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Characterization of the Alternating Bowel Habit Subtype in Patients with Irritable Bowel Syndrome

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BACKGROUND: Due to a wide range of symptom patterns, patients with irritable bowel syndrome (IBS) are often subgrouped by bowel habit. However, the IBS subgroup with alternating bowel habits (IBS-A) has been poorly characterized.

OBJECTIVES: (i) To determine a set of bowel habit symptom criteria, which most specifically identifies IBS patients with an alternating bowel habit, (ii) to describe IBS-A bowel symptom patterns, and (iii) to compare clinical characteristics among IBS-A, constipation-predominant (IBS-C), and diarrhea-predominant IBS (IBS-D).

METHODS: One thousand one hundred and two Rome I positive IBS patients were analyzed. Three sets of potential criteria for IBS-A were developed and compared by multirater Kappa test. Gastrointestinal, psychological, extraintestinal symptoms, and health-related quality of life were compared in IBS-A, IBS-C, and IBS-D using χ^2 test and analysis of variance (ANOVA).

RESULTS: Stool consistency was determined to be the most specific criteria for alternating bowel habits. IBS-A patients reported rapid fluctuations in bowel habits with short symptom flares and remissions. There was a greater prevalence of psychological and extraintestinal symptoms in the IBS-A subgroup compared to IBS-C and IBS-D. No differences were seen between bowel habit subtypes in health-related quality of life.

CONCLUSIONS: IBS-A patients have rapidly fluctuating symptoms and increased psychological comorbidity, which should be taken into account for clinical practice and clinical trials.

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INTRODUCTION

Irritable bowel syndrome (IBS) is a chronic, functional disorder of the gastrointestinal (GI) tract affecting 9.4–21.8% of the U.S. population (1). Affected individuals have chronic or recurrent abdominal pain or discomfort associated with an altered pattern of defecation. Patterns of disturbed defecation may range from diarrhea to constipation to an alternation between the two. Patients are often subclassified by their predominant bowel habit, that is, diarrhea-predominant (IBS-D), constipation-predominant (IBS-C), or alternating diarrhea and constipation (IBS-A). While it is believed that patients with IBS share underlying pathophysiologic features regardless of bowel habit, several differences in perception, autonomic function, and symptom characteristics between IBS-D and IBS-C patients have been described (2–5). Studies have typically focused on the IBS-D and IBS-C subgroups, most likely due to the fact that their symptoms are easier to differentiate than those of IBS-A. IBS patients with an alternating bowel habit pattern present a unique clinical challenge and many of the IBS medications being studied affect either diarrhea or constipation thus may not be appropriate for IBS-A patients (6, 7).

The most recent symptom-based diagnostic criteria for IBS (Rome II) have recommended the use of specific GI symptoms to classify patients into those with IBS-D and IBS-C (8). However, these suggested subgrouping criteria were determined by expert opinion, and were not evidence-based. No criteria were suggested for the IBS-A subgroup, and the determination of clinical symptoms on which to base this classification has been challenging. Despite this relative lack of attention, the IBS-A subgroup appears to make up between 19% and 63% of IBS patients (9–11).

Traditional management of IBS patients has routinely included the use of fiber supplementation and laxatives to treat symptoms of constipation and antidiarrheal agents to treat symptoms of diarrhea. This approach may be useful in IBS-A patients with sustained periods of diarrhea or constipation but

may exacerbate symptoms in those with rapidly alternating bowel habits. The temporal pattern of bowel habit alternation in this subgroup has not previously been established. Newer therapies used for the management of IBS symptoms, such as tegaserod for IBS-C (7) and alosetron for IBS-D (6), are targeted at specific bowel habit patterns and the efficacy of these pharmacologic agents in IBS-A patients has not been well studied. For the purposes of clinical research studies and patient management it is important to find a simple method to identify patients who have alternating bowel habits as their predominant pattern.

A variety of criteria have been used to describe the IBS-A subgroup (9, 10, 12–15). However, the rationale for the criteria in each study is often not stated. Various permutations of the Rome II criteria are the most common method used to define the IBS-A subgroup (*e.g.,* those not fitting either the definitions of IBS-C or IBS-D), though the criteria were not designed for this purpose. The aims of this study are: (i) to determine a set of bowel habit symptom criteria, which is most specific for IBS patients with alternating bowel habits; (ii) to examine clinical characteristics of the IBS-A subgroup, including symptom severity, fluctuations of alternating bowel habits, duration of symptom exacerbations, and remissions, psychological symptoms, extraintestinal symptoms, and health-related quality of life (HRQoL); and (iii) to compare the IBS-A subgroup to the IBS-C and IBS-D subgroups.

