ORIGINAL CONTRIBUTION

Bowel Habits and Fecal Incontinence in Patients With Obesity Undergoing Evaluation for Weight Loss: The Importance of Stool Consistency

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BACKGROUND: Fecal incontinence is highly prevalent in the general population and especially in risk groups. Obesity is also common and is associated with comorbidities that impair general health and interfere with daily activities. Identifying mutable factors for fecal incontinence, such as stool consistency, is of paramount importance to improve quality of life.

OBJECTIVE: The aim of this study was to estimate the prevalence of fecal incontinence in patients with obesity undergoing evaluation for weight loss, its relationship with bowel habits, and its impact on quality of life.

DESIGN: This investigation is a cross-sectional observational study.

SETTINGS: This study was conducted in patients with obesity who were undergoing evaluation for weight loss.

MAIN OUTCOME MEASURES: Fecal incontinence was defined as loss of flatus or liquid/solid stool occurring at least monthly. Data on comorbidities, BMI, quality of life, bowel habits including stool consistency measured with the Bristol Stool Form Scale, and symptoms of fecal incontinence were collected.

RESULTS: Fifty-two patients were included, with a mean BMI of 39.6 kg/m^2. Symptoms of fecal incontinence were found in 17 patients (32.7%): flatus in 9 of 17 (52.9%), liquid stool in 6 of 17 (35.2%), and solid stool in 2 of 17 (11.7%). No differences were found between patients with and without fecal incontinence in age, sex, comorbidities, or BMI. Health-related quality of life was lower in patients with fecal incontinence than in those without, but this difference was not significant, with the exception of the dimensions of role-physical ($p = 0.03$) and social functioning ($p = 0.04$). Patients with incontinence reported significantly higher percentages of altered bowel habits with nonformed stools ($p = 0.004$).

LIMITATIONS: The cross-sectional design hampered identification of the time at which the impact of obesity occurred.

CONCLUSIONS: Fecal incontinence is common in patients with obesity. Stool consistency was significantly different in these patients. This study supports the possibility of improving incontinence during weight loss by modifying stool consistency.

KEY WORDS: Fecal incontinence; Obesity; Stool consistency; Bristol Stool Form Scale.

Fecal incontinence (FI) is a significant health care problem with more than 5% of community-dwelling adults reporting symptoms and approximately 1% experiencing symptoms that restrict their lives.[1] Obesity is increasingly common in the developed world[2] and is significantly associated with comorbidities that impair general health and interfere with basic activities of

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daily living.[3] Although obesity has been linked to urinary incontinence, its association with FI is less studied.[4,5]

Several possible mechanisms have been proposed to explain how obesity influences continence. Chronically increased intra-abdominal pressure, obesity-related nerve conduction abnormalities, and intervertebral disc herniation injury have been described.[6,7] Unfortunately, for patients losing weight with medication or before surgery, few treatments are currently available for FI.

The Bristol Stool Form Scale (BSFS) is a widely used scale to evaluate stool consistency.[8] Bowel disturbances such as chronic diarrhea have recently been considered to be one of the most important risk factors for late-onset FI.[9] This information is important because identifying modifiable risk factors, such as stool consistency, for FI in patients with obesity is critical for improving outcomes and quality of life.[10,11]

Unfortunately, no studies have been performed to identify modifiable risk factors for FI in patients with obesity. The primary objective of this study was to estimate the prevalence of FI in patients with obesity undergoing evaluation for weight loss. Specifically, bowel habits and stool consistency were studied.

PATIENTS AND METHODS

A cross-sectional study was performed among consecutive patients with obesity who attended our hospital from October 2009 to October 2010.This study was approved by the Research Ethics Committee of our institution, and all participants gave explicit informed consent for their data to be used in this study.

Inclusion and Exclusion Criteria

Of all the patients who attended the Department of Endocrinology and Clinical Nutrition, those with a BMI of 30 or over evaluated for weight loss were included in the study. The only exclusion criteria were pregnancy or treatment for FI before enrollment.

