Altered Rectal Perception in Irritable Bowel Syndrome Is Associated With Symptom Severity

IRIS POSSERUD,* ALMA SYROUS,* LINA LINDSTRÖM,* JAN TACK,‡ HASSE ABRAHAMSSON,* and MAGNUS SIMRÉN*

*Department of Internal Medicine, Sahlgrenska University Hospital, Göteborg, Sweden; and ‡Department of Internal Medicine, University Hospital Gasthuisberg, Leuven, Belgium

Background & Aims: **Diverging results exist regarding the connection between altered visceral perception and gastrointestinal (GI) symptoms, as well as the effects of psychological status on visceral sensitivity. We sought to investigate different aspects of rectal perception in irritable bowel syndrome (IBS) and the association with GI and psychological symptoms.** ***Methods:*** **We included 109 patients with IBS meeting Rome II criteria (77 women; age range, 20–71 years) and 29 healthy controls (21 women; age range, 20–68 years). They underwent rectal balloon distentions determining sensory thresholds for discomfort and pain, the perceived intensity of unpleasantness, and the viscerosomatic referral area. The fifth percentile (thresholds) and 95th percentile (unpleasantness and referral area) in controls were used to define altered perception. Questionnaires were used to assess severity of IBS-related GI symptoms and psychological symptoms.** ***Results:*** **When combining the 3 aspects of perception, 67 patients (61%) had altered rectal perception. These patients, compared with normosensitive patients, more frequently reported moderate or severe pain (73% vs 44%; $P < .01$), bloating (73% vs 36%; $P < .0001$), diarrhea (47% vs 21%; $P < .01$), satiety (39% vs 13%; $P < .01$), and clinically significant anxiety (31% vs 12%; $P < .05$). In a multivariate analysis, only pain and bloating remained associated with altered rectal perception.** ***Conclusions:*** **Altered rectal perception is common in IBS and seems to be one important pathophysiologic factor associated with GI symptom severity in general and pain and bloating in particular. It is not just a reflection of the psychological state of the patient.**

Irritable bowel syndrome (IBS) is common in Western populations[1] and is characterized by abdominal pain and/or discomfort related to abnormal bowel habits.[2] The pathophysiology of IBS is not fully understood, and a number of mechanisms have been suggested.[3] Visceral hypersensitivity is often considered to play a major etiologic role[4] and has been proposed to be a biological marker[5] even useful to discriminate IBS from other causes of abdominal pain.[6] Others argue that increased sensitivity is mainly due to psychological factors,[7] and experimental manipulation of psychological state has shown that stress, distraction, and relaxation affect sensory thresholds to visceral distentions.[8–11] On the other hand, physiologic stimuli, such as nutrients, have also been shown to affect visceral perception and increase sensitivity to visceral distentions in IBS,[12–15] which could indicate the presence of biological alterations.

Even though several studies have shown that patients with IBS are hypersensitive to visceral stimuli as a group, visceral hypersensitivity is not present in all patients with IBS, and its relevance for symptoms remains unclear.[16] Hypersensitivity to gastric distention has previously been shown to be associated with specific symptoms in patients with functional dyspepsia, namely postprandial epigastric pain, belching, and weight loss,[17] and it is well known that there is a significant overlap between IBS and other functional disorders.[1,18] Results from studies assessing the relationship between visceral sensitivity and IBS symptoms are divergent.[5,19–23] However, available studies are hampered by small sample size, use of nonvalidated questionnaires, and failure to take psychological factors into account. Especially the latter is a major limitation, because psychological factors potentially can influence pain perception and reporting.[7] Moreover, a recent study of perceptual response to rectal stimulation in patients with IBS showed that disease activity remained stable over time despite normalization of rectal perceptual responses due to habituation following repeated testing,[24] but this is a debated issue.[25] These findings, to some extent, seem to argue against the importance of visceral hypersensitivity measured by rectal balloon distentions for gastrointestinal (GI) symptom severity.

Accordingly, the relevance for visceral hypersensitivity as a symptom-inducing and hence clinically relevant

Abbreviations used in this paper: AML, ascending method of limits; CI, confidence interval; IBS, irritable bowel syndrome; IBS-A, alternating-type irritable bowel syndrome; IBS-C, constipation-predominant irritable bowel syndrome; IBS-D, diarrhea-predominant irritable bowel syndrome; GSRS, Gastrointestinal Symptom Rating Scale; HAD, Hospital Anxiety and Depression scale; OR, odds ratio; VAS, visual analogue scale.

