions and their impact on the IBD course, and proposes a stepwise approach to the assessment and treatment of overweight or obesity for the IBD provider.

Keywords
Inflammatory bowel disease, Crohn's disease, ulcerative colitis, overweight, obesity, lifestyle modification, anti-obesity medications, weight management, endobariatrics

The incidence and prevalence of obesity and overweight are rising globally. Although recent studies have suggested that obesity is linked to complications in patients with inflammatory bowel disease (IBD), the data on the safety, efficacy and impact of weight management strategies in this population are limited. In fact, the most recent US nutrition and IBD guidelines do not discuss weight management interventions in this high-risk patient population.[1] In contrast, the European Society for Clinical Nutrition and Metabolism and United European Gastroenterology have jointly published a guideline addressing obesity management among patients living with



Indications by BMI	Lifestyle modification	Pharmacotherapy	Endoscopic interventions[a]	Bariatric surgery[a]
25-26.9	√			
27-29.9	√	With comorbidities		
30-34.9	√	√	√	
35-39.9	√	√	√	With comorbidities
>40	√	√	√	√

Figure 1. Stepwise approach to management strategies for patients with IBD who are overweight or obese.

BMI, body mass index; GIP, gastric inhibitory polypeptide; GLP-1, glucagon-like peptide-1; IBD, inflammatory bowel disease.
[a]Consider endoscopic interventions and bariatric surgery in patients with IBD who do not have foregut disease.

gastrointestinal and liver diseases, including those with IBD. The joint guideline recommends a comprehensive approach to management that accounts for concurrent issues such as malnutrition, sarcopenia, and vitamin deficiencies. Overall, management of those living with overweight or obesity should follow a stepwise approach to assessment and treatment.[2] This article reviews the efficacy of currently available treatments for the management of overweight and obesity in patients with IBD, including lifestyle modification, anti-obesity medications such as glucagon-like peptide-1 (GLP-1) agonists, endobariatric procedures, and bariatric surgery, and examines the impact of these interventions on the IBD course. A stepwise approach to the assessment and treatment of patients with IBD who are living with overweight or obesity is provided (Figure 1).

Lifestyle Modifications for Weight Loss

Dietary Changes and Calorie Restriction

Despite the worsening obesity epidemic and the known association between visceral adipose tissue (VAT) and disease-related complications, there are few studies evaluating the impact of dietary changes on weight reduction and IBD complications (Table 1). In the past decade, there has been increasing interest in using various dietary interventions such as the Mediterranean diet to promote weight loss. In a prospective study of 142 patients with IBD (84 with ulcerative colitis [UC], 58 with Crohn's disease [CD]), adherence to a Mediterranean diet for 6 months resulted in a significant reduction in body mass index (BMI) (UC -0.42 points, P=.002; CD -0.48 points, P=.023) and waist circumference, an inexact measure of VAT (UC -1.25 cm, P=.037; CD -1.37 cm, P=.041).[3] Of interest, adherence to a Mediterranean diet was also associated with improvement in liver steatosis in patients with CD and UC. Additionally, this study observed significant improvements in inflammatory biomarkers, clinical disease activity, and quality of life. Although the change in BMI was statistically significant, it was small and unlikely to be clinically significant. Despite the improvements seen in IBD, the efficacy of the Mediterranean diet for weight loss in the general population has been quite variable. The Mediterranean diet has been associated with significant improvements in cardiovascular disease; however, studies evaluating a reduction in BMI or VAT have had varying results.[4,5] A systematic review assessing the effect of a Mediterranean

Table 1. Lifestyle Modification Studies in Patients With IBD

Source	Study type	No. of patients	IBD type/activity	Intervention	Outcomes
Ng et al[62]	Prospective	32	CD, mildly active or in remission	Low-intensity walking program	Exercise group had significantly improved QoL No increase in disease activity
Klare et al[63]	RCT	30	CD and UC, mild to moderate	10-week exercise program	Health-related QoL improved 19% in the intervention group and 8% in the control group No adverse events were noted
Jones et al[64]	Prospective	1857	CD and UC	Godin leisure-time activity index to assess exercise	Among patients with CD, those with higher levels of exercise were significantly less likely to develop active disease at 6 months Similar results not seen in patients with UC
Chicco et al[3]	Prospective	142	CD and UC	Mediterranean diet for 6 months	Improved BMI and waist circumference and reduced liver steatosis Improved QoL in both UC and CD patients No change in lipid profile
Negm et al[13]	Prospective observational	80	CD and UC	Fasting during Ramadan (mimicking IF)	No change in inflammatory markers In patients with UC, partial Mayo score increased (most pronounced in those who were older and had higher baseline calprotectin levels)
Tavakkoli et al[65]	Prospective	60	CD and UC in remission	Fasting during Ramadan (mimicking IF)	No worsening of IBD symptoms or severity No change in QoL UC activity score decreased significantly with fasting

