

Is a negative colonoscopy associated with reassurance or improved health-related quality of life in irritable bowel syndrome?

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Background: Although colonoscopy is rarely of clinical use in irritable bowel syndrome (IBS), it is, nonetheless, frequently performed in IBS. Proponents contend that a normal colonoscopy provides reassurance and improves health-related quality of life (HRQOL). However, no previous data have measured these effects. We sought to measure the association of a normal colonoscopy with reassurance and HRQOL in patients with IBS aged <50 years.

Methods: We retrospectively evaluated 458 patients with IBS, aged 18 to 49 years. Subjects completed a symptom questionnaire, the Symptom Checklist 90 (SCL-90) psychometric checklist, and the Short Form 36 (SF-36) Health Survey. The main outcomes were HRQOL as measured by the mental component score (MCS) and the physical component score (PCS) of the SF-36 and reassurance as operationalized by a negative response to the question: "Do you think there is something seriously wrong with your body?" The independent variable was presence or absence of a previous normal colonoscopy. We performed regression analysis to control for potential confounders, including timing of colonoscopy.

Results: The unadjusted mean SF-36 PCS was 42 ± 10 (0-100 scale: 0, worst) in patients with recent colonoscopy (<12 months), 45 ± 11 in patients with distant colonoscopy (>12 months), and 45 ± 10 in patients without colonoscopy ($p = 0.78$). The mean SF-36 MCS in the 3 groups were 42 ± 13 , 44 ± 11 , and 43 ± 11 ($p = 0.57$). Colonoscopy did not impact the proportion reassured (69.3%, 67.2%, 66.6%; $p = 0.85$). There were no significant differences between groups for any outcomes when adjusting for potential confounders.

Conclusions: We found no independent association between a negative colonoscopy and reassurance or improved HRQOL in IBS patients aged <50 years. These results suggest that the role of colonoscopy in IBS may be limited but require confirmation in prospective trials. (Gastrointest Endosc 2005;62:892-9.)

Irritable bowel syndrome (IBS) is a chronic disorder of GI function characterized by recurrent abdominal pain and altered bowel habits in the absence of detectable organic disease.¹ IBS is a prevalent and an expensive condition affecting 15% of the general adult population, resulting in 3.6 million physician visits annually in the United States and costing over \$10 billion per year in direct and indirect expenditures.²⁻⁴ Moreover, patients with IBS have a health-related quality of life (HRQOL) that is significantly worse than patients with diabetes mellitus or end-stage renal disease.⁵ In light of the substantial human and economic costs of IBS, it is essential to develop cost-effective strategies in the primary care setting to manage this prevalent and expensive condition.

There currently is no consistent biologic marker of IBS, and patients are identified on the basis of symptoms alone (Table 1).¹ Because the symptoms of IBS are difficult to quantify, the proper diagnosis of IBS remains challenging and uncertain. Although the Rome-II criteria for IBS encourage clinicians to make a positive diagnosis on the basis of validated symptom criteria,¹ many clinicians and patients remain unsettled by the prospect of overlooking alternative diagnoses, such as inflammatory bowel disease, microscopic or collagenous colitis, or colon neoplasia.⁶ This clinical uncertainty often prompts diagnostic colonoscopy to rule out alternative etiologies. Community-based surveys of patients with IBS indicate that up to 50% receive a colonoscopy during the course of diagnostic evaluation.⁷ Although current management guidelines recommend several routine screening tests in IBS (e.g., complete blood count, serum chemistries, stool examination for infectious pathogens), they do not recommend

TABLE 1. Rome II diagnostic criteria for irritable bowel syndrome**1a: Diagnostic criteria**

At least 12 wk, which need not be consecutive, in the preceding 12 mo of abdominal discomfort or pain that has two of 3 features:

1. Relieved with defecation; and/or
2. Onset associated with a change in frequency of stool; and/or
3. Onset associated with a change in form (appearance of stool).