METHODS

Clinical Characteristics of Study Patients

A retrospective analysis was made of 1,102 Rome I positive IBS patients presenting to the Functional Bowel Disorders (FBD) Center at UCLA between 1996 and 2002. The study was approved by the UCLA Institutional Review Board August 19, 2003. Advertisement for IBS studies recruited 44.6% of the patient group; the remainder included those referred from community physicians and those seen in the UCLA FBD clinic. All patients completed a set of bowel symptom questions. Ninety-nine patients (9%) were excluded because they answered affirmatively to the statement "I usually have infrequent, hard, or lumpy stools but I easily develop loose and watery stools when I take a laxative." This question was used to screen out IBS-C patients whose bowel habit may have alternated to diarrhea primarily due to a medication side effect.

Symptom Questionnaires

Responses were obtained for symptom questions from the following categories: severity and course of illness, bowel habits and GI symptoms, and extraintestinal and constitutional symptoms. The Rome diagnostic and supportive symptoms items were identical to those in the Rome II modular questionnaire (8, 16). The remaining symptom questions were derived from the UCLA Bowel Symptom questionnaire, which has not been formally validated but has been in previously published studies (2, 17–19). Data were collected from all patients for Rome diagnostic symptoms, Rome II supportive symptoms, usual symptom severity, symptom severity, and abdominal pain severity over the past week, psychological symptoms, and HRQoL. Self-reporting of alternating hard and loose stool was collected from 237 patients, most bothersome symptom from 360 patients, duration of flare and remission from 366 patients, and speed of alternation from 362 patients.

SCL-90: ASSESSMENT OF PSYCHOLOGICAL COMORBIDITIES (20). Sufficient information for scoring of the validated psychological symptom questionnaire was completed by 80.2% of the patients. The SCL-90 is a symptom inventory used to determine patterns of psychological symptoms. The following four domains were chosen for analysis due to their clinical relevance in IBS: somatization, depression, anxiety, and a composite score, the global severity index (GSI). Raw scores are normalized based on a nonpsychiatric patient standard by calculating an area T-score (0–100 scale) for each domain and for the GSI. T scores >63 are considered to represent a case at risk for a psychiatric disturbance.

SF-36: ASSESSMENT OF QUALITY OF LIFE (21). This HRQoL instrument was completed by 90.9% of the patients. The SF-36 is a validated general QoL instrument that uses eight domains: physical functioning, role limitations due to physical health, bodily pain, general health perceptions, vitality, social functioning, role limitations due to emotional problems, and mental health. Composite scores are formulated for overall mental health and physical health. The measure used in this study assessed patient perceptions over the past week.

Table 1. Rome II Supportive Symptoms for Diarrhea or Constipation

Must have presence of any of the following symptoms at least 25% of the time:
1. Fewer than 3 BM per week
2. More than 3 BM per day
3. Hard or lumpy stools
4. Loose, mushy, or watery stools
5. Straining during a BM
6. Having to rush to the toilet to have a BM
IBS-C must have:
1 or more of 1, 3, 5 and none of 2, 4, 6
or
2 or more of 1, 3, 5 and 1 or less of 2, 4, 6
IBS-D must have:
1 or more of 2, 4, 6 and none of 1, 3, 5
or
2 or more of 2, 4, 6 and one of 1 or 5; cannot endorse 3

Adapted from Drossman et al., 2000 (8). BM = bowel movement.

Table 2. Criteria Sets for IBS-A*

Criteria set 1 for IBS-A: Rome II derived
2 or more of 2, 4, or 6 plus 3
or
2 or more of 2, 4, or 6 plus 1 and 5
or
1 of 2, 4, or 6 and 1 or 5
or
1, 2, 3, 4, 5, 6
Criteria set 2 for IBS-A: modified Rome II
Identical to criteria set 1 except "loose, watery stool" is an exclusion for IBS-C.
Criteria set 3 for IBS-A: Stool consistency
Both hard, lumpy and loose, watery stool >25% of the time

*Three criteria sets were developed to identify patients with IBS-A. The Rome II supportive symptoms 1–6 (Table 1) are used in the definitions
Adapted from Drossman et al., 2000 (8).