BMI, body mass index; CD, Crohn's disease; IBD, inflammatory bowel disease; IF, intermittent fasting; QoL, quality of life; RCT, randomized controlled trial; UC, ulcerative colitis.

diet on glycemic control, weight loss, and cardiovascular disease in patients with type 2 diabetes (9 studies with 1178 patients) showed that adherence to a Mediterranean diet led to improvement in glycemic control and blood pressure with an average decrease in BMI of 0.29.[5] In summary, although a Mediterranean diet is considered an overall healthy diet and is recommended for patients with IBD, there are no clear data suggesting this diet is effective for weight loss in those who are living with overweight or obesity.

There is a clear association between higher energy consumption and the development of excess adiposity.[6] In contrast, calorie restriction (CR) can have a significant impact on weight and systemic inflammation.[6-8] More specifically, CR has been associated with improved energy metabolism, reduced insulin insensitivity as well as oxidative stress, and perhaps a beneficial shift in the fecal microbiome.[6] CR is defined as a reduction in total caloric intake (continuous energy restriction), regardless of whether this comes from a reduction in proteins, fats, or carbohydrates. Popular methods of CR include time-restricted eating, a ketogenic diet, fasting-mimicking diet (a 5-day cycle high in unsaturated fats and low in calories, proteins, and carbohydrates designed to mimic fasting physiologically while still consuming food), alternate-day fasting, or modified alternate-day fasting (Table 2).[6] However, excessive calorie restriction is also a concern, as starvation may worsen metabolic functions. In patients with IBD, it is crucial to only recommend CR to appropriate patients (those without a history of an eating disorder, for example) and to involve a registered dietitian with expertise in weight management and/or IBD in the patient's care. Restrictive and disordered eating are not uncommon in patients with IBD.[9] Therefore, it is very important to screen for restrictive and disordered eating as well as malnutrition and micronutrient deficiencies prior to starting a weight management program.

Looking specifically at the impact of CR on obesity, Rangan and colleagues[10] demonstrated in a rodent model of IBD that mice exposed to a fasting-mimicking diet (low calorie, low protein, plant-based diet) not only had significant reduction in body weight (<20%) but also had reduced intestinal inflammation, increased epithelial regeneration from stem cells, and promotion of anti-inflammatory microbiome populations compared with mice fed a regular diet. These results were confirmed in an additional study in which a fasting-mimicking diet for weight management resulted in a significant weight loss as

Table 2. Types of Fasting Diets for Weight Loss

Intermittent fasting diets	
Alternate day fasting	24-hour period of fasting followed by a 24-hour period of unrestricted eating
5:2 fasting	2 days per week of fasting (not back-to-back) and 5 days of unrestricted eating
16:8 fasting	Unrestricted eating during an 8-hour window each day
Periodic fasting	Caloric intake is significantly reduced for multiple days (consecutively) followed by unrestricted eating for the rest of the month
One meal a day	One meal is consumed within 1 hour per day, followed by fasting for the remaining 23 hours
Fasting-mimicking diet	
5 days of low-calorie, low-protein, low-carbohydrate, and high-fat consumption followed by 25 days of normal eating	

well as reduced IBD symptoms and systemic inflammation, promoting regeneration of the inflamed enterocytes and repair of the damaged intestinal epithelium.[11] Most recently, Wu and colleagues[12] studied the changes associated with intermittent fasting (IF), including weight improvement as well as changes in the microbiome and metabolome after 2 weeks and 20 weeks of the restricted eating pattern. In this study, 2 weeks of IF resulted in a significant drop in weight as well as an increase in *Bacteroides, Muribaculum,* and *Akkermansia* ($P<.001$, $P<.001$, $P<.001$, respectively) and decreased the abundance of *Ruminiclostridium* ($P<.05$). The authors concluded that IF improves glucose metabolism but may also positively influence the microbiota in mice with colitis. In humans, a prospective observational study of 80 patients with IBD who were fasting during Ramadan (mimicking IF) found an increase in clinical disease activity in patients with UC (60) and no significant changes in those with CD (20).[13] Those who were older and those with a higher baseline calprotectin were more likely to have an increase in disease activity with fasting. More recently, a study on time-restricted eating in 12 patients with IBD demonstrated that the dietary restriction was well tolerated and associated with improvement in clinical disease activity after 4 weeks.[14] However, in this study, there was no significant drop in weight or other body composition metrics after the intervention. To date, there are at least 3 ongoing prospective studies assessing the impact of time-restricted eating on weight loss and IBD outcomes.[15] Early findings from one of these studies show significant weight loss compared with standard of care (3.1% vs 0%) in a cohort of UC patients who underwent IF.[16] Future studies are expected to not only quantify the average weight loss associated with this method of CR but also identify any improvement in IBD outcomes and which patients would benefit most from this weight management technique.