Orlistat is a gastrointestinal lipase inhibitor that interferes with fat absorption and is widely used in treating obesity.[12] This treatment commonly causes flatulence and diarrhea. Therefore, all included patients were evaluated before any treatment or diet, including orlistat, was started.

Study Variables

A detailed interview was conducted, height and weight were measured to calculate BMI, and data on demographics, past medical history, and obesity-related comorbidities were gathered. The FI questionnaire was administered, and patients were also asked selected detailed questions based on Rome III classifications of bowel habits.[13] In all included patients, quality of life was also studied prospectively through a self-reported questionnaire.

Stool Consistency

To evaluate stool consistency, the BSFS, a widely used clinical tool in functional digestive problems, was used.[8] The scale comprises a simple visual chart accompanied by a text description that classifies stools in 7 forms. The description differentiates among the following: type 1, separate hard lumps, like nuts; type 2, sausage-shaped but lumpy; type 3, like a sausage or snake but with cracks on its surface; type 4, like a sausage or snake, smooth and soft; type 5, soft blobs with clear-cut edges; type 6, fluffy pieces with ragged edges, a mushy stool; and, finally, type 7, watery, no solid pieces. This description is accompanied by a bowel record with diagrams of all types of stools. For this study, the Spanish validated scale was used.[14]

Fecal Incontinence

A patient was considered to have FI after responding positively to the following entry question: "Have you suffered any recurring episodes of involuntary loss of stool or flatus in the last 4 weeks?"[15] Patients with FI were classified according to the type of leakage (solid, liquid stool, or flatus incontinence).[15]

Quality-of-Life Assessment

Health-related quality of life was evaluated by the use of the validated Spanish version of the 36-item Short Form Health Survey.[16] This questionnaire generates scores from the following 8 health domains or subscales: limitations in physical activities because of health problems (physical functioning), limitations in usual role activities because of physical health problems (role-physical), bodily pain, general health perceptions (general health), vitality (energy and fatigue), limitations in social activities because of physical or emotional problems (social functioning), limitations in usual role activities because of emotional problems (role-emotional), and psychological distress and well-being (mental health).

Statistical Analysis

Quantitative data are expressed as absolute numbers, mean and standard deviation (SD), with the range between parentheses. Categorical variables are presented as absolute numbers or percentages. Comparisons of qualitative data were performed by means of the 2-tailed χ^2 test (or Fisher exact test when needed). Continuous variables were compared with the use of the Student t test or the Mann-Whitney U test according to a previous analysis of the normal distribution of the data. A bilateral p value of less than 0.05 was considered statistically significant. The statistical analysis was performed with the use of SPSS version 17.0 (SPSS, Chicago, IL).

RESULTS

During the study period, 52 patients (11 men) were included. The mean age of the participants was 44.8

TABLE 1. Bowel habit according to Rome III classification[13] in all surveyed patients (n = 52)

	n (%)
Inability to discriminate flatus from feces	
Yes	2 (3.8)
No	50 (96.2)
Fecal urgency	
No	32 (61.4)
Daily	9 (17.3)
Weekly	7 (13.5)
Monthly	4 (7.6)
Time to defecation	
<1 min	7 (13.5)
1–5 min	12 (23.1)
5–15 min	12 (23.1)
>15 min	21 (40.3)
Abdominal or pelvic pain during defecation	
No	40 (76.9)
Daily	6 (11.5)
Weekly	5 (9.6)
Monthly	1 (1.9)
Fecal incontinence	
Yes	17 (32.7)
No	35 (67.3)
Use of pads due to fecal incontinence	
Yes	2 (3.8)
No	50 (96.2)

(SD,15.8) years. None of the patients was excluded for any of the exclusion criteria. The mean BMI was 39.6 kg/m^2 (SD, 5.7; range, 31.1–60.1).