Where abnormal frequency is $>3/d$ and $<3/wk$

Where abnormal stool form is "lumpy/hard" or "loose/watery"

1b: Supportive symptoms

1. Fewer than 3 bowel movements/wk
2. More than 3 bowel movements/d
3. Hard or lumpy stools
4. Loose (mushy) or watery stools
5. Straining during a bowel movement
6. Urgency (having to rush to have a bowel movement)
7. Feeling of incomplete bowel movement
8. Passing mucus (white material) during a bowel movement
9. Abdominal fullness, bloating, or swelling

"Diarrhea predominant," 1 or more of 2, 4, or 6; and none of 1, 3, or 5.

"Constipation predominant," 1 or more of 1, 3, or 5; and none of 2, 4, 6.

Capsule Summary**What is already known on this topic**

- No consistent biologic marker of IBS exists, and the diagnosis is made on the basis of symptoms.
- Colonoscopy frequently is performed in IBS, but it is rarely useful.
- A normal colonoscopy may reassure patients and improve their HRQOL.

What this study adds to our knowledge

- A retrospective analysis of 458 consecutive IBS patients younger than 50 years from a single institution found that a negative colonoscopy was not associated with decreased belief in the serious nature of IBS symptoms or improved HRQOL.
- The role of colonoscopy in IBS is limited. Colonoscopy is expensive, it rarely advances the diagnosis of IBS in patients who are <50 years old, it may confuse the clinical picture with unrelated findings, and it may undermine an otherwise confident diagnosis.

the procedure may obfuscate the clinical picture by detecting unrelated colonic findings (e.g., diverticulosis, small polyps), violate patient trust by undermining a confident diagnosis, subject patients to potentially unnecessary risks, and not be cost effective compared with standard noninvasive management.^{6,13-15}

Proponents contend that a normal colonoscopy may provide reassurance, assist in accurate diagnosis, and decrease subsequent resource utilization vs. standard noninvasive management.¹⁶⁻¹⁸ Although there are no data in IBS to support these hypotheses, evidence in functional dyspepsia (a related functional bowel disorder) suggests that a "negative" endoscopy may improve patient satisfaction and provide reassurance compared with standard noninvasive management.¹⁹ This suggests that "negative" procedures in functional bowel disorders may provide important benefits beyond mere diagnostic information. In light of this uncertainty, we sought to determine whether a normal colonoscopy is associated with reassurance or improved HRQOL in a large retrospective cohort of patients with IBS <50 years of age.

PATIENTS AND METHODS**Patients**

We analyzed consecutive patients aged 18 to 49 years with Rome I or II positive IBS evaluated at the University of California at Los Angeles Center for Neurovisceral Sciences and Women's Health between January 1, 1995, and December 31, 2002. The Rome criteria provide a valid and reproducible definition of IBS and are the most stringent criteria for accurately diagnosing IBS (Table 1).¹ The

routine colonoscopy in patients with IBS who are under 50 years old without alarm signs (e.g., blood in the stool, iron deficiency anemia, unexplained weight loss, family history of colon cancer of inflammatory bowel disease, refractory diarrhea).^{8,9} Nonetheless, data indicate that 25% of all colonoscopies in patients under 50 years of age and 10% of all colonoscopies in the United States are performed for the evaluation of IBS symptoms.¹⁰

The frequent use of colonoscopy in IBS suggests that it may provide important clinical information. However, data suggest that colonoscopy rarely alters the initial diagnostic impression in IBS and that IBS is a safe diagnosis that is rarely revised over time.^{11,12} The Rome-II diagnostic criteria have a positive predictive value of 98% and, necessarily, patients with Rome-II positive IBS rarely ever have a significant underlying organic disease when evaluated by colonoscopy.¹³ Despite these well-documented data, clinicians continue to search for intermingled and identifiable conditions that may explain the symptom complex of IBS.¹⁰ Opponents of routine colonoscopy contend that

Center for Neurovisceral Sciences and Women's Health is a university-based specialty clinic that focuses on the evaluation and treatment of patients with disorders of GI function. A third of the patients evaluated at the center are self-referred, and two thirds are referred by primary care providers, community gastroenterologists, and academic gastroenterologists. All patients evaluated in this study completed a GI symptom questionnaire, a psychologic symptom checklist (Symptom Checklist 90 [SCL-90-R]),²⁰ and the Short Form 36 (SF-36) Health Survey.²¹ The study was approved by our institutional review board and was conducted in accordance with the institutional guidelines regulating human subjects research.