Impact of Exercise on Weight Loss

To date, there are no studies specifically evaluating the impact of exercise on weight loss in patients with IBD. This may be because exercise (defined as a type of physical activity that is planned, structured, and often repetitive) is designed to improve overall physical fitness, and by itself, without dietary changes, medications, or bariatric procedures, plays a small role in overall weight loss.[17] The obesity, diabetes, and endocrine societies all recommend exercise as part of any weight loss program based on the findings of multiple studies.[17] Exercise has been associated with improved cardiovascular outcomes and fitness, reduced insulin insensitivity, reduction in blood pressure, and improvement in mental health and quality of life.[17] However, these findings could be secondary to bias, as patients often overreport actual exercise and underreport food intake. Future studies using devices that measure physical activity, such as wearable monitors, may prove very useful tools for research in this area. Nonetheless, studies suggest that individuals who are active for more than 150 minutes per week and include aerobic exercises, resistance training, and stretching have the most weight loss.[17] Aerobic exercise and resistance training have been shown to reduce visceral fat in the general population.[18] Moreover, given the increased risk of sarcopenia in patients with IBD, the inclusion of exercise and more specifically resistance training as part of any weight loss program is highly encouraged to mitigate muscle loss.[19] Further research is required to determine optimal timing and composition of an exercise program for patients with IBD to support healthy, sustainable weight loss and VAT reduction, while limiting loss of healthy muscle and any worsening of symptoms.

Pharmacotherapy for Weight Loss

Similar to lifestyle modifications, a limited number of clinical trials support the efficacy of pharmacologic treatments for obesity in IBD; however, a few retrospective studies and case reports have documented both the efficacy and safety of these agents. Many of these agents are not only effective for weight reduction but may improve IBD outcomes as well. Although there are many pharmacologic therapies available for weight loss, this article focuses mostly on the novel GLP-1 agonists, as these agents are rising in popularity and of increasing interest for use in patients with IBD.

Glucagon-Like Peptide-1 Agonists

The GLP-1 agonists semaglutide (Ozempic, Novo Nordisk) and liraglutide are currently among the most effective and popular medications for weight management. To date, there are 2 studies assessing the efficacy of these agents for weight loss in IBD patients living with obesity.[20,21] In a retrospective study of 16 patients with UC treated with liraglutide or semaglutide in a Spanish tertiary care center, there was a median of 5.7 kg (interquartile range, 3.7-8 kg) of weight loss over 6 months of therapy with a mean percent weight loss of 6.6% (range 3.6%-8.5%).[20] Of the 16 patients in this study, 3 discontinued treatment prior to 6 months (2 owing to minimal weight loss and 1 owing to diarrhea). Similarly, Pham and Johnson[21] studied 24 patients with mostly quiescent or mild CD or UC as well as obesity treated with 5 different weight loss therapies. In 9 patients treated with liraglutide in this study, the average weight loss was 1.8% after 12 months and only 1 patient discontinued therapy because of side effects. In both of these studies, the mean percentage of weight loss was lower than that published in the initial clinical trials of both liraglutide and semaglutide; furthermore, these studies are limited by a small sample size. A 2024 study by Desai and colleagues[22] demonstrated the efficacy of semaglutide for weight loss in patients with IBD and obesity (similarly to patients without IBD), and there was no increased risk of adverse events. Additional studies are needed to further assess the efficacy and safety in the short and long term of these agents as well as of tirzepatide (Zepbound, Eli Lilly), a GLP-1/gastric inhibitory polypeptide agonist, in those with IBD and obesity.

Prior to the rise in popularity of GLP-1 agonists for weight loss and diabetes management, these peptides were studied for years at a molecular level in connection with IBD and systemic inflammation. In the intestinal epithelium, GLP-1 is secreted by enteroendocrine L cells. Interestingly, a high density of cells with intracellular concentrations of this peptide has been observed in the ileum and the rectum, important locations of disease activity in CD and UC, respectively.[23,24] Given this, it is not surprising that dysregulation of GLP-1 has been documented in IBD patients.[25,26] Both GLP-1 receptor expression and postprandial GLP-1 release have been shown to be reduced in IBD patients with active disease, although the etiology of GLP-1 dysregulation in IBD patients is not entirely understood.[25,26] This mechanism is supported by early human data suggesting that GLP-1 agonists can improve disease activity. Villumsen and colleagues[27] found that of 3751 patients with both IBD and type 2 diabetes identified from Denmark's national health registry as being treated with an antidiabetic drug, those who were treated with a GLP-1–based therapy (982 patients) had a lower risk of IBD-related adverse clinical events (defined as the need for oral corticosteroids, tumor necrosis factor alpha (TNF-α) inhibitors, IBD-related hospitalization, or IBD-related surgery) compared with those treated with other antidiabetic agents (2769 patients). These findings are supported by studies in rodent models, which have shown that GLP-1 agonists have wide-ranging immune effects, reducing macrophage migration and concentrations of proinflammatory cytokines, such as TNF-α and interleukin (IL)-1.[28,29] Additional murine studies have demonstrated that introduction of IL-6 and lipopolysaccharide, both of which are proinflammatory, increases GLP-1 secretion, suggestive of GLP-1 agonists' role in the intestinal response to inflammation.[30,31] Taken together, these studies highlight the potential impact of GLP-1 agonists on systemic inflammation and disease course in patients with IBD, independent of the impact on weight loss.