TABLE 2. General characteristics of surveyed patients with and without symptoms of fecal incontinence

	Fecal incontinence n = 17	*Patients without fecal incontinence n = 35*	*p*
Age, y[a]	44.3 ± 14.5	45.1 ± 16.7	0.942[b]
Sex[c]			
Male	4 (23.5)	7 (20)	1.0[d]
Female	13 (76.5)	28 (80)	
BMI (kg/m^2)[a]	41.7 ± 7.2	38.7 ± 4.8	0.250[b]
Comorbidities[c]			
Arterial hypertension	4	6	
Depressive symptoms	3	4	
Diabetes mellitus	3	4	
Anal surgery	2	0	
Obstetric trauma (in women)	1	1	
Other	9	18	0.670[d]
No. of bowel movement per day[a]	2.0 ± 1.2	1.7 ± 0.7	0.654[b]

[a]Mean ± SD.
[b]Mann-Whitney *U* test.
[c]Absolute numbers (percentages).
[d]χ^2 test.

TABLE 3. Composition and frequency of leakage in obese patients with a diagnosis of fecal incontinence (n = 17)

	Composition of leakage		
Frequency of leakage	*Flatus*	*Liquid stool*	*Solid stool*
Never	0	0	0
Rarely	2	2	0
Sometimes	2	0	0
Weekly	1	2	1[a]
Daily	4	2[a]	1[a]

Data are numbers of patients.
Never = no episodes of leakage in the past 4 weeks; Rarely = 1 episode in the past 4 weeks; Sometimes = more than 1 episode in the past 4 weeks, but less than 1 episode per week; Weekly = 1 or more episodes per week, but less than 1 per day; Daily = 1 or more episodes per day.
[a]Four patients also described incontinence for flatus.

Bowel Habits

Table 1 summarizes the questions on bowel habits. Fecal urgency was reported by 20 patients (38.5%), and symptoms of FI were reported by 17 (32.7%) (flatus incontinence in 9, liquid stool incontinence in 6, and solid stool incontinence in 2) (Table 1).

Fecal Incontinence

There were no significant differences between patients with and without FI in age, sex, comorbidities, or BMI (Table 2). The number of bowel movements per day differed slightly among patients with and without FI (Table 2). However, these differences were not statistically significant ($p = 0.65$). The composition of incontinence episodes and their frequency are presented on Table 3.

Quality of Life

Mean health-related quality of life was lower in patients with FI (Table 4). However, this difference was not significant, with the exception of the role-physical ($p = 0.03$) and social functioning ($p = 0.04$) subscales.

TABLE 4. Results of health-related quality-of-life subscales assessment (SF-36 test[16]) in patients with obesity with and without symptoms of fecal incontinence

	Fecal incontinence (n = 17)	*Patients without fecal incontinence n = 35*	*p*[a]
Physical functioning	53 ± 28.8	65.6 ± 24.9	0.140
Role-physical	56.2 ± 26.3	74.5 ± 23.4	0.031
Bodily pain	43.7 ± 24.3	51.8 ± 28.2	0.531
General health	41.3 ± 21.2	49.4 ± 19.2	0.263
Vitality	37.1 ± 30.4	47.7 ± 23.6	0.247
Social functioning	52.5 ± 31.4	70.96 ± 27.4	0.046
Role-emotional	64.4 ± 31.2	76.9 ± 22.1	0.137
Mental health	48.3 ± 26.2	59.3 ± 22.9	0.204

Data are mean ± SD.
SF-36 = 36-item Short Form Health Survey.
[a]Student *t* test.

TABLE 5. Bristol Stool Scale Form[14] in the present study and in previous studied series

Type of stool	*Heaton et al*[8] *N = 1897*	*Adibi et al*[17] *N = 1045*	*Maestre et al*[10] *N = 460*	*Present study N = 52*
1	8.6	4.2	5.2	4.2
2	13.9	8.2	9.3	14.6
3	19.5	38.7	25.2	39.6
4	47.3	37	35.7	18.8
5	5.7	4.3	6.6	12.5
6	4.8	5	7	8.3
7	Not assessed	2.5	0.1	2.1

Data are percentages.