IBS-A Subgroup Classifications

Rome II supportive symptoms (Table 1) were used to establish three sets of potential diagnostic criteria for the IBS-A subgroup. Criteria set 1 was derived from the Rome II classification for predominant bowel habit (Table 2). The Rome II guidelines include only criteria for IBS-C and IBS-D, thus the IBS-A subgroup comprised all patients with at least one Rome supportive symptom suggestive of diarrhea (increased frequency, loose/watery stool, urgency) and one suggestive of constipation (decreased frequency, hard/lumpy stool, straining) but not meeting criteria for either IBS-C or IBS-D. These criteria were chosen because the Rome II criteria are often used by both clinicians and researchers as the gold standard for the diagnosis of IBS. A criticism of the Rome II criteria for bowel habit predominance is that it excludes patients with hard, lumpy stool consistency from the IBS-D subgroup but does not make a reciprocal exclusion of loose, watery stool consistency from the IBS-C subgroup. Because this raised the possibility that IBS-A patients could be included in the IBS-C subgroup, we defined criteria set 2 as a modification in the Rome II guidelines with exclusion of patients with loose or watery stool from the IBS-C subgroup. Criteria set 3 was based on stool consistency alone, as variations in stool frequency and symptoms of urgency or straining can be seen with either bowel habit. Using this criteria, IBS-C had only hard or lumpy stool, IBS-D had only loose or watery stool, and IBS-A had both stool consistencies >25% of the time. Patients with neither hard nor loose stool were considered unclassifiable (IBS-U) in criteria set 3 and were not used in the remaining analysis.

Statistical Analysis

To assess potential differences in the categorization of bowel habit subtypes by three potential criteria sets, a multirater Kappa test was used (22). This Kappa statistic has an advantage over the conventional K statistic, allowing comparison between more than two raters or rating systems at a time. Criteria set 3 was used to further analyze the characteristics of the IBS-A subgroup (as described in the results section). Descriptive statistics were used to characterize the IBS-A subgroup in terms of bowel habit symptom frequency, rapidity of bowel habit alternation, and dominance of either constipation or diarrhea in the alternating pattern. Categorical data describing symptom flare and remission, as well as temporal pattern, were dichotomized into clinically meaningful groups. To assess potential sample differences between the bowel habit subgroups on categorical and continuous variables, χ^2, analysis of contrasts, and ANOVA tests were performed. Specifically, the IBS-A subgroup was compared to the IBS-C and IBS-D subgroups for differences in age, gender, psychological symptoms, HRQoL, IBS symptom severity, and extraintestinal symptoms. Pearson's correlations were used to assess the relationship among age, gender, and psychological symptoms. A series of stepwise logistic regression was used to control for the anticipated influence of somatization on the reporting of extraintestinal symptoms.

Table 3. Comparison of Criteria Sets*

Bowel Habit	Set 1 (Rome II)	Set 2 (Modified Rome)	Set 3 (Stool Consistency)
Unclassified (%)	0.5	0.5	3.9
IBS-A (%)	49	52.6	46.4
IBS-C (%)	19	15.4	17.4
IBS-D (%)	31.5	31.5	32.3

*The distribution (percentage) of IBS patients by predominant bowel habit is shown for each of the three criteria sets.

RESULTS

Comparison of Bowel Habit Criteria for IBS-A

Application of the multirater K statistic revealed a strong agreement among the three criteria sets on bowel habit subgroup categorization (Kappa = 0.85, $p < 0.001$). Using any of the three criteria sets, approximately 50% of the patients met criteria for either IBS-C or IBS-D. The remaining patients met criteria for the IBS-A subgroup (Table 3). While the differences between criteria sets were small, for the purposes of further describing patients with an alternating bowel habit, the stool consistency criteria were used. It was the most specific and least likely to include patients with either pure diarrhea or pure constipation, as presence of both loose/watery stools and hard/lumpy stools was required. In a subgroup of patients (n = 237) who were queried on whether their "bowel habits alternated between hard/lumpy stool and loose or watery stool at least 25% of the time in the past 3 months," 95% of those classified as IBS-A based on the stool consistency criteria (criteria set 3) answered "yes," compared to 88% defined by Rome II criteria (criteria set 1) and 75% defined by modified Rome II criteria (criteria set 2). However, the modified Rome II criteria were more inclusive, that is, more sensitive to include this subset of subjects who reported alternating bowel habits (88%) compared to the stool consistency criteria (70%) and the Rome II criteria (69%). However, the modified Rome II criteria were less specific for the alternating bowel habit, allowing inclusion of some patients

who may clinically be categorized with predominantly diarrhea or constipation symptoms. Finally, the Rome II criteria (criteria set 1) allowed the inclusion of patients with both hard/lumpy and loose/watery stools (who likely have IBS-A) into the IBS-C subgroup as well as including patients in the IBS-A subgroup who clinically may be categorized as IBS-C. For these reasons and that our primary aim was to characterize clinical symptoms in patients with IBS-A, the stool consistency criteria were used for the remaining analysis as it was most likely to include only IBS patients with alternating bowel habits.