Study outcome measures

(1) HRQOL. HRQOL was measured by the SF-36 Health Survey. The SF-36 is a widely used, validated, generic HRQOL instrument composed of 36 self-reported items.²¹ The instrument has been tested in many patient populations and medical conditions, including IBS, and we have previously demonstrated that patients with IBS score significantly lower on the SF-36 than patients with other chronic medical conditions.⁵ The SF-36 captures several health domains deemed important by patients with IBS, including bodily pain, energy/fatigue, and social functioning. In particular, the SF-36 contains several items pertaining to vital exhaustion, including the degree of feeling "full of life," feeling "worn out," and feeling "tired." Because vital exhaustion is regarded to be a critical component of health status in IBS,²² the SF-36 is an appropriate generic measure of HRQOL. The 36 items are organized into 8 discrete scales (physical functioning, physical role limitations, emotional role limitations, bodily pain, general health, emotional well-being, energy/fatigue, and social functioning), which are compiled into two summary scores: (1) physical component score (PCS), and (2) mental component score (MCS). Each raw scale score is linearly transformed to scores that range from 0 to 100, with higher scores indicating better HRQOL (normative mean, 50; standard deviation, 10). These physical and mental summary scores served as the dependent variables in our analysis.

(2) Reassurance. Surveys indicate that patients with functional bowel disorders often seek care to resolve fears and concerns about the seriousness of their symptoms instead of the severity or frequency of symptoms.²³⁻²⁹ Patients with IBS, in particular, fear underlying colon cancer, disability, poor prognosis, and death.²⁵⁻²⁹ Moreover, data indicate that many patients continue to fear cancer, despite consultation with and treatment by their physician.³⁰ In light of these documented fears and concerns, we operationalized reassurance as a negative response to the question: "Do you think something serious is wrong with your body?" We selected this item for the following reasons: (1) it is an established item on the SCL-90-R psychologic symptom checklist²⁰; (2) it has

"face validity" as a measure of disease-specific fears or concerns; and (3) it is a simple item that allows for ease of clinical interpretation, in contrast to complex, multidimensional scales of reassurance.

Primary regressor

Our objective was to determine whether there is an association between a previous negative colonoscopy and reassurance or improved HRQOL in IBS. The primary regressor, therefore, was the presence or the absence of a previous "normal" colonoscopy, defined as absence of pathology to account for the IBS symptoms, including colitis, cancer, or obstruction. Of note, there were no patients in the cohort with any of these pathologic findings, because each is incompatible with the diagnosis of IBS.¹ Because the time since colonoscopy may impact HRQOL and reassurance, we dichotomized procedures as recent (within the previous 12 months) or distant (beyond the previous 12 months). We also performed a separate analysis in which we treated time from colonoscopy as a continuous variable (instead of a dichotomous variables) and regressed "months since colonoscopy" across our outcome measures of reassurance and HRQOL.

Conceptual model

Because the decision to perform colonoscopy in patients with IBS depends upon several factors, we developed a conceptual model to specify variables that might affect both HRQOL and the decision to perform colonoscopy. We based our conceptual model upon a priori hypotheses guided by empirical data from the literature. The variables in the conceptual model that were included in our multivariable regression analyses are listed in Table 2. Because we deemed each of the variables to be important, based upon a priori hypotheses, we included all of the variables in the final regression model instead of performing a potentially arbitrary stepwise regression analysis. We, therefore, attempted to measure the independent association of a previous normal colonoscopy with HRQOL and reassurance by adjusting for these pre-specified variables.

Analysis

We analyzed patient data by using SAS version 8.0 (SAS Institute Inc, Cary, NC). To evaluate the association of negative colonoscopy with both mental and physical HRQOL, we conducted separate analyses for the PCS and MCS of the SF-36. For each component score, we first performed an analysis of variance (ANOVA) to compare the mean SF-36 scores for 3 groups: (1) patients without a previous colonoscopy, (2) patients with a previous normal colonoscopy within the previous 12 months (recent colonoscopy), and (3) patients with a previous normal colonoscopy beyond the previous 12 months (distant colonoscopy). We considered an α of less than 0.05 for the

TABLE 2. Descriptive statistics for measured variables specified in the conceptual model

