

Syndrome and Bacterial Overgrowth in the Small Intestine

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ABSTRACT

The present work analyzes the most frequent cause of consultation in Gastroenterology services worldwide, Irritable bowel syndrome (IBS) is a chronic gastrointestinal disorder characterized by recurrent symptoms that include abdominal pain and abnormal bowel habits either in the form of diarrhea, constipation, or both; in the absence of an apparent organic cause, with a global prevalence estimated at 11.2% with predominance in women, the prevalence of Latin America seems to be higher than that reported internationally if Rome II is considered (24.4%), and if the publications that used Rome III are considered, the prevalence was 11.8%.

Keywords: Syndrome; Irritable Bowel; Bacterial Overgrowth

Summary

Irritable bowel syndrome (IBS) is a chronic gastrointestinal disorder characterized by recurrent symptoms that include abdominal pain and abnormal bowel habits either in the form of diarrhea, constipation, or both; in the absence of an apparent organic cause, with a worldwide prevalence estimated at 11.2% with a predominance in women, the prevalence in Latin America appears to be higher than that reported internationally if Rome II is considered (24.4%), and if publications using Rome III are considered, the prevalence was 11.8%.

Introduction

Irritable bowel syndrome is the most frequent cause of consultation in Gastroenterology services worldwide, and in general medicine is among the 10 most frequent causes of consultation despite its under diagnosis, because patients only consult after a long time of suffering the disease, and this is explained that their symptoms are confused with other gastrointestinal pathologies

such as, gastroesophageal reflux disease, dyspepsia, gastroenteritis/ infectious colitis, and in general with the so-called functional bowel disorders (FIBD), a broad spectrum with different symptoms (abdominal pain, constipation, diarrhea and abdominal distension/ swelling) in which, depending on the predominance of one or the other, the diagnosis of functional constipation, functional diarrhea and functional abdominal distension/swelling is established [1].

Material and Methods

A narrative review was carried out, searching PubMed, Scielo and ScienceDirect databases, among others. The collection and selection of articles was carried out in English-language indexed journals from 2010 to 2022. As keywords, the following terms were used in the databases according to DeCS and MeSH methodology: irritable bowel syndrome and small bowel bacterial overgrowth. In this review, 60 original and review publications related to the topic studied were identified, of which 21 articles met the specified inclusion requirements, such as articles that were within a range of no less than 2010, that were full-text articles and that reported on the benefits

of the use of hypothermia in post-cardiac arrest patients. Exclusion criteria took into account that the articles did not have sufficient information and that they did not present the full text at the time of review.

Results

Irritable bowel syndrome (IBS) is a chronic gastrointestinal disorder characterized by recurrent symptoms that include abdominal pain and abnormal bowel habits either in the form of diarrhea, constipation, or both, in the absence of an apparent organic cause. The poor sensitivity and specificity of individual symptoms for diagnosing IBS led to the development of various clinical criteria over time. The Rome criteria, with their three initial versions in 15 years (Rome I-III), were widely disseminated to try to pigeonhole this syndrome so frequent in consultations; At this point it should be emphasized that, despite all their possible shortcomings, the Rome criteria are currently the only ones accepted by regulatory agencies (the Food and Drug Administration -FDA- included), pharmaceutical companies and most academic researchers. In May 2016, the Rome IV Criteria were published and are widely used for the diagnosis of IBS, as well as to further characterize subtypes based on fecal condition and stool, termed diarrhea-predominant (IBS-D), constipation-predominant (IBS-C), or mixed (IBS-M) [2]. In a meta-analysis published in 2012 by Lovell et al. the worldwide prevalence was estimated at 11.2% with a predominance in women, the prevalence in Latin America appears to be higher than that reported internationally if Rome II is considered (24.4%), and if the publications that used Rome III are considered, the prevalence was 11.8% [1]. Regarding gender distribution, there is no global percentage available, but all studies show a majority female sex, in Colombia there are only 2 studies from which it is concluded that the average age was 36.4 years and 62.4% were women. The prevalence of IBS was 19.9% [3].

In most cases there is no known cause for IBS, although it may be related to a history of stress or anxiety, or episodes of acute gastroenteritis. There is also data supporting the influence of genetic, environmental and familial factors. Logically, as in any other IBS, there should be no organic, metabolic or neurological disease that could cause the symptoms. Recently, the accumulated evidence obtained in studies indicates that the intestinal microbiota may play a fundamental role in the development of this pathology. Some authors have proposed that in addition to its appearance, it seems to influence its clinical course, predisposing to its chronicity. Although there is controversy, it is very likely that the intestinal microbiota contributes to IBS symptoms, at least in some patients [4]. The human intestinal microbiota is a very dynamic and highly complex ecosystem, composed of about 100 trillion microbial cells with approximately 9.9 million genes in its totality, in recent years, it has been extensively studied and its active intervention has been seen in an important way with various physiological processes of the host, by altering its

composition, diversity and metabolism it influences the development and course of various intestinal pathologies such as IBS, as it seems to influence brain activity through the enteric nervous system, while its composition and function are affected by the central nervous system. Based on these findings, the term "brain-gut-microbiome axis" has been proposed and the enteric microbiota has become a potential therapeutic target in cases of IBS, as it is the only mechanism that explains the relationship of this pathology to some patients with previous psychological triggers such as stress or anxiety.

