

How much bloating in the irritable bowel syndrome?

LUCIAN LIVIU POP¹, IULIA ANTONIA MUREȘAN¹, DAN LUCIAN DUMITRAȘCU¹

¹“Iuliu Hațieganu” University of Medicine and Pharmacy, Medical Clinic II

The irritable bowel syndrome (IBS) is the most common chronic gastrointestinal disorder referred to gastroenterologists. One of the most common manifestations of IBS is bloating. Abdominal bloating is defined as subjective sensation of abdominal distension associated with girth increment. Therefore, it is described in the Rome IV criteria as bloating/abdominal distension. Bloating symptoms are reported by 10-30% of the general population and it was rated as the most bothersome symptom by 60% of IBS patients; the lack of specificity of this complaint prevented bloating to be included between the diagnostic criteria for IBS. Indeed, bloating may be reported also in healthy people or in other functional conditions.

This paper looks to the evolutions of the concepts on bloating according to the Rome working groups from the beginning until now and it represents a comprehensive review on the prevalence and pathogenesis of bloating.

Keywords: Bloating, functional gastrointestinal disorders, irritable bowel syndrome, Rome criteria.

INTRODUCTION

The concept of irritable bowel syndrome (IBS) suffered minor changes in definition and diagnosis in the last decades; however, the individualization of this entity relied on a more or less group of symptoms used. Being the most common chronic gastrointestinal disorder referred to gastroenterologists [1] it is commonly characterized by abdominal pain and/or/without abdominal discomfort, associated with altered bowel movement consistency and frequency expressed by constipation or diarrhea [2]. It is a functional disorder, not an organic disease often associated with psychological disorders [3].

A HISTORICAL APPROACH

The Rome criteria have evolved from the work of a group invited by Aldo Torsolli during the International Congress of Gastroenterology and published in 1989 (The Rome Guidelines for IBS) [4] through the Rome Classification System for FGIDs (1990) [5]. In the years that followed, the Rome experts group have elaborated a total of four editions of the Rome Classification System for FGIDs in order to define and update with the scientific progress, the functional disorders, including IBS and bloating. These Rome group meetings have been helpful in popularizing the term IBS and providing concrete symptom criteria [6]. The first standardized definition of IBS accompanied by diagnostic criteria evolved from the Rome I working

group. According to this, IBS is defined as in Table 1 [7].

Some years later, the definition was mildly altered, and in Rome II criteria for IBS is presented in Table 2 [8].

More recently, according to the Rome III diagnostic consensus, IBS was defined as recurrent abdominal pain or discomfort for at least three days per month in the last three months and with two or more of the following: improvement with defecation, onset associated with a change in frequency of stool or onset associated with a change in form of stool [3]. Rome III criteria for IBS are presented in Table 3. There are four main subtypes of IBS: IBS with constipation (IBS-C), IBS with diarrhea (IBS-D), mixed (IBS-M) and unclassified (IBSU). IBS-C is characterized by hard or lumpy stool with $\geq 25\%$ of bowel movements and loose or watery stool with $< 25\%$ of bowel movements. Loose or watery stool with $\geq 25\%$ of bowel movements and hard or lumpy stool with $< 25\%$ of bowel movements is indicative of IBS-D. IBS-M is characterized by lumpy stool with $> 25\%$ of bowel movements and loose or watery stool with $\geq 25\%$ of bowel movements [9].

The latest version of the Rome working groups, Rome IV, has introduced changes in the diagnostic criteria of IBS based on the available evidences and on the target population [10, 11]. From the Rome IV criteria, the term discomfort was eliminated based on a survey, because discomfort is a nonspecific term and should lead to confusions. The term “discomfort” has different meanings in

different languages and is an ambiguous term for patients [10].

According to the Rome IV criteria only abdominal pain and not abdominal discomfort is now necessary to define IBS. Patients need to present

pain minimum one day per week, in the last three months. This was proved by a study that showed a frequency of less than one day per week for abdominal pain present in healthy subjects [11, 12]. Rome IV criteria for IBS are presented in Table 4.