Variable	No previous colonoscopy (N = 378)	Distant normal colonoscopy (N = 55)	Recent normal colonoscopy (N = 25)	p Value
Demographic variables				
Age, y	37.4	38.0	39.5	0.008
Gender, % women	71.2	72.1	71.9	0.81
Ethnicity				
White, %	78.1	78.0	77.9	0.85
Black, %	8.1	8.0	7.8	0.75
Asian/Pacific Islander, %	2.2	2.0	2.3	0.80
Other, %	11.6	12.0	12.0	0.78
Education				
Non high school graduate, %	11.9	10.8	8.1	0.09
High school graduate, %	36.4	36.3	36.1	0.73
College graduate, %	20.7	19.9	19.0	0.42
Professional school graduate, %	31.0	33.0	36.8	0.05
Marital status, % married	45.2	45.7	43.9	0.42
Disease-specific patient variables				
Disease severity (0-20 VAS; 20, most severe)	11.6	12.3	13.0	0.05
Diarrhea predominant IBS, %	41.3	41.3	41.7	0.85
Disease frequency, % > "several flares per wk"	30.2	29.4	28.6	0.08
Pain predominant IBS, % with pain predominance	41.2	41.0	41.0	0.9
Symptom annoyance, % with "annoying" symptoms	27.9	27.7	27.7	0.90
Nondisease-specific patient variables				
Compulsiveness (SCL-90-R obsessive scale score)	57.6	58.4	60.3	0.04
Anxiousness (SCL-90-R general anxiety scale score)	55.8	55.9	56.2	0.20
Depression (SCL-90-R depression scale score)	59.3	59.7	60.4	0.15
Health-related quality of life				
SF-36 Physical component score	43.8	43.5	43.0	0.35
SF-36 Mental component score	45.2	45.0	43.2	0.20

VAS, Visual analog scale; IBS, irritable bowel syndrome.

ANOVA to be significant. We then measured the independent association of previous colonoscopy on both mental and physical HRQOL through multivariable regression analysis, accounting for potential confounders (Table 2) and the timing of colonoscopy.

To evaluate the association of negative colonoscopy with reassurance, we first performed a chi-square test to compare the proportion of patients endorsing the reassurance item across the 3 patient groups. We considered an α of less than 0.05 for the chi-square test to be significant.

TABLE 3. Univariate results that compare mental and physical HRQOL stratified by colonoscopy status

Patient group	Mental HRQOL	Physical HRQOL
No previous colonoscopy, N = 378	42.5 ± 10.6	44.7 ± 10.0
Distant normal colonoscopy (beyond 12 mo), N = 55	44.0 ± 10.7	44.6 ± 11.1
Recent normal colonoscopy (within 12 mo), N = 25	41.6 ± 12.5	42.7 ± 10.0

HRQOL, Health related quality of life.

$p = 0.57$ for Mental HRQOL comparison; $p = 0.78$ for Physical HRQOL comparison.

TABLE 4. Univariate results that compare proportion endorsing reassurance item stratified by colonoscopy status

Patient group	Proportion reassured,* % ± SD
No previous colonoscopy, N = 378	66.6 ± 47.2
Distant normal colonoscopy (beyond 12 mo), N = 55	67.2 ± 48.7
Recent normal colonoscopy (within 12 mo), N = 25	69.3 ± 48.0

SD, Standard deviation.

$p = 0.85$ for chi-square test.

*Reassurance is a negative response to question "Do you think something serious is wrong with your body?"

We then measured the independent association of previous colonoscopy and reassurance through multivariable logistic regression analysis, accounting for potential confounders (Table 2) and the timing of colonoscopy.

RESULTS

Patient characteristics

There were 458 patients with Rome-positive IBS who completed the study questionnaire. The mean age was 38 ± 13 years, and 72% of the cohort were women. Of the cohort, 78% were white and 8% were African American. Thirty-six percent of the patients had at least a high-school education, and 21% had attended college. By using the suggested criteria in the Rome II manual, 40% of the cohort had diarrhea-predominant IBS, 32% constipation-predominant IBS, and 28% alternating IBS (i.e., fit neither the diarrhea-predominant nor constipation-predominant group). Of the cohort, 43% had IBS for over 2 years before the questionnaire administration, and 18% reported "several flares" of IBS symptoms per week. The mean SF-36 PCS 43.6 ± 10.4 , and the mean MCS was 44 ± 10.7 . The descriptive statistics for each of the measured variables across the 3 groups of patients, (1) no previous colonoscopy, (2) "distant" normal colonoscopy, and (3) "recent" normal colonoscopy, are shown in Table 2. The univariate analyses indicated that patients receiving a previous colonoscopy were older, more likely to have a professional degree, more likely to have higher symptom severity, and more compulsive than those without a previous colonoscopy.