Given that the overwhelming majority of side effects from GLP-1 agonists are related to the gastrointestinal tract, it is important to consider these effects in patients with IBD. In the phase 3 clinical trials for liraglutide and semaglutide, the most common side effects were nausea, diarrhea, and constipation.[32] In the initial studies mentioned previously and anecdotally from providers using these agents in patients with IBD, these side effects have not significantly limited use of these drugs. It is important to note that there have been conflicting data on whether GLP-1 agonists are associated with an increased risk of bowel obstruction.[33,34] The increased risk of bowel obstruction may be secondary to bowel wall thickening and intestinal villous growth that has been seen in rodent models treated with GLP-1 agonists, and perhaps is precipitated in human patients who develop significant constipation as a side effect.[35] Further studies are needed to better understand this potential side effect of GLP-1 agonists.

Patients with IBD are at increased risk for developing sarcopenia, defined as a loss of muscle mass or function. Independent of disease activity, sarcopenia is associated with disease complications, including poor response to biologics and increased postoperative complications. It is important to recognize that sarcopenia may be exacerbated by the muscle loss associated with GLP-1 agonist use.[36] Further studies are needed to understand if patients with IBD develop more significant muscle loss as compared with the general population and the impact of concomitant resistance training in combination with high-quality diet on muscle health. Finally, the route of administration of GLP-1 agonists is an important practical consideration in patients with IBD. Semaglutide is now available in both subcutaneous and oral forms. Oral semaglutide is primarily absorbed in the gastric mucosa; further studies are necessary to understand absorption patterns in patients with upper gastrointestinal involvement of their CD.[37,38]

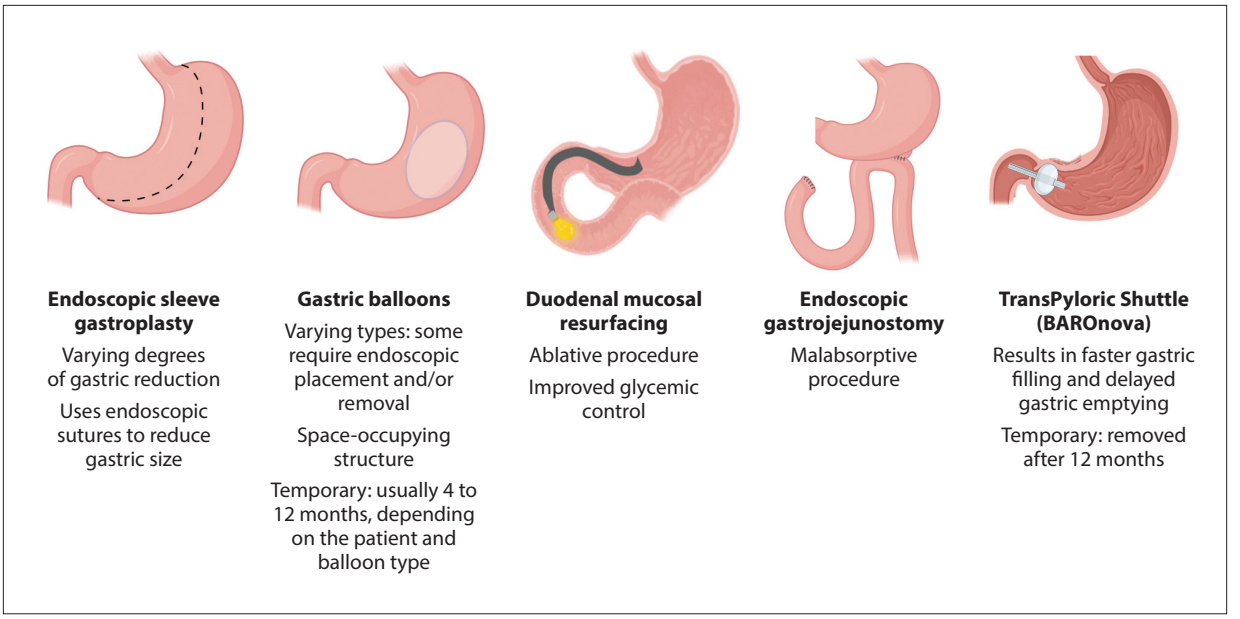


Figure 2. Endobariatric procedures for weight loss in patients with inflammatory bowel disease.

