Irritable Bowel Syndrome and Small Intestinal Bacterial Overgrowth (SIBO)

Oh Young Lee, M.D., Ph.D.
Division of Gastroenterology, Department of Internal Medicine, Hanyang University, Seoul, Korea

Irritable bowel syndrome (IBS) is characterized by bowel habit change and abdominal pain relieved with defecation. Although the exact mechanisms of IBS are unclear, the pathogenesis is known to be due to multifactorial factors which include visceral hypersensitivity, altered brain-gut axis, dysmotilities, and genetic influence. Therefore, IBS is diagnosed and managed based on the clinical criteria with exclusion of organic causes. Recently the relatively objective factor of small intestinal bacterial overgrowth (SIBO) sharing similar symptoms with IBS has been suggested as a pathogenetic factor of IBS.

SIBO is a condition defined by the presence of abnormally high number of bacteria or the growth of colon-type bacteria in the small intestine. As anatomical or functional impairment of the small intestine as well as systemic conditions could develop SIBO, there are many conditions predisposing to SIBO such as resection of an ileocecal valve which would normally prevent colonic bacteria from entering the ileum, intestinal stasis caused by small bowel dysmotility, reduced secretion of gastric acid which inhibits bacterial overgrowth, and systemic diseases like liver cirrhosis or scleroderma. By fermenting undigested carbohydrates within the small intestine, SIBO could impair the digestion and absorption of nutrients resulting similar symptoms of IBS, such as diarrhea, abdominal pain, bloating, and flatulence.

Many studies have reported the higher prevalence of SIBO in patients with IBS than healthy controls (HC). About 80% of IBS patients were reported to have SIBO compared with only 20% of HC, and their IBS symptoms improved after antibiotic treatment with normalization of SIBO test. However, other studies concluded that IBS patients had low prevalence of SIBO and the prevalence of SIBO in IBS was not significantly different from HC. These discrepancies might be influenced by variable methods and different criteria used to diagnose SIBO. Currently lactulose breath test (LBT) is most commonly used to diagnose SIBO, but actually it was a method measuring colon transit time at first. LBT detects hydrogen or methane gas in expired air which is produced from fermentation of lactulose by intestinal bacteria and then absorbed through the intestinal mucosa. There are three different criteria for SIBO by LBT; when expired air was collected every 15 to 20 min for 3 h after ingestion of 10 g of lactulose, double peaks during LBT can be considered as a positive result, or increase of hydrogen within 90 min, or increase > 20 particles per million (ppm) within 180 min can also be regarded as positive. In addition, glucose has been used as a substrate for breath test substitute for lactulose, and direct culture of aspirates from proximal small bowel has been also used to diagnose SIBO. However, glucose breath test has a high false negative result when glucose is absorbed from the proximal small bowel and direct culture methods can underestimate bacterial overgrowth in the distal small intestine. Even LBT has a false positive result when subjects
have a rapid intestinal transit time. Therefore, it can be said that there is no gold standard to diagnose SIBO yet and it is controversial that SIBO plays a definite role in the pathogenesis of IBS. However, fecal DNA fingerprinting could be used as an objective and direct method to qualify intestinal bacteria but the difficulty of anaerobes culture may elucidate the association between bacterial overgrowth and gastrointestinal symptoms.6

One of the main physiologic functions of gastric acid is inactivation of ingested micro-organism. Majority of ingested micro-biological pathogens never reach the intestine due to gastric barrier. PPIs may lead to gastrointestinal bacterial overgrowth. As we know, overlaps between IBS and GERD are common in the general population. Therefore, possible link among SIBO, IBS and PPI should be investigated, based on the following facts that IBS patients take PPI more likely than controls, PPI may contribute to SIBO by inhibiting gastric acid secretion, and studies exhibiting the association between IBS and SIBO did not exclude the PPI users.7

In spite of all these uncertainties, it is still intriguing and worthwhile to study the quality and quantity of variable intestinal bacteria that could alter the intestinal function and develop gastrointestinal symptoms associated with functional alterations. The manipulation of these intestinal bacteria might improve the gastrointestinal symptoms and furthermore the general health of human being.

References