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Irritable bowel syndrome dietary modifications - what to forbid and what to recommend?

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1. Summary

Irritable bowel syndrome is a gastrointestinal disorder, that affects about 10 % of world's population. The etiology remains unclear, however studies show, that bad dietary habits may aggravate the symptoms. The most frequent signs of IBS are: abdominal pain, bloating, constipation, diarrhea and change in bowel habits.

The aim of this study was to describe dietary modifications that can alleviate the symptoms and improve patients' quality of life. The study material consisted of publications, that we've found on databases as PubMed, ResearchGate and Google Scholar.

Patients find out, that certain food aggravate the symptoms. The most frequent triggering factors are: coffee, dairy products, alcohol, spicy foods and lipids. Our review shows, there are some recommendations that help patients in their everyday diet change. For example drinking at least 3 cups of coffee per day can reduce bloating and diarrhea, while drinking more than 1,5 L of other fluids per day can alleviate symptoms as constipation. According to studies, following a IBS diet can minimize the signs.

Moreover, recently developed „IBS food pyramid” is based on actual recommendations and knowledge a visual and user-friendly tool helping patients in everyday diet changes.

Unfortunately, still there is insufficient evidence of studies about dietary approaches. Well designed and randomized control trials are needed to improve efficacy, safety and knowledge about dietary modifications.

Key words: irritable bowel syndrome, diet, abdominal pain, diet pyramid

2. Introduction and purpose

Irritable bowel syndrome is a common gastrointestinal disease with a high global prevalence. According to the research, about 10% of the world population suffers from this disorder.[1] Although IBS is not associated with increased mortality, it considerably reduces the quality of life. The etiology remains unclear. The most important risk factors are: female sex, younger age and preceding gastrointestinal infections. [2] The research suggest the link between pathogenesis of the disease and disturbed intestinal motility, visceral hypersensitivity, intestinal flora disorders or low-grade inflammation. [3] Psychosocial factors as low quality of life, psychiatric disorders and chronic life stress are also associated with IBS.[4] Moreover, numerous studies refer the role of the diet. It can be explained by atypical modulatory mechanisms of the gut which response to stimulation of gut receptors mediated by nutrients. Common symptoms of the IBS are: chronic abdominal pain, diarrhea, constipation, flatulence and disturbed bowel habits.

A diagnosis of IBS is usually suspected on the basis of the patient’s history and physical examination. Additional tests aren’t needed. Actually Rome Criteria IV describes an assessment of the symptoms. IBS patients are divided into 4 - based on stool patterns - subtypes: diarrhea-predominant (IBS-D), constipation-predominant (IBS-C), mixed diarrhea and constipation (IBS-M) and other (IBS-U).[5]

The effective treatment for IBS isn’t known. Actually used medications are only relieving symptoms, but there is no well known treatment which affects cause of the disease. Antidepressants, painkillers, antidiarrheals and prokinetic drugs are widely used.

Most patients find out that certain food aggravates the symptoms. About 50% of patients has reported that certain food worsen the symptoms within 3 hours after eating. The most common examples are: coffee, fried and sweetened products, alcohol and sweets. [6]

The aim of this study was to describe dietary modifications that alleviate symptoms and improve quality of life. Study material consisted of publications, which were found in PubMed, ResearchGate and Google Scholar databases.

3. Description of the state of knowledge

3.1. The importance of the dietary modifications

As said before, the crucial thing about managing IBS is replacing bad dietary habits with the healthy ones. The actual dietary advice for IBS management is based mostly on the common sense and is adjusted to subtype of the disease. People with IBS should be given information that explains the importance of self-help in effectively managing their IBS. Diet, physical activity and general lifestyle are the most important parts of the treatment. Regular meals, taking time to eat and avoiding missing meals or leaving long gaps between eating are not only basics rules of healthy diet, but also play the significant role in IBS management.[6] Furthermore, mentioned rules are beneficial in all subtypes of IBS. Apparently there is a higher prevalence of food trigger reactions in patients with IBS-D.

Moreover these patients are commonly suffering from psychiatric disorders in which healthy lifestyle is almost as important as pharmacotherapy and psychology course.[7] Overall benefits of dietary habits changes are indisputable.