Characterization of IBS-A Using the Stool Consistency Criteria

GENERAL PATIENT CHARACTERISTICS. The combined IBS patient sample included 31% males and 69% females. The mean age was 45.5 ± 13.3 yr (range: 18–84 yr). There was a small but statistically significant difference in mean age between the IBS-A (44.3 ± 13 yr) and both IBS-C (47.6 ± 13 yr, $p < 0.05$) and IBS-D (46.3 ± 14 yr, $p < 0.05$). The IBS-A subgroup had fewer female patients compared to the IBS-C subgroup (IBS-A 69.1% *vs* IBS-C 84.1%, $p < 0.05$) and slightly greater female predominance than the IBS-D subgroup (IBS-D 61.5%, $p < 0.05$).

No differences were seen in age, sex, symptom severity, frequency of bowel habit, most bothersome symptom, or psychological symptoms between the advertising and physician referral groups.

BOWEL HABITS AND BOWEL HABIT SUPPORTIVE SYMPTOMS. Within the IBS-A subgroup, there was a variation in the frequency of diarrhea *versus* constipation. Approximately half of the IBS-A patients endorsed equal frequency of each bowel habit, 20% had constipation >75% of the time, and 30% had diarrhea >75% of the time. Increased stool frequency (65%) was more common than decreased stool frequency (35%); 21% complained of both and 14% had neither. Straining, urgency, and incomplete evacuation were each endorsed by over 80% of patients. Passage of mucus with bowel movements was noted in 51% (Fig. 1).

TEMPORAL PATTERN OF BOWEL HABIT ALTERNATION IN IBS-A. Alternation rate among hard, lumpy, and loose or watery bowel movements varied with 39.4% occurring within 24 h, 32.6% within days, 8.6% within weeks, and 17.7% with no definite pattern. Rapid alternation (less than a week, *i.e.,* within <24 h or within days) was significantly more common than slow alternation (within weeks) ($\chi^2[1] = 87.4$, $p < 0.001$) or no pattern of alternation ($\chi^2[1] = 57.5$, $p < 0.001$).

DURATION OF SYMPTOM FLARE AND REMISSION. With regard to duration of IBS symptom "flare-up," those lasting less than 1 wk were more common than flares lasting more than a week, $\chi^2[1] = 66.1$, $p < 0.001$. Short flares of a

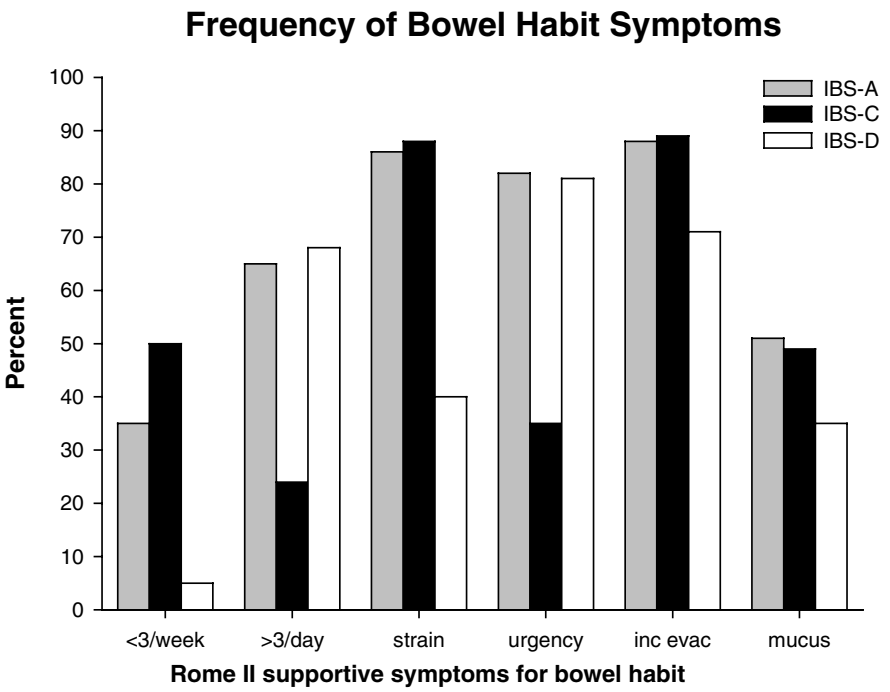

Figure 1. Frequency of bowel habit symptoms among IBS-A patients as defined by the stool consistency criteria is shown. Bowel habit symptoms include less than three bowel movements per week, more than three bowel movements per day, straining with defecation, urgency to defecate, sense of incomplete evacuation after bowel movement, and passage of mucus with bowel movement. The frequency of these symptoms in the IBS-C and IBS-D groups are given for comparison.