Association between colonoscopy and outcomes

The univariate analyses of mental and physical HRQOL stratified by colonoscopy status are shown in Table 3.

There were no significant differences in either component score of the SF-36 among the 3 patient groups ($p = 0.57$ for MCS, $p = 0.78$ for PCS). The proportion of each group that was "reassured," as operationalized by a negative response to the question "Do you think something serious is wrong with your body?" is shown in Table 4. There were no significant differences in this belief among the 3 patient groups ($p = 0.85$).

Multivariable regression analysis adjusting for potential confounders specified in the conceptual model revealed that previous normal colonoscopy was associated with a nonsignificant 1.9 point decrease in the MCS ($p = 0.16$, $t = -1.4$) and a 1.1 point increase in the PCS ($p = 0.44$, $t = 0.77$) vs. no previous colonoscopy. Logistic regression revealed that previous normal colonoscopy was associated with a nonsignificant 1.23 times increase in the odds of reassurance versus no previous colonoscopy (odds ratio 1.23; 95% confidence interval [0.52, 2.88]). Therefore, there were no significant associations between previous normal colonoscopy and either HRQOL or reassurance when adjusting for measured confounders. This relationship was maintained when we regressed "months since colonoscopy" (instead of dichotomizing colonoscopy as "recent" [within 12 months] vs. "distant" [beyond 12 months]) across our outcome measures of reassurance and HRQOL, indicating that the timing of colonoscopy was not independently associated with either outcome (data not shown).

DISCUSSION

This analysis found that a negative colonoscopy was not associated with a decreased belief in the serious nature of IBS symptoms or improved HRQOL in patients less than 50 years of age, despite accounting for potential confounders. Given that colonoscopy rarely advances the diagnosis of IBS in patients less than 50 years of age, colonoscopy may

