Irritable Bowel Syndrome

Irritable Bowel Syndrome: Disentangling a Multifactorial Condition

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Part I: What is Irritable Bowel Syndrome?

Irritable bowel syndrome (IBS) is an increasingly common digestive condition, affecting up to 20% of individuals.[1, 2] IBS is protean in its manifestations, with symptoms variable from person to person, and can include a combination of any of the following symptoms: bloating, diarrhea, constipation, abdominal pain, and cramping.[1] It is not unusual for IBS to be intermittent; becoming worse for certain periods of time, easing for some time, and then flaring up again. Although IBS is not a life-threatening disease, it is a nuisance, impedes health-related quality of life, and may impact one’s ability to perform day-to-day activities. It is also associated with higher costs of health care, including more hospitalizations, and reduced performance at work.[1, 3] Many patients with symptoms of IBS seek natural solutions, and there is evidence to suggest that natural treatment options may indeed be able to help.

IBS used to be considered a “diagnosis of exclusion,” meaning that every other likely disease needed to be ruled out before the name “IBS” could be assigned. This led to much unnecessary and complicated testing. More recently, the Rome III criteria have been adopted to diagnose IBS. According to Rome III, IBS can be diagnosed when recurrent abdominal pain or discomfort are present for six months, with these symptoms present at least three days per week for the past three months. The abdominal pain or discomfort must be associated with two of the following: 1) improvement with defecation; 2) onset associated with change in frequency of stool; 3) onset associated with change in form (appearance) of stool.[1] Other symptoms that may be present include bloating, increased or decreased frequency of bowel movements (less than 3×/wk or greater than 3×/d), mucus in the stool, or abnormal stool consistency.
Warning signs that the symptoms are not due to IBS include: age over 50 years, a short history of symptoms, weight loss, rectal bleeding, and low iron or anemia. These symptoms can indicate more serious disease, including colorectal cancer, and should receive further assessment.

Furthermore, IBS is classified into three main groups: diarrhea-dominant (IBS-D); constipation-dominant (IBS-C); or mixed subtype (IBS-M).[1]

Research on IBS is growing rapidly as awareness of this condition grows. It increasingly appears that IBS is a multifactorial condition, with impaired gut-barrier function and/or imbalance of gut flora, disrupted circadian rhythm due to shift work, and elevated levels of psychological stress, all potentially impacting the course of IBS. These factors and natural approaches to managing IBS will be discussed in upcoming parts of this series.

References

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Part II: Gut-Barrier Function and IBS

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In part I, we reviewed general information about what IBS is. In this section, we will discuss the impact the importance of gut-barrier function in IBS. There is ample evidence to suggest that IBS sufferers have altered barrier function and increased intestinal permeability.

In very basic terms, one of the functions of the intestines is to separate the semidigested food particles inside the intestines from the blood vessels on the other side of the intestines. Specialized cells
lining the walls of the intestines are joined together by tight junctions so that there are no “gaps” between cells, and the only molecules that can pass from the intestines to the bloodstream are those that have been properly digested and allowed through by the cells. Cells allow some particles through via specific receptors on the cell surface, and certain small fats can diffuse through the cell membrane. In either case, however, larger particles are not allowed through. When the tight junctions malfunction, however, food particles that normally are not allowed through can in fact pass from the intestine to the bloodstream. This can lead to mucosal immune activation and ongoing inflammation, which may both worsen the integrity of the intestine as well as increase sensitivity to pain.[1]

A term that has been long-used by naturopaths to describe this phenomenon is “leaky gut” or “leaky gut syndrome.” More recently, research is supporting this link between leaky gut and IBS.[2] In a recent study examining gut-barrier function, IBS patients had significantly more “gaps” between the cells of the intestine compared to healthy patients. The number of gaps per number of cells was called “gap density.” Healthy patients had 6 gaps per every 1000 cells, whereas IBS patients had 32 gaps for 1000 cells, a five-fold increase.[3] In another study, patients with IBS-C (constipation) were found to have abnormally decreased permeability in the small intestine, while IBS-D (diarrhea) patients had increased permeability in the large intestine.[4] Accompanying this altered intestinal permeability is an increased activation of mucosal mast cells, the immune cells that mediate hypersensitivity/allergic reactions. One study found that the severity of IBS was correlated with the presence of increased intestinal permeability as well as with the number of mucosal mast cells present.[5]

One of the most important agents being investigated for their potential ability to repair gut-barrier function is probiotics. Probiotics modulate the reactivity of the immune system and may help repair gut integrity.[6] Early human studies suggest that administration of probiotics may help restore normal intestinal permeability.[7] One study found that probiotics improved small-intestinal permeability in concert with decreased IBS symptom scores.[7] Similar results have been documented in children with abdominal pain, where probiotics improved intestinal permeability and led to a decrease in the frequency and severity of abdominal pain.[8]

In upcoming segments, we will investigate the role of shift work and psychological stress on symptoms of IBS.

References


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**Part III: Shiftwork, Stress, and IBS**

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In part II, we discussed the importance of intestinal barrier function in IBS. This can be regulated by local influences like the gut microflora, as well as more “distant” influences. Much has been written about the “gut-brain axis” in IBS as well as other conditions.[1, 2] Parts III and IV discuss the impact of the nervous system on IBS.