Stool Consistency

The data on stool consistency measured by the BSFS in other published series and in our study are presented in Table 5. Patients with FI in our study reported significantly higher percentages of bowel habits with nonformed stools (stool types 6 and 7) (Fig. 1). This difference was statistically significant ($p = 0.004$).

DISCUSSION

FI is highly prevalent in the general population and especially in groups at risk.[1] Obesity has recently been considered as a risk factor for pelvic floor disorders, especially urinary incontinence and FI.[18] Moreover, diagnosis of mutable alterations in bowel habits could aid the management of this clinical disorder. In this study, we found that a high percentage of patients undergoing evaluation for weight loss had FI and altered stool consistency, as measured by the BSFS.

Obesity is an increasingly common disease in the developed world,[3] and it is significantly associated with urinary incontinence, which impairs general health and interferes with basic activities of daily living.[7] In recent years, obesity has also been considered a risk factor for FI. In a study performed using self-report questionnaires in 2109 community-dwelling women, BMI was associated with an increased prevalence of FI ranging from 19% for a BMI of <25 kg/m^2 to 35% for a BMI of >40 kg/m^2.[17] In a large case-control study performed in 415 controls and 131 patients with obesity, the prevalence of FI was 3.7% vs 13%.[19] Subsequently, several series have been published, revealing a high percentage of continence problems in this risk group[20,21]

Several mechanisms have been proposed to explain how obesity influences continence. Chronically increased intra-abdominal pressure and obesity-related nerve conduction abnormalities or intervertebral disc herniation injury have been described.[6,7] Unfortunately, these effects of obesity are not currently potential treatment targets during the weeks or months while weight loss is being achieved with medication or surgery. Recent evidence indicates that continence improves with weight loss measures alone.[11] The only question that remains unanswered is what can be done before weight loss has been achieved. The present study was designed to focus on the search of modifiable factors, which include stool consistency.

Changes in stool consistency could be a key tool in some digestive functional diseases. Therefore, evaluation of the appearance and consistency of stools is an important semiological component of the clinical approach to patients with gastrointestinal disorders.[22,23] The BSFS was developed to classify stool consistency. In a previous study, our group demonstrated that the Spanish version was suitable for use in clinical practice and research.[14] This scale is based on a text definition and a chart of each type of stool.[8] An excellent study by Heaton et al[24]demonstrated that this scale correlates very well with whole gut transit time and fecal output. However, the most useful feature of the BSFS

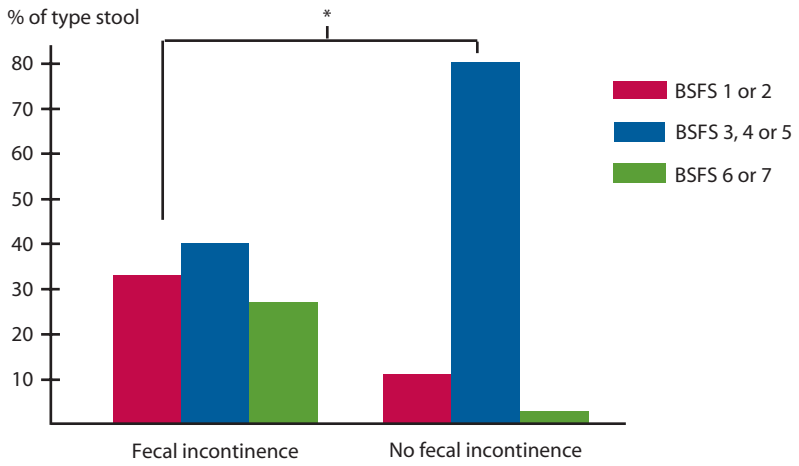

FIGURE 1. The Bristol Stool Form Scale[14] in patients with obesity with and without symptoms of FI. *$p = 0.004$ for the comparison with the χ^2 test between groups. BSFS = Bristol Stool Form Scale.

