Author:
Maria Nastasia Hudson

Reviewers:
Prof. Mauro Pessia
Dr. Ian Said Huntingford

Irritable Bowel Syndrome Overview

Introduction

Irritable bowel syndrome (IBS) is one of the most common disorders of the gastrointestinal tract, affecting around ten to fifteen percent of individuals worldwide, and is especially prevalent in the Western World (Raskov, Hans et al., 2016). The disorder may manifest in different forms ranging from mild to severe, but the commonest symptoms include frequent occurrences of bloating, abdominal pain and altered bowel habits presenting as either constipation (IBS-C) , diarrhea (IBS-D) or the interchanging of the two (IBS-M) as described by the Rome IV Classification (Figure 1) . IBS is not a life-threatening condition, however; it is highly uncomfortable and painful. In fact, other symptoms may also be common such as lack of sleep and depression due to the low quality of life associated with the condition (Canavan, C et al., 2014). Despite the fact that IBS is a gastrointestinal disorder, it is becoming increasingly evident that both the microbiome and the brain play major roles in the development and manifestation of this condition.

The gut-brain axis (GBA) is a term used to describe the bidirectional relationship between the central nervous system and the gastrointestinal tract (Collins, S.M et al., 2009). This axis describes a crucial relationship that must be considered in patients suffering from many inflammatory bowel disorders and irritable bowel syndrome.
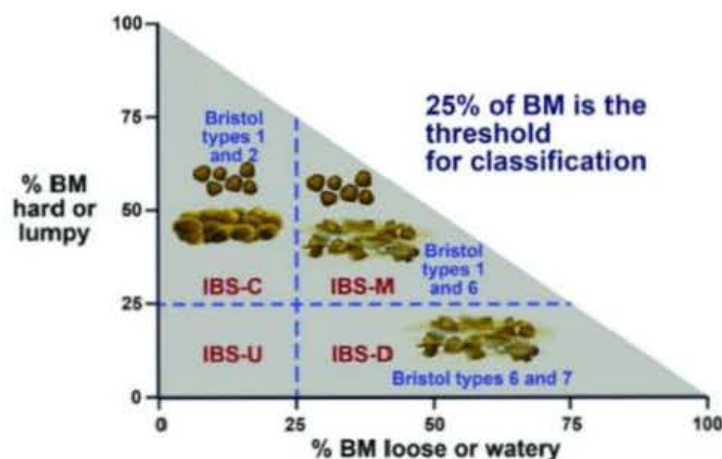

Figure 1: (Source- Menees, Stacey et al. 2018)

The above graph, % Bowel Movement (BM) hard or lumpy against % BM loose or watery, illustrates the different IBS subgroups according to both the Rome IV and the Bristol Stool Form Scale. Individuals having IBS with loose or watery stools >25% of the time have IBS-D (IBS with diarrhea) or Bristol Type 6 and 7 whilst those having IBS with hard or lumpy stools >25% of the time are classified as having IBS-C (IBS with constipation) or Bristol Type 1 and 2. Individuals having a mixture of stool consistencies are classified as having IBS-M (IBS with a mixed pattern) or Bristol Type 1 and 6. IBS-U is a term used to group those individuals having a type of IBS which is, as of yet, unclassified.

The role of the microbiome and irritable bowel syndrome

There are numerous microorganisms inhabiting the human gut, most notably in the last part of the small intestine and the colon. Bacteria are the most predominant microorganisms. However, fungi and viruses may be found to a lesser extent (Menees, Stacey et al., 2018). Ninety-three percent of the bacterial species are from the phyla Bacteroidetes, Actinobacteria, Proteobacteria and Firmicutes (Turnbaugh, P.J. et al., 2007). It is important to note that the microbiome is influenced by many factors.

In fact, several studies have suggested that lifestyle factors such as diet, drugs and exercise have a critical role in influencing the microbiome and its composition, more so than genetic influences. Moreover, the composition of the microbiome is an important factor in predicting many conditions such as diabetes, obesity, and even IBS (Musso, Giovanni et al., 2010).