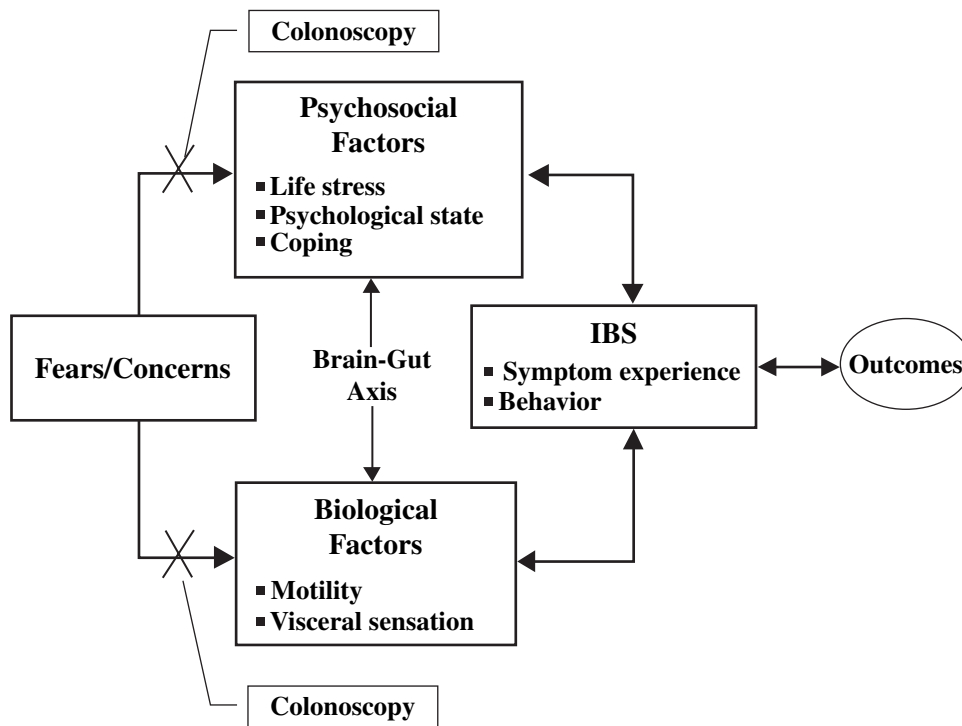


Figure 1. Conceptual model depicting the relationship between outcomes and fears/concerns in IBS, as moderated by psychosocial factors, biologic factors, symptom experience, and behaviors. (Modified from Drossman DA, Whitehead WE, Camilleri M. Irritable bowel syndrome: a technical review for practice guideline development. *Gastroenterology* 1997;112:2120-37, with permission from the American Gastroenterological Association.) Psychosocial factors and biologic factors interact through the “brain-gut axis” of neural circuitry. A negative colonoscopy may interrupt the network of biopsychosocial interaction by ameliorating or blocking the influence of patient fears/concerns.

confuse the clinical picture with unrelated findings, may undermine an otherwise confident diagnosis, and is relatively expensive, and these results further the argument that the role of colonoscopy in IBS may be limited.

Gastroenterologists are under increasing pressure to defend the widespread use of expensive endoscopic procedures and to devise strategies to target these procedures for high-yield purposes.³¹ With the aging of the American population and the increasing need for colorectal cancer screening, there is a progressive mismatch between supply and demand for colonoscopies.³² Therefore, it is immediately relevant to critically appraise the role of colonoscopy in IBS, a condition that accounts for 10% of all colonoscopies performed in the United States.¹⁰ The results of this analysis, although limited by its retrospective study design, are negative with regard to reassurance as justification for the thousands of colonoscopies performed yearly in patients with IBS and under 50 years of age in the absence of alarm signs. To the contrary, these results further the argument that colonoscopies in IBS should be minimized in an effort to shift resources to meet the demands for other indications, e.g., colorectal cancer screening.

Our results run contrary to the plausible notion that negative diagnostic tests may improve reassurance and HRQOL in IBS. This theory is based in the “biopsychosocial” conceptual model of IBS (Fig. 1), which suggests

that disease-specific fears and concerns (e.g., fear of underlying cancer) may influence biologic functioning, psychosocial functioning, and the experience of IBS symptoms through modulation of the “brain-gut axis” of neural circuitry.⁹ Disease-specific fears may directly induce symptoms through changes in bowel function (e.g., motility or visceral hypersensitivity) or indirectly as a purely psychological event.⁹ The integrated effect of altered biologic, psychological, and social functioning may impact symptom experiences, behavior, and outcomes.⁹ This evolving model of IBS has been corroborated by physiologic data in both animal and human studies.^{33,34} The implication for clinicians and patients is that disease-specific fears, although not necessarily etiologic, are relevant to understanding the patients’ experience of IBS and to planning therapeutic strategies. In light of this conceptual model, it could be argued that a negative colonoscopy may impact outcomes by explicitly addressing disease-specific fears and concerns. By acknowledging the patients’ concerns early in the diagnostic and therapeutic course, a negative colonoscopy may interrupt the network of biopsychosocial abnormalities in IBS and ultimately improve patient outcomes (Fig. 1).

Despite this well-founded conceptual model, our results fail to demonstrate an association between a normal colonoscopy and improved outcomes. This result may arise for any of several reasons, including the following:

(1) the results of colonoscopy themselves are inert unless properly explained by an informed clinician within the context of a global disease model (data not captured by our analysis); (2) although a negative colonoscopy may address focused concerns, e.g., fear of colon cancer, it is simply inadequate to impact global HRQOL or overall reassurance as suggested in Figure 1; (3) the benefits of a negative colonoscopy may be too short-lived to be readily detected in the absence of a prospective evaluation with short-term follow-up; (4) the biopsychosocial model in Figure 1 may fail to portray otherwise undescribed short circuits that are not impacted by a negative colonoscopy (i.e., the model is incomplete); or (5) our results are invalid.