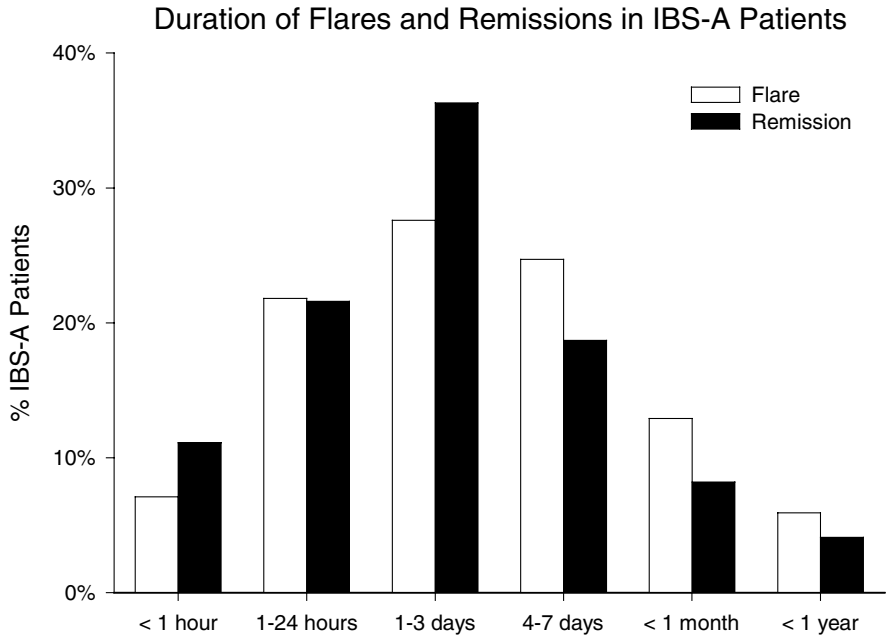

Figure 2. Length of IBS symptom flares and remissions in IBS-A patients as defined by the stool consistency criteria.

week or less were seen in 81% (7% within 1 h, 22% <24 h, 27% 1–3 days, and 25% 4–7 days; Fig. 2). Only 19% had flares greater than 1 wk (13% <1 month, 6% <1 yr). Similarly, most patients had a short duration of "relatively symptom-free" remission periods. Remissions lasting less than 1 wk (11% <1 h, 22% <24 h, 36% 1–3 days, and 19% 4–7 days) were more common than those lasting greater than 1 wk (8% <1 month, 4% <1 year), $\chi^2[1] = 97.3$, $p < 0.001$. The pattern of rapid flares and remissions was similar in all bowel habit subgroups. Flares of 1 wk or less are seen in 77% IBS-C and 73% IBS-D. Remissions of 1 wk or less are seen in 91% IBS-C and 87% IBS-D.

Comparison among IBS-A, IBS-C, and IBS-D

GI SYMPTOMS. The distribution of patients' most bothersome symptom is shown in Figure 3. Irregular bowel habit was the most bothersome symptom in all bowel habit subgroups. In comparison to IBS-C patients, IBS-A patients were more likely to report abdominal pain ($\chi^2[1] = 4.63$, $p < 0.05$) and urgency ($\chi^2[1] = 5.30$, $p < 0.05$) and less likely to report incomplete evacuation ($\chi^2[1] = 8.04$, $p < 0.05$) as their most bothersome symptom. IBS-A patients were more likely to report abdominal fullness ($\chi^2[1] = 6.32$, $p < 0.05$) and visible distension ($\chi^2[1] = 3.87$, $p < 0.05$), and less likely to report urgency ($\chi^2[1] = 4.42$, $p < 0.05$) compared to the IBS-D subgroup.