Other Pharmacologic Therapies

Although GLP-1 agonists have dominated the pharmacologic weight loss industry, phentermine has been reported in a small study to result in more weight loss in UC patients as compared with semaglutide and liraglutide.[21] In this study, both bupropion-naltrexone and phentermine were shown to be effective for weight loss in patients with IBD. However, the fact that the study was small limited the conclusions that could be drawn.[21] Metformin, which has been used for weight loss in patients with diabetes, has yet to be studied in patients with IBD. Of these drugs, bupropion-naltrexone and metformin have been reported to have gastrointestinal side effects, such as vomiting, nausea, and diarrhea.[39,40] Similar to the GLP-1 agonists, other weight loss agents have demonstrated the potential to improve IBD outcomes. For example, metformin has been shown in murine models to reduce disease activity by suppressing the signal transducer and activator of transcription 3 signaling pathway and reducing IL-17 expression.[41] Other available pharmacologic agents for obesity, such as orlistat, are not recommended for patients with IBD owing to the pronounced gastrointestinal side effects, including steatorrhea and diarrhea.[42] In addition, some of the weight management therapies on the horizon may be contraindicated in patients with IBD. For example, metreleptin (Myalept, Chiesi), a leptin analog being studied for weight management, is thought to increase proinflammatory cytokines, such as TNF-α, suggesting that this agent may not be well suited for patients with IBD.[43,44]

Microbiota Manipulation

Both IBD and obesity are associated with alterations in the gut microbiome. Given this, there has been increased research interest in modulation of the microbiome from probiotic supplementation or fecal microbiota transplantation (FMT) as a target for weight loss. Supporting this theory, in rodent studies, the administration of various strains of *Lactobacillus* has been shown to decrease in the abundance of the proinflammatory *Firmicutes* phylum, enhance insulin sensitivity, reduce levels of low-density lipoprotein cholesterol, and reduce body weight.[45] In the landmark study examining the efficacy of FMT for weight loss, twin mice (1 lean and 1 obese) were cohabitated and their weight as well as microbiome were monitored; in this study, the microbiota from the lean mice prevented additional weight gain and obesity-associated metabolic disease in the obese mice.[46] Subsequent studies showed that those mice who received FMTs from either lean or obese humans ultimately mirrored the adiposity phenotype of the donor.[46,47] Moreover, in a study in which fecal material from a wild boar (an animal with high amounts of lean skeletal muscle) was given to mice, the recipient animals were able to maintain their lean mass despite a high-fat diet and reduce the development of hyperlipidemia.[48] Finally, looking at the use of FMT as an adjunctive therapy for weight loss, mice subjected to a high-fat diet were then given a CR diet (25% less than energy needs) either alone or with an FMT; the mice who received FMT and a CR diet were significantly lower in weight than those in the diet-only group.[49] These findings have prompted several studies in humans receiving FMT; however, the

Table 3. Endobariatric and Bariatric Surgery Studies in Patients With IBD

Source	Study type	Number	IBD type	Intervention	Outcomes
Johnson et al[52]	Case series	7 patients	CD and UC	ESG: 4 IGB: 3	No complications noted Weight loss as expected Obesity-related comorbidities improved in 4 patients 1 patient had a disease flare
Reenaers et al[66]	Retrospective	85 patients	CD and UC	RYGB: 3 SG: 73 GB: 12	No difference in postoperative complications, nutritional deficiencies, or proportion of weight loss between IBD and non-IBD patients (matched controls)
Mian et al[67]	Systematic review	13 studies	CD and UC	Not specified	Bariatric surgery was safe and effective with significant weight loss at 6 and 12 months postoperatively
Braga Neto et al[68]	Retrospective	47 patients	CD and UC	RYGB: 28 SG: 8 GB: 8 Other: 2	IBD patients who had significant weight loss after surgery had fewer IBD-related complications compared with matched controls
Aminian et al[54]	Retrospective	20 patients	CD and UC	RYGB: 7 SG: 9 GB: 3	Mean change in BMI at 1 year was 14.3 +/- 5.7 7 early postoperative complications occurred (5 patients with dehydration, 1 pulmonary embolism, 1 wound infection) 90% of those with FU had improvement in IBD status
Colombo et al[69]	Case series	6 patients	CD and UC	Restrictive bariatric surgery	Bariatric surgery was safe and effective in IBD patients as compared with 95 controls without IBD 5 patients were able to stop corticosteroids and were in endoscopic remission at 1 year postoperatively
Sharma et al[70]	Retrospective, database study	493 patients	CD and UC	Not specified	Despite an increase in BMI, there was a decrease in IBD patients undergoing bariatric surgery from 2004 to 2014 Those who had bariatric surgery had a reduction in morbidity and no change in mortality
Ungar et al[71]	Retrospective	4 patients	CD	SG	Favorable surgical course, no complications
Keidar et al[58]	Prospective	10 patients	CD and UC	SG: 9 GB: 1	After an average of 46 months FU, all patients had weight loss and 10 of 16 obesity-related comorbidities resolved No IBD exacerbations 1 surgical complication reported
Bazerbachi et al[55]	Retrospective, database study	791 patients	CD and UC	Not specified	Increased risk of postoperative small bowel obstruction in IBD patients as compared with healthy controls No mortality in IBD patients
Hudson et al[57]	Systematic review	101 patients	CD and UC	Not specified	Mean excess weight loss: 68.4% 10 patients had a disease flare postoperatively, 20 remained in remission, 7 stopped IBD therapy