However, we believe our results are valid on the basis of several strengths. First, we recruited our study cohort from one of the largest functional bowel disease specialty clinics in the United States. This referral setting allows for a cohort that is not only demographically and geographically diverse but also is composed of patients from diverse practice settings. Second, there were over 450 patients in the study. This large sample size extends the generalizability of our findings and reduces the probability of missing a true association. Third, we acknowledged the likelihood that the benefits of colonoscopy are temporally related. By adjusting for the timing of colonoscopy in relation to the patient survey, we allowed for a greater opportunity to detect a positive association. Last, we adjusted for a wide range of variables that could potentially confound the relationship between colonoscopy and improved outcomes (Table 2). We, therefore, evaluated the adjusted independent contribution of colonoscopy to subsequent HRQOL and reassurance.

This study has potential shortcomings as well. First, the university-based referral setting may not be generalizable to primary care settings. Although a third of the cohort was self-referred through advertising, two thirds of the cohort was referred from primary care providers, community gastroenterologists, and academic gastroenterologists. Therefore, many of the patients had already received and failed first-line therapies for IBS, and many also had high poor HRQOL score. Although it may be hypothesized that disease severity, anxiety, depression, and compulsiveness are higher in a referral setting compared with a community practice, the analysis adjusts for these covariates (and others), and essentially compares patients within the same cohort stratified by these confounding variables.

Second, this analysis is a cross-sectional survey. Although this study design is capable of generating rich information at one point in time, it is unable to track trends longitudinally. Therefore, our results are limited to an observed association; they do not confirm causation. Future research should aim to prospectively measure the impact of colonoscopy vs. usual care on HRQOL and reassurance.

Third, the analysis fails to account for the “quality” of previous IBS care. Indeed, quality varies widely from physician to physician and center to center. Moreover,

different physicians have different attitudes, beliefs, and knowledge about IBS, and also have different thresholds to initiate diagnostic testing (e.g., colonoscopy). However, although these variables may impact the decision to perform colonoscopy in the first place, it is unclear how they might mediate the relationship between colonoscopy and subsequent reassurance and HRQOL.

Fourth, our data do not include the presence or the absence of benign incidental pathology on colonoscopy, such as diminutive polyps, diverticula, or hemorrhoids. Although there are no data to support the hypothesis that incidental benign pathology on colonoscopy might provide reassurance (by virtue of “finding something,” even if unrelated), the possibility, nonetheless, exists. Future research should measure the potential impact of finding incidental colonic pathology on subsequent reassurance and quality of life.

Fifth, we did not have access to the patients’ previous medical records and could not confirm that each reported colonoscopy had indeed been performed. This form of “ascertainment bias” is a common obstacle in self-reported questionnaires. However, there is no a priori reason to believe that incorrect reporting would have a systematic pattern. Instead, it is more likely that incorrect reporting was random. This random error should not qualitatively alter the results of our analysis. Last, although we used a validated measure of HRQOL that is widely applied in IBS (SF-36), the psychometric properties of our reassurance measure (negative response to the question “Do you think something serious is wrong with your body?”) have not been established. Nonetheless, this measure is an established item on the SCL-90-R, a validated scale of psychologic health. Because the item was carefully selected during the validation phase of the SCL-90-R, we adopted the item in whole instead of creating a new outcome measure of our own. Moreover, we selected this measure because it is a simple, single-item surrogate of reassurance that has adequate “face validity,” a maneuver designed to increase the clinical interpretability of our findings. In contrast, complex measurements of reassurance, such as the Cognitive Scale for Functional Bowel Disorders (CS-FBD),³⁵ are not only difficult to administer in a clinical setting but also are difficult to rapidly interpret. For these reasons, we believe our simple yet directed measurement of reassurance is operationally sound. Nonetheless, future research should measure the impact of negative colonoscopy on specific diagnostic fears (e.g., cancer), as well as on validated disease-specific measures of health-concern such as the CS-FBD.³⁵ In the meantime, our data are the first to measure the impact of a negative colonoscopy on any measure of HRQOL or reassurance.

In conclusion, our analysis found no association between a negative colonoscopy and reassurance or improved HRQOL in patients under 50 years of age with IBS, despite accounting for potential confounders. These

results suggest that the role of colonoscopy in IBS may be limited but require confirmation in prospective trials.

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