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Lower Gastrointestinal Disorders in Patients with Irritable Bowel Syndrome

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A B S T R A C T

Irritable bowel syndrome (IBS) is a functional disorder of the gastrointestinal system characterized by abdominal pain related to bowel emptying, defecation impairment and abdominal distention. The aim of the study was to objectify lower gastrointestinal system disturbances in IBS patients. Thirty IBS patients and 30 healthy subjects were included in the study. IBS patients were divided into two subgroups: IBS with predominant diarrhea (IBSd) and IBS with predominant constipation (IBSc). All study subjects underwent physical examination (including digitorectal examination), standard laboratory testing and anorectal manometry. Endoscopy was performed only in group of IBS patients. A statistically significant difference was recorded in most manometric parameters between healthy subjects and IBS patients, which was even more pronounced in IBSd patients. Study results showed that the intestinal motility disorder underlying IBS could be objectified by use of anorectal manometry.

Key words: *irritable bowel syndrome, Rome criteria, anorectal manometry*

Introduction

The irritable bowel syndrome (IBS) is a functional disorder of the gastrointestinal system characterized by abdominal pain accompanying bowel emptying, altered bowel habits and abdominal distention. IBS is one of the most common and at the same time the least known diseases in gastroenterology. The symptoms may be continuous or intermittent; however, the symptoms should persist for at least three months to make the diagnosis of IBS[1–4].

The so-called Rome criteria for functional disorders of the gastrointestinal system were presented by an expert team at the 13th International Congress of Gastroenterology in 1988. In 2006 expert group presented Rome III criteria which are the current standard. According to these criteria, the diagnosis is made on the basis of characteristic signs and symptoms of the disease, i.e. 'positive diagnosis' rather than by elimination of other diseases [2]. These criteria define IBS as a pathologic entity with three different clinical forms: syndrome subgroup predominated by diarrhea, subgroup predominated by constipation, and subgroup with abdominal distention and/or abdominal pain[5,6] (Table 1).

The symptoms of functional gastrointestinal disorders have a high incidence and prevalence in the general population. The prevalence of IBS in west European countries has been estimated to range between 5% and

TABLE 1
ROME III CRITERIA FOR IRRITABLE BOWEL SYNDROME

At least 3 months, with onset at least 6 months previously of recurrent abdominal pain or discomfort associated with 2 or more of the following:
• Improvement with defecation; *and/or*
• Onset associated with a change in frequency of stool; *and/or*
• Onset associated with a change in form (appearance) of stool

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25%, and is more common in female population[6]. The prevalence of particular IBS subgroups has not been thoroughly investigated, however, according to some authors, the IBS subgroup with diarrhea has a lower prevalence than the other two subgroups [7].

According to only one epidemiologic study carried out in Croatia in 500 subjects recruited from the Zagreb population, which found the prevalence of IBS to be 28%. The figure is relatively high in comparison with the results reported elsewhere, however, the author attributes it to the impact of war and postwar stressors[8].

The pathogenesis of IBS remains unknown. These patients are considered to suffer from disturbances in the bowel sensor and motor function, central nervous system (CNS) impairments, psychological disturbances and effects of stress. In addition, the role of certain intestinal (luminal) factors has also been suggested. Anyhow, there is no known specific, unique pathophysiological disorder to differentiate IBS from organic digestive diseases[1,2,10].

As the diagnosis of IBS is currently based exclusively on the symptoms of the disease, the clinicians are continuously in search for reliable and objective methods to verify the existence of IBS.

Subjects and Methods

Subjects

Thirty IBS patients (19 female and 11 male) and 30 healthy subjects (18 female and 12 male) were included in the study. There were no statistically significant differences between the two groups according to sex, age, level of education and body mass index (BMI). IBS patients were divided into two subgroups according to predominant symptoms: IBS with predominant diarrhea (IBSd; ten female and six male) and IBS with predominant constipation (IBSc; nine female and six male). There were no statistically significant differences between the two subgroups according to age, sex and level of education, however, such a difference was recorded in BMI in favor of IBSd subgroup. IBS patients with predominant diarrhea or constipation were included in the study on the basis of Rome criteria and exclusion of a potential organic disease of the gastrointestinal system.

Methods

Normal findings of the following tests were required for patient inclusion in the study: complete blood count, erythrocyte sedimentation rate, basic biochemistry parameters (potassium, sodium, blood glucose, urea, creatinine, liver transaminases, serum amylases); negative stool bacteriology and parasitology; negative blood in stool; and normal upper abdominal ultrasonography. IBS patients underwent endoscopy, i.e. rectosigmoidoscopy in patients under age 40 and total colonoscopy in those aged >40[8]. Both IBS patients and healthy control subjects underwent anorectal manometry. Manometry of the anorectal segment was performed by computed manometry (Griffon, Albyn Medical, Scotland) with the use of 4-lumen perfusion catheter with radially distributed perfusion openings in different projections[10,11].

The following parameters of anorectal function were assessed by use of manometry: anal canal length, maximal pressure at rest, maximal squeeze pressure, recto anal inhibitory reflex, rectal sensation threshold, and critical rectal defecation volume. Defecation dynamics was evaluated according to changes in the external anal sphincter pressure on attempted balloon expulsion from the rectum.