However, details on the pathophysiology of microbiome-related IBS remain elusive [5,6]. We refer to the state of eubiosis when the intestinal microbiota is in a state of equilibrium, presumably fulfilling all the requirements for us to benefit from its effects on health at the metabolic, immune, mood, neuronal and protective barrier levels, typical of a healthy individual [7]. On the contrary, we call dysbiosis the imbalance in the bacterial composition of the microbiota, with transitory or definitive disappearance of some of the beneficial effects for health. In dysbiosis, the microbiota tends to decrease in diversity, although not necessarily in quantity of microorganisms, so there is an imbalance of microorganisms, and even they change their natural habitat as for example in Small Intestinal Bacterial Overgrowth (SIBO) associated with IBS, where bacteria normally found in the large intestine colonize the small intestine, receiving the name of pathobionts (benign endogenous microbes that have the capacity to colonize and generate pathologies in conditions of dysbiosis) [2,8,9]. We can define SIBO (small intestine bacterial overgrowth) by the abnormal and excessive presence of bacteria in the small intestine that are normally found in the large intestine [2,9]. This requires diagnostic tests such as small bowel aspirate/culture with growth of 10^3 - 10^5 CFU/ml, which is accepted as the "best diagnostic method" (S:100 and E:100); the disadvantage is that it is invasive, expensive and requires an expert gastroenterologist to perform; and the glucose (S:6-93% and E:78-100%) or lactulose (S:6-68% and E:44-70%)

breath test which is a safe and non-invasive diagnostic method to diagnose IBS patients [9-12]. In the intestine there are four main sources of gas, mainly hydrogen (H₂), carbon dioxide (CO₂) and methane (CH₄). Hydrogen and methane are produced exclusively by intestinal bacteria through the fermentation of carbohydrates; therefore, when substrates (glucose [75 g] or lactulose [0.5 g/kg maximum 10 g]) are administered, this will result in the production of hydrogen and/or methane, which are absorbed into the systemic circulation and then exhaled through the lungs and detected by means of specific electrochemical sensors for hydrogen or methane [13]. The distribution in children is the same as in the adult population, so it is a pathology that intervenes in all stages of life; Collins and his collaborators found a prevalence of 91% SIBO in children with chronic abdominal pain, and Scarpellini and his group reported a prevalence of 65% in children with irritable bowel syndrome [14].

Rifaximin is a semisynthetic non-systemic antibiotic, which has an impact on Gram-positive and Gram-negative bacteria, both aerobic and anaerobic. According to different studies, rifaximin improves symptoms in 33% to 92% of patients, eradicating SIBO in up to 80%. Rifaximin is probably the only antibiotic capable of achieving a long-term favorable clinical effect in patients with IBS and SIBO. This antibiotic is slightly absorbed in the gastrointestinal tract, has few side effects and a low rate of resistance. Di Stefano et al. found that metronidazole significantly reduced the positive results of exhaled hydrogen tests as well as patients' symptoms, although rifaximin was more effective than metronidazole [15].

Discussion and Conclusion

The FDA has ruled on this and it has recently been approved to treat irritable bowel type diarrhea and in patients with positive methane breath test for bacterial overgrowth. The FDA suggests the use of 550mg every 8 hours for 14 days. This approval is based on the 3 largest randomized clinical trials (phase 3) of this drug TARGET 1, TARGET 2 and TARGET 3, where it was studied in more than 3000 patients and demonstrated the efficacy and safety of the drug, with improvement in symptoms such as bloating/abdominal pain and diarrhea [16]. When rifaximin has been compared against other antibiotics in reviews (neomycin, doxycycline, amoxicillin/clavulanate, metronidazole, levofloxacin and ciprofloxacin) on average the improvement is 69 % (33 - 92 %) with rifaximin, 38 % neomycin, 44 % the rest ($P < 0.01$). It may have a more favorable adverse event profile than systemic antibiotics, without clinically relevant antibiotic resistance [17,18]. However, despite the fact that these trials have shown improvement in patients when using rifaximin, impact percentages that exceed 90% of the total number of patients treated have not been achieved. For this reason, the literature shows different schemes for the use of rifaximin, and there is no worldwide standardization regarding the treatment of bacterial overgrowth. IBS is frequently associated with syndromes and symptoms involving other systems, among which headache (34% to 50% of patients), fibromyalgia (32.5%), low back pain (30%), chronic fatigue (51%), dyspareunia (52.3%) and changes in urinary frequency (50%) (3-5).

It is believed that the association with these disorders has an impact on the quality of life of individuals, observing a greater limitation in the performance of their daily activities [19]. One of these extraintestinal symptoms that is being evaluated at the moment is the relationship with sleep disorders and other typical manifestations of stress and anxiety. A related study was conducted in the city of Bogotá, Colombia in patients with IBS, which showed that 47.5% of patients presented daytime hypersomnia, 81% showed some degree of alteration in the sleep quality index of which 31% with scores compatible with moderate and severe alteration, 51% presented restless legs syndrome, 75% presented alteration in the quality of life.

This leads us to conclude that IBS is related to a significant decrease in quality of life (QOL) and reduces work productivity. Its impact on QOL is comparable to that of disorders such as diabetes, arterial hypertension and chronic renal disease [20,21].

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