Usual symptom severity, described by IBS-A patients as moderate in 36% and severe or very severe in 55%, was not different compared to the other bowel habit subgroups. Overall IBS symptom severity over the past week assessed using visual analog scale measurements (0–20 cm scale) was not significantly different among the three subgroups (mean scores IBS-A = 12.0 ± 4, IBS-C = 11.4 ± 5, and IBS-D = 11.6 ± 4). Abdominal pain severity over the past week was higher in the IBS-A subgroup compared to the IBS-C ($F[1, 577] = 11.71$, $p < 0.01$) and the IBS-D ($F[1, 775] = 4.80$, $p < 0.05$) subgroups with mean scores of 11.1 *versus* 9.3 and 10.2, respectively.

PSYCHOLOGICAL SYMPTOMS. No significant differences were seen between IBS-A and IBS-C patients in mean scores for psychological symptoms. However, the IBS-A subgroup had significantly higher mean scores than the IBS-D subgroup in the domains of somatization ($p < 0.001$), depression ($p < 0.05$), and global severity index ($p < 0.01$; Table 4). Of particular note, the IBS-A subgroup was most likely to have elevated psychological symptom scores (>63, at risk for psychiatric disorder). Specifically, 42% of IBS-A patients had an elevated somatization score compared to 31% in the IBS-C and IBS-D subgroups, and 37% had elevated GSI scores compared to 29% and 27% in IBS-C and IBS-D. There was no correlation between sex or age and somatization or GSI scores.

Extraintestinal Symptoms

IBS-A patients were more likely than IBS-D patients to endorse sexual problems related to bowel symptoms, urinary urgency, and frequency, tiring easily, feeling weighted down, muscle and joint pain, and aching all over (all $\chi^2[1] > 3.9$, $p < 0.05$). No differences were seen between these variables between IBS-A and IBS-C (Fig. 4). No differences between any subgroups were seen in the presence of morning muscle stiffness. After controlling for somatization (step 1, $R^2 = 0.071$, $p < 0.001$), urinary urgency was the only symptom that contributed additional predictive variance (Step 2,

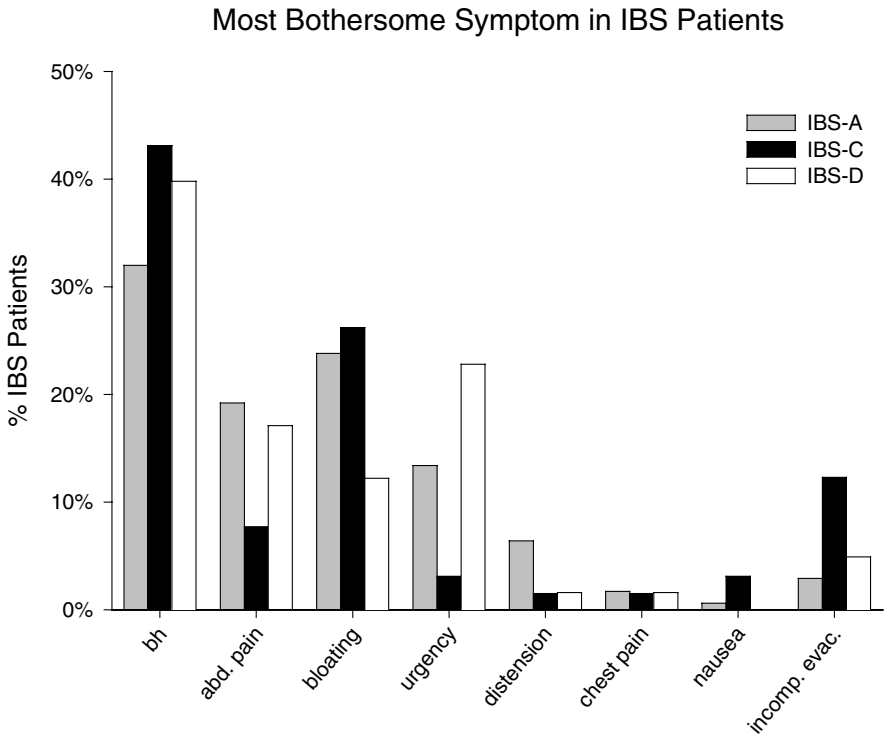

Figure 3. Most bothersome symptom (altered bowel habits, abdominal pain, bloating, urgency to defecate, abdominal distension, chest pain, nausea, and sensation of incomplete evacuation after defecation) identified by patients with IBS-A, IBS-C, and IBS-D.

$R^2 = 0.022$, $p < 0.01$) to the prediction of bowel habit categorization.