BMI, body mass index; CD, Crohn's disease; ESG, endoscopic sleeve gastroplasty; FU, follow-up; GB, gastric band; IBD, inflammatory bowel disease; IGB, intragastric balloon; RYGB, Roux-en-Y gastric bypass; SG, sleeve gastrectomy; UC, ulcerative colitis.

results are quite variable, likely secondary to significant heterogeneity among the donors and recipients.[50] In the majority of human studies to date, there has not been significant weight loss associated with FMT. For example, in a randomized clinical trial of 41 patients living with obesity, there was no significant difference in those treated with an FMT from a lean donor in comparison to their own fecal microbiota after 6 months of follow-up.[51] There are no studies specifically assessing the use of FMT in IBD patients with obesity, and further work is needed to better understand if the microbiome can be manipulated, either alone or in combination with lifestyle changes, as an effective weight management strategy.

Novel Endobariatric Procedures for Weight Loss

With the rising obesity epidemic, there has been an increased interest in novel, noninvasive endoscopic bariatric therapy (EBT) procedures for weight loss (Figure 2). Data on the safety and efficacy of these procedures in patients with IBD are very limited. To date, there is a

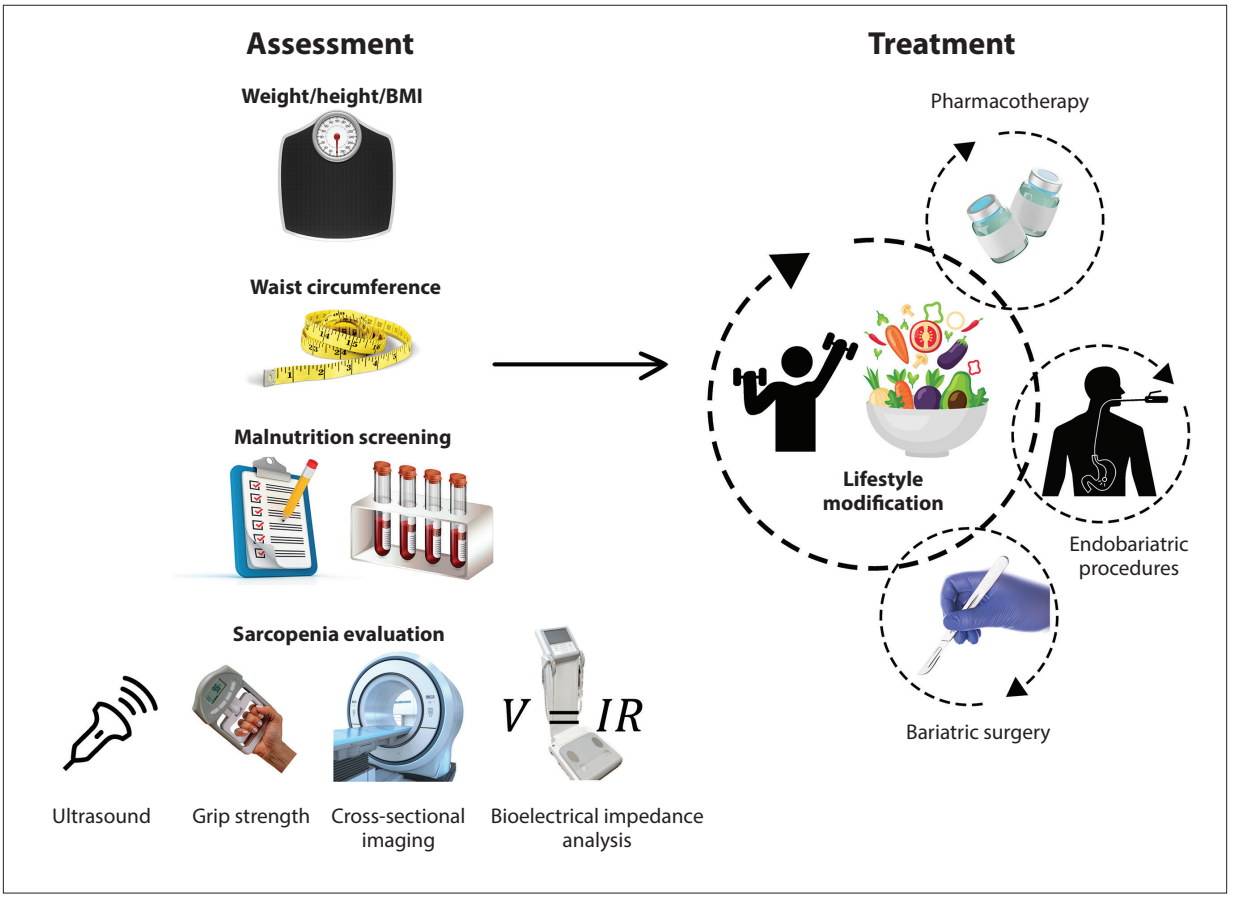


Figure 3. Care of patients with IBD and overweight or obesity should include both assessment and treatment. Anthropometric testing including weight and height with calculation of BMI should be done for all IBD patients, and waist circumference should be measured in overweight patients. Malnutrition screening for restrictive and disordered eating as well as micronutrient deficiencies is important prior to starting obesity treatment. When possible, additional assessment of muscle mass should be performed with ultrasound, grip strength, cross-sectional imaging and/or bioelectrical impedance analysis. In terms of treatment, lifestyle modification should be seen as a component of all overweight and obesity management programs. This can be combined with pharmacotherapy, endobariatric procedures, or bariatric surgery.

BMI, body mass index; IBD, inflammatory bowel disease; V=IR, voltage is equal to current multiplied by resistance (Ohm's Law).

single retrospective case series of 7 patients with IBD (6 with CD and 1 with UC) who underwent EBT, including 3 patients who were treated with an intragastric balloon and 4 who underwent endoscopic sleeve gastroplasty (Table 3).