3.2. The most frequent triggering foods

3.2.1. Coffee

Coffee is a well-known factor that stimulates colonic motor activity and gastric acid secretion. What's surprising, effects on the gastrointestinal tract can't be attributed completely to caffeine as the stimulating factor. In fact, caffeine affects CNS and cardiovascular system, but effects in gastrointestinal system are mostly caused by a very unlikely pH which varies from 5 to 6, with a very small buffering capacity or titrable acidity. All of the coffee properties make it aggravating factor in IBS, especially in the IBS-D subtype. [8] The most common symptoms after drinking are: pain, dyspepsia and loose stools or diarrhea. What's important, many IBS patients suffer from reflux esophagitis. Research suggest, that improving their reflux symptoms could be done by reducing coffee intake. Guidelines suggest that caffeine intake should be restricted to 400 mg per day, which corresponds to 3 cups per day.[9]

3.2.2. Alcohol

IBS patients consume less alcohol than the normal population. It is known that chronic alcohol consumption can damage the mucosa and disrupt the assimilation of nutrients and intestinal motility. In research it was observed, that in fact alcohol intake was associated with GI symptoms more often in IBS patients, but only if drinking was binge (more than 4 drinks per day, defining 1 drink as 5 oz of wine, 12 oz of beer and 1,4 oz of vodka). Light drinking (1-3 drinks per day) was not associated with GI symptoms to any appreciable degree. It could be that chronic drinking increases changes in the gut and it's associated with increases in GI symptoms.[10] Furthermore, alcohol intake cause higher incidence in GI symptoms in IBS-D patients than in IBS-C and IBS-M individuals. The most common described GI symptoms are: nausea, abdominal pain, diarrhea and bloating. [11] Recommendations suggest, that alcohol intake should be adjusted to personal reactions. In addition, IBS patients should be advised to consume alcohol in safe limits described as at most 1 drink per day for women and 2 drinks per day for men.[9]

3.2.3. Milk and dairy products

Low level of the enzyme lactase in the intestine of adult people is a well-known phenomenon. In most of the world's population, lactase transcription is down-regulated after weaning, resulting in diminished lactase expression in the small intestine.[12] It can cause common symptoms similar to typical IBS. As a result, lactose intolerance can not be distinguished from IBS-D. Undigested lactose is cleaved into fatty acids and gas by gut flora. It may result in intensified GI symptoms, especially bloating, loose stools and abdominal pain.[13] Several experiments showed a significant correlation between lactose and other sugars intolerance and intensity of the IBS symptoms. However intolerance is not more prevalent in IBS. It is due to the fact, that GI system of the suffering patient is increasingly sensitive to triggering factors, which results in more intensified GI reactions. Research suggest up to 12 g of the lactose per day can be handled, but nevertheless, it's necessary to customize the dose individually.[9] The best way to avoid undesirable effects is introduction to everyday diet lactose-free milk, lactose-free yoghurts and a hard cheese instead of milk, cream or ice cream.[14]

3.2.4. Lipids

The avoidance of fatty foods is one of the most frequent dietary modifications. However, despite to the subjective reports, differences between IBS patients and healthy people in fat intake are inconsistent. Convergence may be caused by differences in personal preferences, dietary habits and as regards to IBS patients, the subtype of the disease.[15] Fatty foods are attributed to GI symptoms, especially bloating and diarrhea. It's due to the fact, that intestinal gas transport is delayed by intraluminal lipids, which cause in intensive flatulence. Moreover, duodenal lipids change reflex stimulation of duodenal motor activity in IBS patients. It is manifested by inhibitory effect on the small bowel and stimulating colonic motor activity. [16] According to recommendations, fat intake should be adjusted to IBS symptoms during or after eating. If the exclusion of fatty foods from the diet is desirable, it should be carried out with healthy eating guidelines. WHO recommends IBS patients to limit fat intake to 40-50 g per day, while in normal individuals it should range 30%-35% of total daily energy. [9]

3.2.5. Fiber

It is widely believed, that high fiber intake is a symptom relieving factor. However, as the research suggest, advantages and disadvantages of fiber intake depend on its type. For example, short chain, insoluble types are associated with a high gas production and may cause abdominal pain and flatulence. Although, long chain, soluble ones can relieve the symptoms by lowering gas production and activating gastrointestinal motility.[17] For years, plant-based foods were recommended especially for IBS-C subtype. Nowadays it's well known, that these products contain mixtures of fiber which may cause different side effects. [14] Actually, there is no valid data about utility of both types of fibre. A systematic review found no beneficial effect with fibers, whereas meta-analysis including 906 patients showed that soluble fibers intake helps alleviate the symptoms. [18] Furthermore, dietary fiber has also other benefits. It improves body weight management, regulates blood pressure and lower blood cholesterol levels.[17] Actual recommendations suggest no more than 20-30 g of fiber (especially soluble) per day. Moreover IBS-C individuals should try dietary supplementation of linseeds.[6]

3.3. Recommended foods

First of all, dietary modifications should be adjusted to personal preferences. Main purpose is to encourage the intake of foods that individually have beneficial effects and the avoidance of unhealthy options. [18] Moreover, introducing to everyday diet foods that alleviate symptoms have to be safe and well tested.