HRQOL. The IBS-A subgroup's mean mental composite score was similar to the IBS-C subgroup, but was lower than the IBS-D subgroup (IBS-A = 42.7 ± 10.5, IBS-C = 42.9 ± 10.3, IBS-D = 45.0 ± 10.3; F[2,937] = 5.02, $p = 0.007$ for IBS-A *vs* IBS-D). No significant differences were seen in the SF-36 physical composite score between bowel habit predominance subgroups (IBS-A = 43.0 ± 10.8, IBS-C = 44.6 ± 10.2, IBS-D = 44.5 ± 10.4).

DISCUSSION

Consistent with previous reports, IBS-A was the largest bowel habit subgroup in our study (9, 11, 23, 24). Based on symptom data collected from a large sample of IBS patients, we have found that approximately 50% have alternating bowel habits. Our results indicate that stool consistency provide the simplest and most specific criteria for the purpose of characterizing IBS patients with alternating bowel habits. These patients display rapid alternation of bowel habits and a short flare/remission cycle, which is important in determining appropriate therapy. While IBS-A patients have a spectrum of bowel habit patterns, most (50%) have hard stool and loose stool with equal frequency. Overall IBS symptom severity was similar among all three groups, but IBS-A patients reported greater severity of abdominal pain. Additionally, the IBS-A subgroup appeared most like the IBS-C subgroup in terms of increased extraintestinal somatic symptoms, HRQoL, and psychological symptoms.

Table 4. Psychological Symptoms

	Mean ± SD		
	IBS-A	IBS-C	IBS-D
Somatization	60.1 ± 10.2	58.9 ± 9.7	57.4 ± 10.0†
Depression	57.9 ± 11.0	57.0 ± 10.4	56.1 ± 11.5†
Anxiety	55.4 ± 12.8	54.3 ± 11.4	53.8 ± 12.2
Global severity index	58.6 ± 10.9	57.7 ± 9.6	56.1 ± 11.1†

*Mean scores for SCL-90 domains are shown by bowel habit subgroup.
†Indicates a significant difference from that of the IBS-A subgroup.

Criteria Selection

Classifying IBS patients into subgroups based on bowel habit predominance is common in both clinical practice and research studies. It is clearly important to distinguish these patient subgroups, particularly when selecting patients for clinical trials assessing the efficacy of pharmacological agents that significantly affect stool frequency and consistency. The diagnostic criteria by which subgroups are determined have not been well established or validated. The three sets of IBS-A criteria in our study demonstrated strong agreement on bowel habit subgroup categorization. However, we chose to use the stool consistency criteria because in our study it had the highest specificity in identifying IBS patients with an alternating bowel habit, and our primary goal was to

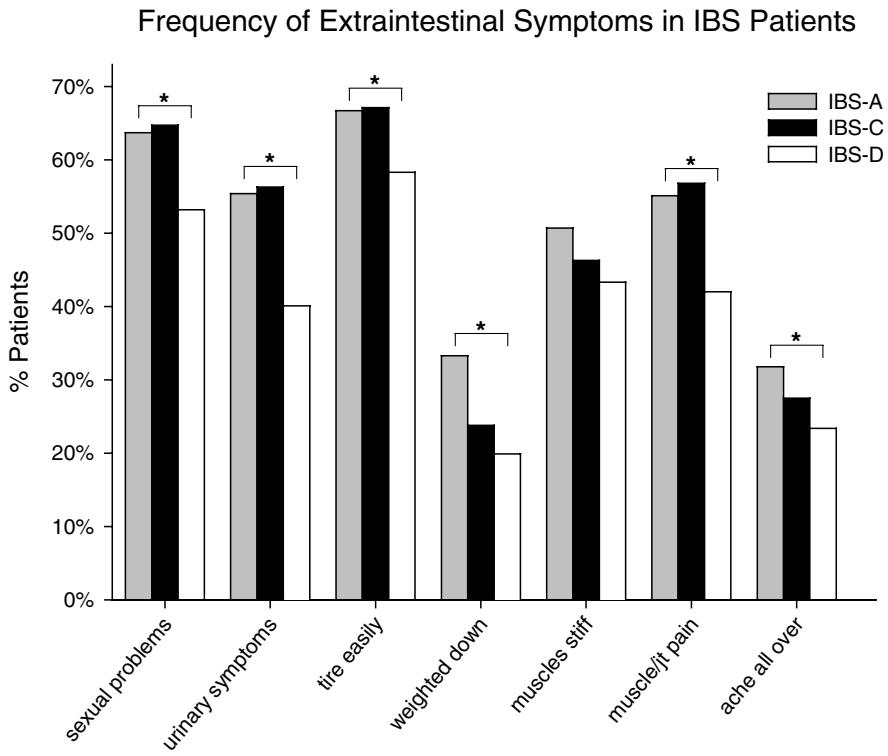

Figure 4. Frequency of extraintestinal symptoms (sexual problems due to IBS symptoms, urinary frequency or urgency, tiring easily, feeling weighted down, muscle stiffness, muscle or joint pain, aching all over) in patients with IBS-A, IBS-C, or IBS-D. * indicates $p < 0.05$ for IBS-A *versus* IBS-D, ** indicates $p < 0.05$ for IBS-A *versus* IBS-C.