Bacteria in the microbiome are crucial for health. These bacteria provide the human diet with essential amino acids, vitamins, and fatty acids as well as influence normal gut development and function. This is shown by studies involving animals that lack gut bacteria, which also have reduced gut function and motility when compared to those animals having a normal collection of gut microbiota (Menees, Stacey et al., 2018). It is interesting to note that under normal circumstances, there is immune homeostasis in the gut environment that allows bacteria to carry out their symbiotic function. However, if the intestinal barrier is breached by the entry of various inflammatory mediators or pathogenic organisms, homeostasis is lost and inflammation results (Pedron T., Sansonetti P., 2008). The inflammatory reaction may result in a dysregulated microbiome which may be the linked to the pathophysiology of irritable bowel syndrome namely due to changes occurring in the connections of the gut-brain axis (Chong, P.P et al., 2019).

The relationship between dysbiosis, lack of diversity of gut microbes, and irritable bowel syndrome development was consolidated by many studies (Carroll I.M. et al., 2012). These studies have demonstrated that IBS development is positively related to factors associated with dysbiosis such as low methane expiration. This relation is further supported by the beneficial effects of probiotics on relieving gut inflammation and sensitivity and thus inflammatory bowel syndrome (Ohmna L. , Simren M., 2013).

IBS susceptibility and the diet's role in IBS development

It should be noted that patients who are diagnosed with IBS are, in general, divided into two distinct subgroups: sporadic and post-infectious. Those patients with sporadic IBS are the ones who have had long-term IBS symptoms with no event correlation, whilst patients with post-infectious IBS are those who developed IBS symptoms after gastroenteritis. The latter make up around six to seventeen percent of patients suffering from IBS (Longstreth, G.F. et al., 2001). Thus, IBS susceptibility is highly linked to bowel inflammation as explained earlier. This being said, IBS etiology is not altogether understood.

However, several studies have indicated that the development of this condition may be dependent on the interplay between the microbiome, genetics, as well as the diet (El Salhy, Magdy et al.,2019). It is for this reason that IBS development is thought to be multifactorial.

The diet plays a crucial role in IBS patients. Patients suffering from IBS report that certain food items, such as milk products and beans, worsen IBS symptoms and therefore the control of dietary factors may be a means of treatment for IBS patients (El Salhy, M. et al. 2014). It was found that a diet low in fermentable oligo-, di-, mono-saccharides and polyols (FODMPs) improves IBS-related symptoms and may, by extension, be beneficial to patients. However, a low FODMP diet seems to have various negative repercussions both in the short and long-term. Firstly, only around fifty percent of IBS patients seem to respond to a low FODMP diet and thus the diet is less effective than was previously thought. Secondly, low adherence is not uncommon due to the fact that this form of diet is costly, and thirdly, in the long- term a low FODMP diet seems to have a negative impact on the microbiome itself, which may incongruously even worsen IBS symptoms (Eswaran, S.L et al., 2016) The National Institute for Health and Care Excellence (NICE) proposed an effective and less harmful diet for IBS patients, which is nowadays the first-line diet

Vegetables	Fruits	Others
Onions, garlic, beans, peas, artichoke, cabbage	Watermelon	Wheat flour and wheat-based products
		Milk and dairy products
		Sweeteners containing fructose (for example, corn syrup)
		Sweeteners: sorbitol, menthol, xylitol, isomalt, maltitol, and other sweeteners with names ending in "ol"
		Carbonated drinks (soft drinks), coffee, beer

Table 1 ; (Source: El Salhy, Magdy et al.,2019) The above table indicates the items of food to be avoided by IBS patients according to the NICE Irritable Bowel Syndrome guidelines. It includes vegetables, fruits, and numerous other products that one must avoid in order to better control IBS-related symptoms.

indicated for these individuals. The diet proposed to these patients entails eating regular meals as well as reducing the intake of beans, carbonated drinks, fatty foods, and others (Table 1).

Conclusion

As clearly explained above, IBS is a condition which affects numerous individuals across the world. It negatively impacts the patient's quality of life and the impact is equal to that caused by various other chronic conditions such as kidney failure and diabetes (Gralnek, I.M. et al., 2000). Despite how common and disabling the syndrome is, there are no true effective treatments. In fact, the treatments and medications prescribed are ones that can only manage the condition by alleviating the symptoms. Thus, further research and studies are necessary in order to work towards a better understanding of the etiology behind

IBS in order to effectively treat and manage patients suffering from this syndrome.

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