Table 1

Definition of irritable bowel syndrome according to the Rome I consensus report from Drossman *et al.* 1994 [7]

Continuous or recurrent symptoms for at least 3 months of:

1. Abdominal pain or discomfort relieved with defecation, or associated with a change in frequency or consistency of stool
2. An irregular varying pattern of defecation at least 25% of the time (three or more of):
 - a. altered stool frequency
 - b. altered stool form (hard or loose/watery stool)
 - c. altered stool passage (straining or urgency, feeling of incomplete evacuation)
 - d. passage of mucus
 - e. bloating or feeling of abdominal distension

Table 2

ROME II Diagnostic criteria for Irritable Bowel Syndrome [8]

At least 12 weeks, which need not be consecutive, in the preceding 12 months of abdominal discomfort or pain that has two out of three 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.

Symptoms that cumulatively support the diagnosis of irritable bowel syndrome

- Abdominal stool frequency (for research purpose “abnormal” may be defined as greater than 3 bowel movements per day and less than 3 bowel movements per week);
- Abnormal stool form (lumpy/hard or loose/watery stool);
- Abnormal stool passage (straining, urgency, or feeling of incomplete evacuation);
- Passage of mucus;
- Bloating or feeling of abdominal distension.

Table 3

ROME III Diagnostic criteria* for Irritable Bowel Syndrome [3]

Recurrent abdominal pain or discomfort** at least 3 days/month in the last 3 months associated with two or more of the following:

1. Improvement with defecation
2. Onset associated with a change in frequency of stool
3. Onset associated with a change in form (appearance) of stool

* Criterion fulfilled for the last 3 months with symptom onset at least 6 months prior to diagnosis

** “Discomfort” means an uncomfortable sensation not described as pain.

In pathophysiology research and clinical trials, a pain/discomfort frequency of at least 2 days a week during screening evaluation is recommended for subject eligibility.

Table 4

ROME IV Diagnostic criteria for Irritable Bowel Syndrome [12]

Must fulfill criteria 1, 2 and 3 for the last 3 months:

1. Recurrent abdominal pain (at least once a week)
2. Pain is associated with two or more of the following criteria:
 - a. Related to defecation (at least 30% of occasions)
 - b. Associated with a change in form (appearance) of stool (at least 30% of occasions)
 - c. Associated with a change in frequency of stool (at least 30% of occasions)
3. Symptoms onset at least 6 months prior to diagnosis

Table 5

Diagnostic criteria* for functional bloating [3]

They must include both of the following:

1. Recurrent feeling of bloating or visible distension at least 3 days/month in the last 3 months
2. Insufficient criteria for a diagnosis of functional dyspepsia, irritable bowel syndrome, or other functional GI disorder

* Criteria fulfilled for the last 3 months with symptom onset at least 6 months prior to diagnosis

Rome Foundation managed a study in the general population from the USA, with the aim to observe the frequency of normal bowel habits [13]. The purpose was to identify the prevalence of normality in order to statistically derive abdominal frequencies consistent with disorders of gut-brain interaction. Based on this study the Rome Foundation committees recommend the 90th percentile symptom frequency on both sexes as the threshold to explain normality [11]. In the general population, discomfort or abdominal pain was reported for less than 3 days per month, and for 6.7% of the population at least once a week both symptoms. Hence, according to the Rome IV criteria, the frequency limit for pain in IBS was set at a minimum of once a week [11, 14].

In addition, pain or discomfort had to improve with defecation according to Rome III criteria. Although, in many patients pain remains without changes or even increases with defecation [15]. Also, in Rome III, pain or discomfort symptom had to be associated with change in frequency of stools or change of form of stool [16]. Since not in all IBS patients abdominal pain is associated with stool changes, the term "onset" was excluded from Rome IV criteria [14].