characterize their clinical characteristics and compare them with those of IBS patients with predominantly diarrhea or constipation. These criteria also had strong face validity, as the alternation between hard and loose stools in the absence of external factors such as laxatives or anti-diarrheal medications clearly describes an alternating bowel habit. The other criteria sets depend on symptoms such as altered stool frequency, straining, urgency, and incomplete evacuation. These symptoms are often attributed specifically to either diarrhea or constipation patterns, but are often reported in all of the three subgroups (Fig. 1) in our patient population and are not likely to be bowel habit specific. Of note, this overlap of bowel habit associated symptoms was not seen in another recent study, likely because they used a frequency cut-off of symptoms >50% of the time, while our study required presence of symptoms >25% of the time (10).

Gastrointestinal Symptom Pattern

In our study population of IBS-A patients, 50% reported having equal frequency of diarrhea and constipation, while 30% predominately had diarrhea and 20% predominately had constipation. The generally bell-shaped distribution of bowel habit predominance suggests a continuum with IBS-C and IBS-D. In planning physiological studies to better understand IBS-A, it is those patients with equal frequency of diarrhea and constipation who may best represent the subgroup.

The IBS-A subgroup reported having a very rapid alternating pattern between loose and hard stools, which has not been previously described. In addition, these patients had short durations of symptom flares and remissions. In treating IBS-A, medications targeted at normalizing bowel habits need to have a rapid onset and disappearance of effect. Assessment of symptom response in IBS-A can be made relatively quickly since the flare and remission periods are fairly short in duration. This subgroup of IBS patients should be studied separately from IBS-C and IBS-D in clinical trials if the medication being evaluated has clinically significant effects on colonic motility or stool consistency. Consideration must be taken in determining the appropriate patient criteria (*e.g.,* predominantly diarrhea *vs* predominantly constipation *vs* equal distribution) and optimal dosing of medication.

Comparisons Among IBS-A, IBS-D, and IBS-C

Regarding abdominal pain, extraintestinal somatic symptoms, psychological symptoms, and HRQoL, the IBS-A subgroup tended to be more severely affected than the IBS-D subgroup, but similar to the IBS-C subgroup. Psychological distress scores high enough to be of concern for psychiatric illness were most prominent in the IBS-A subgroup, especially when compared to the IBS-D patients. IBS-A patients also more commonly reported extraintestinal complaints, though these appear to be in part due to the presence of somatization. Treatment with centrally acting agents or

psychological interventions should be considered when treating IBS-A patients, as these modalities may prove beneficial for both bowel and extraintestinal symptoms.

Study Limitations

Our sample is derived from a North American, predominantly White population, and variations in IBS patient characteristics may vary across different countries and cultures. While analysis of a large database allows us considerable power to describe IBS group characteristics, it also has inherent limitations. Questionnaire-based studies may have recall bias, with patients either over- or underestimating symptom severity or frequency. The study was not population-based, thus does not allow us to determine the true frequency of IBS-A in comparison to the other subgroups in the community. Also, many of these patients were recruited from a tertiary referral center. These patients may have greater symptom severity and poorer quality of life than those recruited from the community (25–27). We did not have specific information on what percentage of patients had consulted primary care or specialist physicians. Patients with IBS are known to have symptom changes over time (28, 29), but the present study did not address the fluctuation of bowel habit patterns. However, while symptom fluctuations are expected to occur, this does not obviate the need for classifying and treating patients for their active symptoms at a given point in time.

SUMMARY

In summary, IBS-A patients comprise the largest IBS subgroup and report relatively rapid alternations in bowel habits and short durations of symptom exacerbation and remission. When evaluating the efficacy of a pharmacological agent that affects bowel habits, careful consideration should be taken when including the IBS-A subgroup. Future well-designed prospective studies should be performed to further characterize the IBS-A subgroup, identify any group-specific physiological traits, and evaluate fluctuation of bowel habit symptoms over time. Symptom characterization of IBS-A patients is important in optimizing management, which can be quite challenging in this subgroup.

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