Simply put, the concept of the “gut-brain axis” means that the central nervous system (i.e. brain) powerfully influences gut function, and vice versa. In fact, in addition to the central nervous system, the body has its own unique division of the nervous system that controls the gut, called the enteric nervous system (ENS).[1] The ENS, for instance, controls the 24-hour rhythm of peristaltic contractions that move food along the intestinal tract and ensure bowel regularity.[3] The gut also produces large quantities of signaling chemicals, called neurotransmitters, that are usually thought of in relation to mood and other brain activities, such as serotonin and melatonin.[1] In keeping with the gut-brain axis, factors that affect mood and brain activity, such as stress and altered circadian rhythm, are also tightly connected with gut function.
Circadian rhythm refers to the 24-hour “clock” within humans, which is regulated by the hormone melatonin.[4] While most people only think of this clock in terms of sleeping and waking, many other bodily functions follow a daily rhythm, including secretion of many hormones such as cortisol.[5, 6] In fact, the importance of sleep is only now becoming more widely recognized for its many impacts on human health, with links being established between sleep deprivation and blood sugar problems, high blood pressure, obesity, and even breast cancer.[7–10]

Studies among nurses have demonstrated that working night shifts increases risk of IBS.[11] One survey found that rotating-shift nurses had higher prevalence of IBS compared to day-shift nurses (48% versus 31%) as well as abdominal pain compared to day-shift only (81% versus 54%).[11] This is not surprising, given that the presence of light at night disrupts nocturnal melatonin production;[12] and that melatonin is active in regulating gut function, including peristaltic contractions, as well as protecting intestinal-wall integrity.[3] Several studies have found that administration of melatonin may help reduce symptoms of IBS including pain.[13, 14]

Melatonin administration to patients with IBS has been found to decrease the intensity of organ-related pain and abdominal bloating by 70%, and decreased constipation by 50%.[15] Another study reported benefit on overall symptoms scores, with 88% of patients reported as achieving “mild-to-excellent improvement in IBS symptoms”.[16] These improvements appear to be independent of direct effects on sleep or anxiety.[14]

In part IV, we will discuss the influence of psychological stress on symptoms of IBS.

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Part IV: The Gut-Brain Axis: Stress in IBS

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In part III, we introduced the idea of the “gut-brain axis,” with a focus on circadian rhythm. The brain influences gut activity through direct communication via the nervous system, as well as through hormone secretion. In addition to circadian rhythm disruption, elevated levels of psychological stress can also aggravate IBS.\(^1, 2\) This can be through direct effects on the nervous system, as well as through more general effects on quality of digestion.

The division of the nervous system that regulates involuntary or unconscious bodily activity is called the autonomic nervous system (ANS).\(^3\) This system can be subdivided into the sympathetic nervous system (SNS) and the parasympathetic nervous system (PNS), which are opposing systems that balance each other’s effects. When the body is under stress, the SNS kicks in, leading to the “fight-or-flight response,” increasing the heart rate, and diverting blood flow away from digestive organs to the heart and large muscles. When the body is relaxed, the PNS dominates, promoting blood flow to the digestive organs and the secretion of digestive enzymes to facilitate digestion. Under conditions of chronic stress,
digestion can become problematic due to chronic SNS dominance. To counteract this, it is important to sit down, eat slowly, and relax during meals. Another way to help aid digestion is the use of bitter herbs prior meals, to help “prime” the digestive system in preparation for food.

A large number of human trials have found that use of the specific herbal formula called Iberogast can help ameliorate symptoms of IBS.[4] Studies have found that these herbs can reduce abdominal pain, reduce muscle spasm, and increase secretions in the digestive tract.[4–6]

Stress management on an ongoing basis is also critical to managing IBS. Patients with IBS often suffer from comorbidities, or concurrent related conditions, such as anxiety and depression.[7, 8] It is quite common for IBS symptoms to flare up when these other conditions worsen. Stress in itself, in otherwise healthy individuals subjected to intense physical training, has been shown to impair gut-barrier function,[9] likely through effects on the stress hormone cortisol. A maladapted stress response is thought to contribute to IBS flares through several mechanisms, including impaired gut-barrier function, changes in gut flora, changes in gastrointestinal motility and secretion, decreased mucosal blood flow, and decreased ability to heal and recover from damage.[1, 2] It is crucial for IBS sufferers to adequately manage any such comorbid conditions, as well as engage in practices that can help them reduce and effectively manage stress.

As an example, one study found that women with IBS had significantly higher scores on depression and anxiety rating scales, compared to healthy women.[10] Investigators then treated these women with St. John’s wort, an herbal antidepressant, and found that compared to baseline, they were better able to handle stress based on autonomic nervous system testing. Treatment with St. John’s wort also resulted in significant improvements in gastrointestinal function. Other natural agents that assist with mood and stress management, as well as psychological techniques to help manage stress, such as mindfulness practice and mediation, may also ameliorate symptom burden in patients with IBS.[11, 12]

The sum of the information discussed in this series clearly demonstrates the multifactorial nature of IBS. However, the evidence pertaining to these factors — gut-barrier function, circadian rhythm, and stress — also suggests that, depending on the factors at work in each individual case, use of select agents can help IBS sufferers control their symptoms naturally.

References
2. O’Malley, D, et al. "Do interactions between stress and immune responses lead to symptom exacerbations in irritable bowel syndrome?" Brain,