As a result of changes from Rome III to Rome IV in IBS criteria, the prevalence of IBS decreases by half from 11.1% to 6.1% in the USA, from 11.7% to 5.8% in Canada and from 10.6% to 5.5% in the UK, after applying the Rome IV IBS criteria in English speaking populations for the first time. These changes can be related to the elimination of discomfort from the criteria [17].

BLOATING IN IBS

Abdominal bloating is defined as subjective sensation of abdominal distension associated with a real girth increment [18]. The pathogenesis of bloating includes several factors: a subjective sensation of abdominal bloating, objective abdominal distension, volume of intra- abdominal contents and muscular

activity of the abdominal wall. These factors may act independently or associated [19]. The investigations of the transit of gas showed that in bloating the gut reflex controlling its content is impaired. The segmental contractions of the bowel may cause the sensation of distension, mainly in cases with poor visceral sensitivity [20].

If in the bowels the volume of gas is increased, as it occurs after the consumption of certain legumes, due to the biochemical processing of colon bacteria, some individuals may complain of bloating and/or distension. There is no direct correlation between the clinical intensity of the symptom and the amount of abdominal gas. The muscular tone of the abdomen is also involved in bloating perception [21].

Bloating is frequently encountered in IBS, however in the four editions of the Rome working committees, there was no mention to include bloating in the diagnostic criteria of IBS. In the current gold standard classification of functional gastrointestinal disorders, abdominal bloating and distention are considered as secondary descriptors [22, 23]. Patients with bloating have to be well questioned and investigated to rule out functional dyspepsia. Those subjects, who do not meet the criteria for these categories, may be labeled as having functional bloating [19].

According to ROME III working group, functional bloating is defined as a recurrent sensation of abdominal distension that may or may not be associated with measurable distension but it is not part of another functional bowel or gastroduodenal disorder [3].

Functional bloating is diagnosed when abdominal bloating as a subjective symptom and/or distension as a visible increase in abdominal girth predominate over other symptoms. Rome IV recognizes that patients may also report symptoms of mild abdominal pain and/or minor bowel movement abnormalities [13]. Rome IV diagnostic criteria for functional abdominal bloating/distension are presented in Table 6 [12].

Table 6

Functional abdominal bloating/distension [12]

Diagnostic criteria* must include both of the following:

1. Recurrent bloating and/or distension occurring on average at least 1 day/week; abdominal bloating and/or distension predominates over other symptoms**
2. There are insufficient criteria for a diagnosis of irritable bowel syndrome, functional constipation, functional diarrhea, or postprandial distress syndrome

* Criteria fulfilled for the last 3 months with symptom onset at least 6 months prior to diagnosis

** Mild pain related to bloating may be present as well as minor bowel movement abnormalities

The correct recognition of bloating is difficult in many languages, like Latin languages, where bloating may be confused with epigastric postprandial distention, typical in functional dyspepsia [24]. Therefore, it is important to make sure that the patient is complaining of true abdominal bloating (distension) and not on postprandial distress syndrome.

Abdominal bloating is a very common and embarrassing problem being reported by up to 30% of the general population [25-27]. It is a very subjective complaint among IBS patients, who describe it as a sensation of abdominal fullness with or without measurable increase in abdominal girth [21, 28-30].

In one study, bloating was the most bothersome symptom for 60% of IBS patients. In another study, almost all (90%) IBS patients reported bloating [25]. In a large study led by Safaee *et al.*, bloating was rated as the most bothersome symptom by more than 60% of the patients participated in the study. In the same study, bloating symptoms were reported 58.3% by IBS-C, 65.7% by IBS-D and 81.3% by IBS-I [31], which is different from previous reports that noted high presence of bloating in IBS-C patients [25, 32, 33].

Similar data come from the Far East: thus, in a Japanese online survey, Kanazawa *et al.* reported that up to 30% of healthy subjects and almost all IBS patients may be affected by bloating [34].