Statistics

Several statistical methods were used in the study. The methods of descriptive statistics were generally employed for all variables according to defined groups: arithmetic mean, standard deviation, minimal and maximal values, and Kolmogorov test of distribution normality.

Depending on the characteristics of the data obtained, the methods of parametric or nonparametric statistics were used to determine the significance of between-group differences (t-test, analysis of variance, correlation test, χ^2-test, and Pearson χ^2-test with Yates correction in 2×2 tables).

Results

IBS patients reported on 13 different signs and symptoms of the disease, which primarily referred to the lower gastrointestinal tract. The most common symptoms were abdominal pain or discomfort, reported by 96% of patients, followed by flatulence in 83%, and intestinal urgency and relief upon emptying in 80% of patients. There was no statistically significant difference between the two IBS patient subgroups. An irregular pattern of the occurrence of symptoms was a feature reported by as many as 90% of IBS patients (Table 2).

Digitorectal examination verified the presence of hemorrhoids in 73%, excoriations in 30%, increased anal canal tonus in 23%, and increased anal canal squeeze pressure in 30% of IBS patients. There was no statistically significant difference in digitorectal finding between the two IBS subgroups (Table 3). Endoscopy revealed the presence of internal hemorrhoids in 73%, colonic diverticules in 53%, spastic contractions in 77%, and painful distention in as many as 87% of IBS patients (Table 4).

Statistically significant differences were recorded between IBS patients and healthy control subjects in the following manometric parameters of motility: pressure at rest, rectal sensation threshold, critical volume, minimal RAIR inducing volume, RAIR amplitude, and defecation dynamics (Table 5).

Comparison of anorectal manometric findings between the two IBS subgroups yielded statistically significant differences in the following parameters: pressure at rest, squeeze pressure, perception threshold, critical volume, and defecation dynamics (Table 6).

TABLE 2
SYMPTOMS AND SIGNS OF IRRITABLE BOWEL SYNDROME, CONSIDERING LOWER PART OF GASTROINTESTINAL SYSTEM

	IBS		IBSd		IBSc	
	(n=30)	%	(n=16)	%	(n=14)	%
Relief after defecation	24	80.0	13	81.3	11	78.6
Liquid stool related to pain	20	66.7	12	75.0	8	57.1
Frequent stool related to pain	18	60.0	11	6.8	7	50.0
Abdominal distension	18	60.0	8	50.0	10	71.4
Mucous stool	15	50.0	7	43.8	8	57.1
Incomplete evacuation	22	73.3	9	56.3	13	92.9
Abdominal pain or discomfort	29	96.7	15	93.8	14	100.0
Flatulency	25	83.3	13	81.3	12	85.7
Irregular pattern of impairment	27	90.0	14	87.5	13	92.9
Symptoms persisting more than two years	23	76.7	10	62.5	13	92.9
Urinary stress incontinency	13	43.3	7	43.8	6	42.9
Intestinal urgency	24	80.0	14	87.5	10	71.4

IBS – irritable bowel syndrome patients, IBSd – IBS patients with predominant diarrhea, IBSc – IBS patients with predominant constipation

TABLE 3
DIGITORECTAL EXAMINATION FINDINGS IN IBS PATIENTS

	IBS		IBSd		IBSc		
	(n=30)	%	(n=16)	%	(n=14)	%	p
Excoriations	9	30.0	6	37.5	3	21.4	ns
Fissures	0	0.0	0	0.0	0	0.0	ns
Hemorrhoids	22	73.3	10	62.5	12	85.7	ns
Tonus of anal canal							
normal	23	76.7	13	81.3	10	71.4	ns
lower	0	0.0	0	0.0	0	0.0	ns
higher	7	23.3	3	18.8	4	28.6	ns
Anal canal squeeze							
normal	21	70.0	12	75.0	9	64.3	ns
lower	0	0.0	0	0.0	0	0.0	ns
higher	9	30.0	4	25.0	5	35.7	ns
Pain during examination	5	16.7	2	12.5	3	21.4	ns

IBS – irritable bowel syndrome patients, IBSd – IBS patients with predominant diarrhea, IBSc – IBS patients with predominant constipation

TABLE 4
ENDOSCOPIC FINDINGS IN IBS PATIENTS

	IBS		IBSd		IBSc		
	(n=30)		(n=16)		(n=14)		p
Normal	5	17%	3	19%	2	14%	ns
Hemorrhoids	22	73%	9	56%	12	86%	ns
Diverticules	16	53%	6	38%	10	71%	ns
Pain during distension	26	87%	14	47%	12	86%	ns
Spastic contractions	23	77%	13	81%	13	93%	ns

IBS – irritable bowel syndrome patients, IBSd – IBS patients with predominant diarrhea, IBSc – IBS patients with predominant constipation