3.3.1. Peppermint oil

Trial by Liu et al. checked the efficacy of the peppermint oil used in IBS. Patients received orally one capsule of Colpreamin or placebo 3 times a day for 4 weeks. Results showed, that those who received peppermint oil experienced improvement in symptoms such as loss of abdominal pain.[19] Numerous studies verified these results, however reported also some treatment-related adverse reactions such as heartburn in patients.[20] Mechanism of action of the peppermint oil includes relaxation of smooth muscle, antibacterial and anti-inflammatory effects and change in visceral sensation.[21] Actually, in Poland there is no data about the optimal dose of the product.

3.3.2. Probiotics

There is a weak recommendation for probiotics using. However, it suggests using certain strains probiotics rather than a group of them to reduce adverse reactions and IBS symptoms. Probiotics with a beneficial effect in IBS are: *Bifidobacterium bifidum* MIMBb75, *Bifidobacterium infantis* 35624, *Bifidobacterium lactis*, *Escherichia coli* DSM17252, *Lactobacillus acidophilus* SDC 2012, 2013 and *Lactobacillus plantarum* 299v. [18] Numerous studies conducted on this subject haven't result in any specific data. There was no research proving the efficacy of probiotic in all of symptoms. Generally studies showed no advantages of using probiotics, however there is an evidence that suggest that they may exert an effect through mechanisms which change visceral sensitivity, gastrointestinal motility and intestinal microbiota.[22] In conclusion, there is no data that affirms or denies the efficacy of probiotics, although they seem to offer some benefit in IBS, so patients trying to use the should be informed that they should choose 1 product and control the effects.

3.3.3 Fluids

Actual data shows that fluid intake is especially important for patients with IBS-C subtype.[18] Current recommendations suggest about 1,5-3 L of fluids per day. What's important, drinks should be non-caffeinated, alcohol-free and non-carbonated. [15]Some studies show a higher intake of cola in subjects with IBS compared to controls, but more researches find carbonated drinks as aggravating factors.[23] Water and herbal teas are recommended, while black tea can be associated with a constipation.

3.4. Food pyramid

IBS food pyramid is based on actual recommendations and knowledge that accords to IBS. In 2017 Cozma-Petruț et al. developed a novel „IBS food pyramid” which is a visual and user-friendly tool helping patients in everyday life. It consist of nine levels, with the most important on the bottom, and at least on the top. At the first level, surprisingly, there is a regular physical activity and good hydration. As said before, patients should drink 1,5-3L of fluids per day. Physical activity should be accurate for patients physical abilities, performed for at least 30 min per day, 5 times a week. At the second level there are healthy eating habits described before. On the next step are cereals, especially gluten-free and wheat-free products. Serving 40-60 g of bread or 60-70 g of pasta per day is recommended. At the forth level are fruits. What's important, tomatoes, onion and cabbage aren't recommended, whereas patients with IBS should choose banana, grapefruit, kiwi, lemon or strawberries. On the next step are: meat, fish, legumes, nuts and seeds, while intake of the nuts and seeds should be restricted to 10-15 g per serving and intake of the legumes has to be reduced to 2-3 servings per week. At the seventh level are described before dairy products. Recommendations suggest no more than 200-250 mL of milk per day, while lactose-free products should be chosen. On the top are fats, sweets, alcohol and spicy foods described as the most triggering factors. Their intake should be removed from the diet or at least limited to maximum 50 g per day. [9]

4. Conclusion

In recent years, recommendations showed, that not only a pharmacotherapy is a tool to alleviate the symptoms of IBS, but also that the dietary management is a promising way to increase a quality of patients life. Successful management with lifestyle and diet could minimize symptoms of IBS. Unfortunately, still there is insufficient evidence of studies about dietary approaches. Well

designed and randomized control trials are needed to improve the knowledge about dietary modifications. Moderating patients diet could be easier with individualized recommendations. Future studies are needed to improve the efficacy and safety of dietary modifications in irritable bowel syndrome.

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