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pathophysiologic factor in IBS remains to be proven. Therefore, the aim of the present study was to investigate whether the presence of altered rectal perception is associated with the presence of psychological and/or GI symptoms, as well as with symptom severity. Because several factors known to influence abdominal symptoms, such as stress and food,[26,27] also change visceral perception,[9,11–13] we hypothesized that there would be a relationship between altered perception and specific IBS symptoms.

Patients and Methods

Subjects

Patients with a clinical diagnosis of IBS, based on the Rome II criteria,[2] were recruited from our university-based outpatient clinic, where the majority of referrals come from general practitioners. Organic GI disorder was excluded with appropriate testing, and investigations were determined by presenting symptoms. We included 109 consecutive patients (mean age, 42 years; range, 20–71 years; 77 women) with no previous experience of rectal sensitivity testing. Based on the Rome II criteria, we further subdivided these patients into groups with diarrhea-predominant IBS (IBS-D) and constipation-predominant IBS (IBS-C), and patients who did not fulfill the criteria for any of these subgroups but had alternating constipation and diarrhea were labeled as having alternating-type IBS (IBS-A). Thirty-three of the subjects with IBS had their rectal sensitivity testing before entering a trial of a probiotic versus placebo[28] and underwent repeated sensitivity testing twice, immediately after the end of the 6-week treatment period and 6 weeks later (ie, 12 weeks after the baseline testing). The probiotic had no effect on GI symptoms or sensitivity, and the follow-up testing at 12 weeks was therefore included in the analyses here to assess the stability of our measures of sensitivity and symptoms.

The control group consisted of 29 healthy subjects (mean age, 33 years; range, 20–68 years; 21 women) with no history of GI symptoms, recruited through advertisement. Control subjects completed a GI symptom questionnaire to ensure the exclusion of IBS "nonpatients."

Signed informed consent was obtained from each subject. The study protocol was approved by the ethics committee of Göteborg University.

Study Design

All medications with known effects on the GI tract were discontinued at least 48 hours before the study. After an overnight fast, the subjects presented to the laboratory at 7:30 AM. They received a cleansing tap water enema (750 mL) and were then placed in a left lateral decubitus position in a hospital bed. Rectal sensitivity was assessed with rectal distentions. A polyethylene balloon was attached to a double-lumen polyvinyl tube (Salem Sump Tube, 18F; Sherwood Medical, Tullamore, Ireland). The distance between the attachment sites was 8 cm, and distention to a maximal volume of 650 mL resulted in a spherical balloon shape. The balloon was inflated repeatedly to rule out any leak and was then inserted into the rectum, leaving the distal attachment site 5 cm from the anal verge. After this, the balloon catheter was connected to a computer-driven electronic barostat (Dual Drive Barostat, Distender Series II; G&J Electronics Inc, Toronto, Ontario, Canada). Two distentions at 25 mm Hg were performed to unfold the balloon. The operating pressure was set to 2 mm Hg above the minimal distending pressure necessary to record respiratory variations in the balloon volume.

Rectal Distentions

The distention protocol consisted of phasic isobaric distentions (45 mL/s) lasting 30 seconds, followed by a 30-second interval at the operating pressure. Distentions were performed with stepwise increments starting at the operating pressure and increasing 5 mm Hg until the subject reported pain or when a pressure of 70 mm Hg was reached. During the last 10 seconds of each distention, subjects were asked to rate any perceived sensation on a keypad graded 1–5 as follows: 1, no sensation; 2, rectal fullness; 3, urge to defecate; 4, discomfort; 5, pain. Following each distention, all subjects also rated the perceived intensity of unpleasantness during the distention, using a 100-mm visual analogue scale (VAS) ranging from "no unpleasantness" to "worst imaginable unpleasantness." After the distention protocol, summarizing the whole sequence, subjects were asked to mark the location of their sensations on a schematic body map (scale 1:4)[5] to assess viscerosomatic referral, marking pain, and nonpainful sensations separately.

Questionnaires

Before the barostat procedure, all patients completed 2 questionnaires evaluating GI and psychological symptom severity.

Hospital Anxiety and Depression Scale. The Hospital Anxiety and Depression (HAD) scale was developed for use in medical outpatients rather than psychiatric patients.[29] In the construction of this scale, symptoms that might equally arise from somatic as from mental disorders were excluded, which means that the scale scores are not affected by bodily illness. The HAD scale is a reliable instrument, with cutoff scores, for screening for clinically significant anxiety and depression in patients attending a general medical clinic and has also been shown to be a valid measure of the severity of these disorders of mood. This self-assessment scale consists of 14 items, each using a 4-grade Likert scale (0–3) with subscales for anxiety (7 items) and depression (7 items) graded for severity.