

The Role of Small Intestinal Bacterial Overgrowth in the Pathophysiology of Irritable Bowel Syndrome

Hyojin Park, M.D., Ph.D.

Department of Internal Medicine, Gangnam Severance Hospital, Yonsei University College of Medicine, Seoul, Korea

Article: Frequency of small intestinal bacterial overgrowth in patients with irritable bowel syndrome and chronic non-specific diarrhea
(J Neurogastroenterol Motil 2010;16:40-46)

Small intestinal bacterial overgrowth (SIBO) is a clinical condition caused by excessive number of bacteria in the small bowel. SIBO is characterized by symptoms of diarrhea, abdominal pain, or bloating which may be associated with excessive gas of small intestine due to increased production by bacterial fermentation in the gut. In the last decade, SIBO has been occupied as a hot topic of interests by a group of researchers because of its potential role in the development of irritable bowel syndrome (IBS).¹

In the diagnosis of SIBO, a bacterial count greater than 10^5 colony-forming units/mL by small bowel culture is believed to be the gold standard.² But small bowel culture through jejunal aspirate is time-consuming, invasive, and potential for contamination. Due to several flaws of small bowel culture, a number of non-invasive and indirect tests for diagnosing SIBO have been developed. Breath test, the most common indirect method for evaluating SIBO, utilizes the metabolism of carbohydrates by bacterial enzymes, in turn indirectly measures bacterial activity of small bowel. Different carbohydrates have different properties.

As lactulose is a non-absorbable carbohydrate, it easily reaches the site of potential overgrowth in the small bowel, although non-absorbed carbohydrate has limitations by the intestinal transit time. In patients with rapid transit, lactulose may produce an early hydrogen peak which makes it difficult to discriminate the true SIBO from a phenomenon by rapid intestinal transit, therefore specificity of lactulose hydrogen breath test (LHBT) is relatively low.³

Pimentel and colleagues⁴ suggested a concept that SIBO is a major pathogenic mechanism underlying IBS in 2000. They have found 78% of 202 IBS subjects to be positive for LHBT which is suggestive of SIBO. They also demonstrated a significant improvement in symptoms including abdominal pain, bloating, and diarrhea by treating SIBO with antibiotics and converted many IBS patients from Rome criteria positive to negative.

Since then, SIBO has been proposed as an etiologic factor in IBS, but also the potential role of SIBO in IBS has been strongly debated about the methods used in diagnosing SIBO. A prevalence of SIBO in subjects meeting diagnostic criteria for

Received: December 19th, 2009 Accepted: December 25th, 2009

© This is an Open Access article distributed under the terms of the Creative Commons Attribution Non-Commercial License (<http://creativecommons.org/licenses/by-nc/3.0>) which permits unrestricted non-commercial use, distribution, and reproduction in any medium, provided the original work is properly cited.

*Correspondence: Hyojin Park, M.D., Ph.D.

Gangnam Severance Hospital, Yonsei University, 612 Eonjuro, Gangnam-gu, Seoul 135-720, Korea
Tel: +82-2-2019-3318, Fax: +82-2-3463-3882, E-mail: hjpark21@yuhs.ac

Financial support: None.

Conflicts of interest: None.

IBS varies from 4% to 64%, depending on the kind of test and criteria used to define a positive result.⁵ In addition, a recent well-designed study from the US⁶ using LHBT to diagnose SIBO could not discriminate patients with IBS from healthy subjects, which was a consistent finding the authors demonstrated previously.⁷ Therefore, the proposed etiologic role of SIBO diagnosed by LHBT in IBS patients is controversial and the correlation between the normalization of the LHBT following antibiotic treatment and symptom improvement has become less clear.

Glucose, on the other hand, is rapidly absorbed in the proximal small bowel. Thereby detecting hydrogen in this test means SIBO in a proximal location. Glucose hydrogen breath test (GHBT) is the most commonly used test in the diagnosis of SIBO, although GHBT may be less sensitive for the diagnosis of SIBO since it is absorbed in the proximal small bowel. GHBT has been reported to have a overall sensitivity between 25% to 93% and a specificity from 34% to 96% in detecting SIBO.^{3,5}

In this issue of the *Journal of Neurogastroenterology and Motility*, Ghoshal et al. reported the frequency of SIBO in patients with IBS and chronic non-specific diarrhea (CNSD) with comparison to healthy controls by using GHBT. The authors found that SIBO was more common in patients with CNSD (21.9%) than those with IBS (8.5%) and healthy controls (2%). Since CNSD including diarrhea predominant IBS (D-IBS) had higher frequency of SIBO, the authors suggested clinicians to

consider testing for SIBO among them. However, since false positive GHBT could result from rapid intestinal transit in patients with diarrhea, the frequency of SIBO in patients with CNSD and D-IBS demonstrated in the author's study might have been overestimated in part.

References

1. Lin HC. Small intestinal bacterial overgrowth: a framework for understanding irritable bowel syndrome. *JAMA* 2004;292;852-858.
2. Vanner S. The small intestinal bacterial overgrowth. Irritable bowel syndrome hypothesis: implications for treatment. *Gut* 2008;57:1315-1321.
3. Abu-Shanab A, Quigley EM. Diagnosis of small intestinal bacterial overgrowth: the challenges persist! *Expert Rev Gastroenterol Hepatol* 2009;3:77-87.
4. Pimentel M, Chow EJ, Lin HC. Eradication of small intestinal bacterial overgrowth reduces symptoms of irritable bowel syndrome. *Am J Gastroenterol* 2000;95:3503-3506.
5. Ford AC, Spiegel BM, Talley NJ, Moayyedi P. Small intestinal bacterial overgrowth in irritable bowel syndrome: systemic review and meta-analysis. *Clin Gastroenterol Hepatol* 2009;7:1279-1286.
6. Bratten JR, Spanier J, Jones MP. Lactulose breath testing does not discriminate patients with irritable bowel syndrome from healthy controls. *Am J Gastroenterol* 2008;103:958-963.
7. Gupta D, Ghoshal UC, Misra A, Misra A, Choudhuri G, Singh K. Lactose intolerance in patients with irritable bowel syndrome from northern India: a case-control study. *J Gastroenterol Hepatol* 2007;22:2261-2265.