TABLE 5
MANOMETRY FINDINGS IN IBS AND HEALTHY SUBJECTS

	IBS	Healthy	
	(n=30)	(n=30)	p
Perineum decsending during Valsalva test	8.0 ± 27%	0.0 ± 0%	<0.05
Anal canal length (mm)	35.4 ± 5.5	37.7 ± 4.5	ns
Resting anal canal pressure (mmHg)	81.23 ± 14.4	67.6 ± 9.3	<0.01
Maximalna squeez pressure (mmHg)	137.8 ± 16.5	141.9 ± 13.4	ns
Rectal sensation (ml)	21.5 ± 8.9	27.8 ± 4.4	<0.001
Critical volume (ml)	285.8 ± 188.3	330.5 ± 46.4	<0.001
Minimal RAIR inducing volume (ml)	19.2 ± 3.1	28.8 ± 4.0	<0.01
RAIR – amplitude (mmHg)	22.5 ± 4.6	25.79 ± 4.4	<0.05
Defecation dynamics (n)	22.0 ± 73%	30.0 ± 100%	<0.05

IBS – irritable bowel syndrome patients

Discussion

As it known from previous studies the most patients with IBS in this investigation suffer of one or more symptoms related to the lower part of gastrointestinal tract: diarrhea, constipation, abdominal pain or discomfort, irregular pattern of symptoms, urgency, relief after defecation and flatulency [4,6,3]. One of the most prominent symptoms in our patients with IBS was incomplete evacuation of stool in constipated ones that can be missinterpreted as diarrhea or frequent stools[1,12].

Digitorectal examination is very important part of taking physical status in IBS patients. The most frequent finding were hemorrhoids probably related to the nature of IBS and some habits in those patients. Assessment of the anal canal pressure is often non-adequate because of the pattern of disease.

Pain during colonoscopic examination and spastic contractions are hallmarks of IBS and very often revealed in our patients as in other studies[13,14]. Colonic diverticules are often revealed in those patients too.

The results of anorectal manometry testing obtained in the study pointed to a statistically significant difference between IBS patients and control subjects in most parameters assessed. Anorectal manometry proved very useful in objectifying the intestinal motility disorder underlying IBS[1,4,5]. Differences in manometric parameters were also found between the two IBS subgroups, whereby the group of IBS patients with predominant diarrhea showed greater deviations from normal values in most parameters.

The objective of the study was to evaluate the role of anorectal manometry in the algorithm of diagnostic procedures for IBS. We believe that manometric findings could be considered as objective criteria to verify the disease symptoms.

Additional studies are needed to confirm the value of anorectal manometry in IBS patients, and hopefully to define the criteria to graduate the disease and enable it's more efficient management.

TABLE 6
MANOMETRY FINDINGS IN SUBGROUPS OF IBS PATIENTS

	IBSd	IBSc	
	(n=16)	(n=14)	p
Perineum decsending during Valsalva test	4.0 ± 25%	4.0 ± 29%	ns
Anal canal length (mm)	35.13 ± 3.4	35.7 ± 3.1	ns
Resting anal canal pressure (mmHg)	74.0 ± 10.52	89.5 ± 13.8	<0.05
Maximal squeez pressure (mmHg)	137.3 ± 22.4	139.0 ± 21.2	ns
Squeez pressure (mmHg)	120.5 ± 12.8	125.2 ± 11.2	<0.05
Rectal sensation (ml)	14.4 ± 3.9	19.64 ± 5.16	<0.05
Critical volume (ml)	218.2 ± 42.3	235.5 ± 58.4	<0.05
Minimal RAIR inducing volume (ml)	18.7 ± 3.16	19.79 ± 2.83	ns
RAIR – amplitude (mmHg)	22.56 ± 3.84	23.5 ± 5.3	ns
Defecation dynamics (n)	13.0 ± 81%	9.0 ± 64%	<0.05

IBSd – IBS patients with predominant diarrhea, IBSc – IBS patients with predominant constipation

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PROMJENE U DONJEM DIJELU GASTROINTESTINALNOG SUSTAVA U BOLESNIKA SA SINDROMOM IRITABILNOG CRIJEVA

SAŽETAK

Sindrom iritabilnog crijeva (SIC) funkcijski je poremećaj probavnog sustava koji karakterizira bol u abdomenu povezana sa defekacijom, poremećaji defekacije te distenzija trbuha. Našim istraživanjem željeli smo objektivizirati promjene u donjim dijelovima gastrointestinalnog trakta u bolesnika sa sindromom iritabilnog crijeva. U istraživanje je uključeno trideset bolesnika sa SIC i 30 zdravih ispitanika. Bolesnici sa SIC podijeljeni su u dvije podskupine: prva (SICp) s predominantnim proljevom i druga (SICk) s dominantnom konstipacijom. Svim ispitanicima učinjen je fizikalni pregled (uključujući digitorektalni), standardno laboratorijsko testiranje, anorektalna manometrija, a bolesnicima sa SIC i endoskopija. Rezultati su pokazali da postoji statistički značajna razlika u većini manometrijskih parametara u bolesnika sa SIC, dok je razlika još izraženija u bolesnika sa SICp. Naše istraživanje pokazuje da upotrebljavajući anorektalnu manometriju možemo objektivizirati poremećaj motiliteta crijeva koji i jest u podlozi SIC-a.