is that untrained persons can assess their stools with reasonable accuracy with the self-assessed stool form.[8] Previous studies have also demonstrated the usefulness of this scale in evaluating patients with irritable bowel syndrome, to accurately assess changes in stools due to drug administration and to determine stool form in the community.[8,25,26] Importantly, stool consistency should be evaluated by a method that can be reproduced by all clinicians. The BSFS is an easy-to-use and comprehensive method.[27] Consequently, in a recent description of a very comprehensive FI questionnaire, the BSFS was included because of its clinical importance as a validated method for assessing stool form in interviews.[23]

Bowel disturbances, especially diarrhea, rather than other variables such as obstetric history, have been established as the main risk factor for FI. Recently, a large case-control study of a geographically defined population that simultaneously assessed obstetric and nonobstetric risk factors showed that the strongest independent risk factors for FI in women were diarrhea, irritable bowel syndrome, and previous cholecystectomy.[9] Our group previously confirmed these clinical findings in a study performed in primary care in men and women.[10] In the present study, in addition to differences in stool consistency in patients with incontinence symptoms, we also observed a slight nonsignificant increase in the number of bowel movements per day in affected patients. The clinical importance of these findings is that changes in bowel transit or stool consistency can be modified by drugs or special diets following the first assessment. Targeting individualized treatments to improve bowel symptoms may improve quality of life in patients with FI.[28,29]

The question arises of whether obesity itself leads to altered stool consistency. In a previous study performed in 1963 patients, BMI was significantly associated with upper gastrointestinal symptoms and diarrhea,[30] which may explain the high percentages of FI in this population group rather than altered stool consistency. The effect of changes of stool consistency or bowel habits on the continence outcome of these patients has not been demonstrated. Although the use of loperamide as a first measure in these cases is broadly recommended, there are few longitudinal studies to demonstrate the magnitude of the effect on the grade of incontinence.

On the other hand, obesity surgery and medical treatments such as orlistat may lead to changes in bowel habits because of their effect on fat absorption.[2] Therefore, patients undergoing bariatric surgery should be investigated if they have FI before or after surgery, because most patients will not report these symptoms to their physician unless asked.[21] Anorectal function should also be evaluated. As suggested, loperamide should be considered to manage diarrhea in these patients.[31]

The strengths of this study lie in the finding of a clinical association of FI and altered stool consistency in an homogenous sample of patients with obesity. Our study also has several limitations. One limitation is the lack of a control group with healthy weight. However, there are sufficient data to confirm that obesity is itself a risk factor for FI.[21] The limited sample size does not allow the study of some specific variables, including obstetric and anorectal surgical history, as well as the influence of pelvic floor dysfunction. In addition, the cross-sectional design hampers identification of the time at which the impact of obesity occurred. Finally, we were unable to assess the possible improvement in incontinence with the use of loperamide before any other weight-loss treatment was provided. Such improvement was suggested in randomized control trial in patients with obesity who were taking orlistat.[31]

To our knowledge, this is the first study to assess stool consistency in patients with obesity in relation to a diagnosis of FI in patients not receiving treatment such as surgery or orlistat. Nevertheless, we cannot demonstrate a difference in all quality-of-life subscales in patients with and without incontinence. The most important finding of our study is that drugs or diet can be used to change stool consistency in patients with FI or altered bowel habits while weight loss measures are being followed. Attention should be paid to changes in stool consistency due to obesity treatments to avoid functional digestive problems or anorectal pathology. To study the effect of modifying stool consistency during weight-loss treatments, a randomized control trial of the addition of dietary measures or loperamide to these treatments is warranted.

CONCLUSION

FI symptoms are common in patients with morbid obesity. Stool consistency, measured by BSFS, differed significantly among patients with FI. This study supports the possibility of improving FI during weight loss by modifying stool consistency.

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