There are differences in bloating prevalence according to IBS type. In the majority of studies, the prevalence is higher in constipation-predominant IBS patients compared with diarrhea-predominant IBS patients, while some investigators found no relation of bloating to any of IBS subtype [35, 36]. A strong correlation between the severity of abdominal bloating and the degree of abdominal distension only in patients with constipation predominant IBS suggest that the pathophysiology may be different between subtypes of IBS [34, 37]. Using plethysmography it has been demonstrated that most patients with abdominal distension also report abdominal bloating and that patients with bloating alone have lower sensory thresholds in the rectum compared to healthy subjects, since those with abdominal bloating and distension have normal or higher sensory thresholds [38]. But then,

the increase in abdominal girth has been reported directly correlated with orocecal and colonic transit times, and inversely correlated with stool consistency [39]. Accordingly, abdominal bloating alone is rather the consequence of perturbed visceral sensitivity [34].

Using colonic gas infusion, a study demonstrated that colonic gas load is associated with significant increase of activity of the abdominal muscles assessed by electromyography [40, 41]. This contraction is associated with diaphragmatic relaxation, contributing to the unpleasant symptoms of bloating [42, 44]. In functional patients, the abdominal accommodation reflex is abnormal [43, 44]. Thus, beside the transit of gas in the bowel, wall musculature and diaphragm contribute to the occurrence of distension [18, 42]. This abdomino-phrenic incoordination is associated with abdominal distension more frequently in women than in males and more frequently during menses [45].

Bloating in IBS may be worsened by stress [46] and relieved by relaxation [47].

IBS patients often relate their symptoms to the intake of certain foods. Bloating occurs or is exacerbated postprandial in approximately two-thirds of patients [48, 49]. The presence of the symptom following meals intake is explained by increased visceral perception, increased gut contractions and impaired propulsive movement in response to the nutrition [34].

Abdominal bloating is associated with decreased QoL and may cause a higher healthcare utilization and use of medications [46].

CONCLUSIONS

Abdominal bloating/distension is an important and frustrating clinical condition. It can occur in some cases as a functional gastrointestinal disorder, but frequently also as an associated symptom to IBS. It should be differentiated from the functional dyspepsia of the type postprandial distress syndrome. Abdominal bloating has a high prevalence and considerable impact on the daily lives of subjects diagnosed with IBS. However, it is not specific enough to warrant its inclusion in the Rome diagnostic criteria for IBS.

Sindromul intestinului iritabil (SII) este cea mai comună tulburare cronică gastrointestinală adresată gastroenterologilor. Balonarea este una din cele mai comune manifestări ale SII. Balonarea este definită ca senzația subiectivă de distensie abdominală asociată cu creșterea circumferinței abdominale. Prin

urmare ea este descrisă conform criteriilor Roma IV ca balonare/distensie abdominală. Deși simptomele de balonare sunt raportate de 10-30% din populația generală și a fost evaluat drept cel mai deranjant simptom de către 60% din pacienții suferind de SII, totuși nu este inclus în criteriile de diagnostic Roma pentru SII. Având în vedere faptul că balonarea este prezentă în cazul pacienților suferinzi de orice tulburare funcțională intestinală și chiar la subiecții sănătoși, înseamnă că într-adevăr aceasta nu trebuie considerată un criteriu de diagnostic pentru SII. Acest articol este o revizuire asupra evoluției conceptelor cu referire la balonare conform grupului de lucru Roma de la originile acestuia până în prezent și o revizuire cuprinzătoare asupra prevalenței și patogenezei acestei manifestări.

Correspondence to: Prof. Dan Lucian Dumitrașcu, "Iuliu Hațieganu" University of Medicine and Pharmacy,
Medical Clinic II, Clinicilor 2-4, Cluj-Napoca, Romania
E-mail: ddumitrascu@umfcluj.ro

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