[52] Of interest, 3 patients had prior IBD-related surgery and all 7 were on biologic therapy, with 6 in clinical remission at the time of the procedure. In this small study, all of the patients successfully lost weight (average weight loss 27.5%, range of 4%-46.4%) at 6 months after the EBT with no procedure-related serious adverse events. Additional studies are underway to better define the efficacy and safety of endoscopic sleeve gastroplasty and other EBT procedures in those with IBD (eg, NCT05739162). It will be crucial to understand which patients with IBD are at increased risk for postprocedural malnutrition and/or sarcopenia, especially with more cutting-edge procedures such as duodenal mucosal resurfacing.

Bariatric Surgery

Bariatric surgery continues to represent another option to treat obesity in patients whose BMI is more than 40 or more than 35 with 2 or more comorbidities, including diabetes, hypertension, and dyslipidemia. In the general population, bariatric surgery is not only an effective strategy for weight loss but malabsorptive procedures, such as a Roux-en-Y gastric bypass, can reverse metabolic complications and improve systemic inflammation.[53] In patients with IBD, concerns regarding postoperative fistulae, anastomotic strictures, obstructions, abscesses, and

increased disease flares have been proposed as potential concerns regarding bariatric surgery in patients with CD or UC. Although many providers are comfortable referring patients with UC or colonic CD for bariatric surgery, there is increased concern over the safety of these procedures in patients with foregut CD. However, recent studies have suggested that bariatric surgery is largely safe, effective, and may even have disease-modulating effects (Table 3).[54-56] A systematic review showed postoperative complications for patients with IBD undergoing bariatric surgery were comparable to national rates for the general population.[57] This same study showed an average 6-month excess weight loss of 68% for patients with IBD, which is quite similar to that for the general population.[57] In a retrospective study of 12 UC and 7 CD patients undergoing bariatric surgery, 90% of patients had improvement in their IBD status, which was defined by a discontinuation or reduction in maintenance IBD medications or clinical improvement in symptoms, with associated weight loss.[54] In a similar small prospective case series of 8 patients with CD and 2 with UC who underwent bariatric surgery, all had significant weight loss (average of 71%), and no IBD flares or disease complications were reported.[58] Although bariatric surgery may be the most effective weight loss strategy in the appropriate patients, further research is needed to identify the optimal types of procedures (malabsorptive vs restrictive), the ideal IBD candidate for a bariatric surgery, and how to position this strategy among the novel pharmacologic interventions.

Overweight and Obesity Assessment and Treatment for the IBD Provider

Although the majority of gastroenterologists and IBD providers have not had specific nutrition and/or obesity training, they can still play a significant role in the identification and management of obesity.[59] Using the most recent European guideline on obesity care for patients with gastrointestinal disease, a few general recommendations can be made for the practicing gastroenterologist.[2] First, all patients with IBD should be evaluated for malnutrition at the time of diagnosis and regularly thereafter. This should include an anthropometric assessment, which can be as simple as measurement of weight, height, and even waist circumference where appropriate. These metrics should be measured at each clinic visit, as they are an important vital sign for patients with IBD. In patients who are overweight (BMI, 25.0-29.9), waist circumference should be measured and an assessment for liver steatosis should be considered based on laboratory data and clinical history. In addition, in those patients who are found to have obesity (BMI, ≥30), additional testing for diabetes, thyroid disease, abnormal lipid levels, and so on should be performed. When possible, patients with IBD who are found to have obesity should undergo additional testing to evaluate for sarcopenia. This can be as simple as measuring grip strength (using a digital dynamometer) or performing bioelectrical impedance analysis, cross-sectional imaging, dual-energy X-ray absorptiometry, or bedside ultrasound. Sarcopenia assessment has been shown to be possible in a busy clinical setting, as the tests for it can be done at the time vital signs are obtained and do not require significant training to perform.[60] In addition, malnutrition assessment with any validated tool, such as the Malnutrition Universal Screening Tool (for risk assessment) and the Global Leadership Initiative on Malnutrition (for diagnosis), is essential in this population.[60] Micronutrient assessment should also be completed in those identified as malnourished based on clinical history, including but not limited to vitamins B1, B6, B9, B12, A, C, D, E, K, as well as iron, zinc, magnesium, copper, and selenium. In patients with obesity who are planning to start a biologic, it is important to discuss concomitant obesity management in order to optimize treatment response, as higher proportions of VAT have been associated with impaired response to biologics.[61] Similarly, weight management strategies should be discussed with IBD patients with obesity who are planning to undergo nonemergent IBD surgery in an effort to reduce surgical complications (eg, parastomal hernias, anastomotic leaks, and infections) and improve postoperative outcomes (Figure 1).

All IBD patients with obesity should be offered weight management guidance by an appropriately trained provider. The European guideline on obesity care recommends a stepwise approach for patients with gastrointestinal disease, similar to the general population, starting with lifestyle modifications but quickly escalating care to pharmacologic medications, EBT procedures, or bariatric surgery if lifestyle modification does not result in clinically significant weight loss (Figure 3).[2] Except for orlistat, the majority of anti-obesity medications can be used in patients with IBD while monitoring for side effects.[2] In patients with a BMI greater than 30 who have not had successful weight loss on anti-obesity medications, those with a contraindication to medical therapy, or those who could not tolerate these treatments owing to side effects, EBT offers a noninvasive weight management strategy. Finally, in patients with a BMI greater than 40 or greater than 35 with 2 or more comorbidities for whom medical management has failed, bariatric surgery, especially nonmalabsorptive procedures, can be considered. IBD severity and location should be considered when discussing obesity management in patients with IBD, especially those who may need IBD surgery in the future. Such patients include those with severe UC or stricturing CD and those with reduced small bowel length or an ileoanal pouch who may

have higher rates of postoperative diarrhea.[2] Patients with severe UC or stricturing CD should preferentially consider medical management, as bariatric surgery may make future IBD surgeries more technically difficult.

Conclusions and Looking Forward

In the past decade, it has become increasingly clear that IBD patients are not immune to the rising obesity epidemic and that obesity, specifically visceral fat, is a predictor of disease complications. Therefore, it is crucial for IBD providers to assess patients for overweight and obesity and offer timely and effective weight loss strategies. With the development of highly effective anti-obesity therapies, including novel GLP-1 agonists and other medications on the horizon, patients can be offered non-invasive, effective strategies for substantial weight loss and the potential to improve their disease course. However, there is limited evidence on the use of these obesity interventions in patients with IBD, and future studies are needed to identify which therapeutic strategy is best based on IBD phenotype, disease activity, and luminal anatomy. Strategies including resistance training may prove to be beneficial in reducing muscle loss for patients with IBD who undergo obesity treatment. In addition, novel medications currently under investigation, such as bimagrumab (Eli Lilly), an activin type II receptor antagonist that stimulates skeletal muscle growth, may be combined with GLP-1 agonists to support healthy weight loss with preservation of lean skeletal muscle.

Looking forward, use of obesity phenotyping strategies to identify which patients would benefit from which interventions would truly advance the field and offer individualized care plans. Offering an effective weight loss strategy that minimizes side effects, including muscle loss, should become standard of care for all patients with overweight and obesity in order to reduce both IBD-related complications as well as the many metabolic complications associated with excess weight, thus providing truly comprehensive care.

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