

PREVALENCE OF SMALL INTESTINAL BACTERIAL OVERGROWTH IN IRRITABLE BOWEL SYNDROME

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ABSTRACT

BACKGROUND

Irritable Bowel Syndrome (IBS) is a common functional disorder and the pathophysiology of IBS is poorly understood.

The aim of the study is to assess the prevalence of SIBO in patients with IBS using Lactulose Hydrogen Breath Test (LHBT). Diagnosis of IBS was made according to the Rome III Criteria and Lactulose Hydrogen Breath Test (LHBT) was done.

MATERIALS AND METHODS

The current hypothesis suggests that altered gastrointestinal motility, disturbance of visceral hypersensitivity and infection may contribute to the symptoms. Gut microbiota and intestinal pathogens are likely to influence the pathogenesis of IBS. Small Intestinal Bacterial Overgrowth (SIBO) is defined as an abnormally high bacterial count ($\geq 10^5$ colony-forming units/mL) in the proximal small intestine.

RESULTS

Out of the 120 patients, 9 were LHBT positive (7.5%) compared to none in controls ($p < 0.01$). IBS patients with LHBT positivity was correlated well with the increased frequency of stools. There was no correlation noted with LHBT positivity and abdominal pain or flatulence or bloating compared to IBS patients who were LHBT negative.

CONCLUSION

These findings may suggest that patients with chronic diarrhoea including IBS should be tested for SIBO. Our study also showed that LHBT positivity is associated with increased frequency of stools and diarrhoea. If SIBO is found in patients with chronic diarrhoea, specific treatment with antibiotics may benefit them.

KEYWORDS

Lactulose Hydrogen Breath Test, Irritable Bowel Syndrome, Small Intestinal Bacterial Overgrowth.

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BACKGROUND

Irritable Bowel Syndrome (IBS) is a functional disorder in which there is chronic or recurrent abdominal pain, abnormal bowel habits, bloating, passage of mucus and feeling of incomplete evacuation.¹ IBS is a common disease in the world including India. The underlying pathophysiology of IBS is poorly understood. The current hypothesis suggests that altered gastrointestinal motility, disturbance of visceral hypersensitivity and infection may contribute to the symptoms. Gut microbiota and intestinal pathogens are likely to influence the pathogenesis of IBS.² Small Intestinal Bacterial Overgrowth (SIBO) is defined as an abnormally high bacterial count ($\geq 10^5$ colony-forming units/mL) in the proximal small intestine.³ Symptoms of SIBO include

abdominal pain, bloating and diarrhoea, which are similar to those observed in patients with IBS. If SIBO is common in IBS, it gives a window of opportunity for treatment of a subset of patients with IBS like symptoms. It has been demonstrated that the myoelectric activity of intestinal loops are deeply modified by the intestinal flora leading to the hypothesis that many of the sensorial and motorial symptoms of IBS are really determined by changes in the intestinal bacterial flora. In post gastrointestinal infection states^{2,3} and after use of systemic antibiotics,^{4,5} there is profound changes in intestinal bacterial flora and both these conditions may result in symptoms, which mimic IBS.⁶⁻⁹ There are reports that treatment with antibiotics specifically addressed to correction of intestinal bacterial overgrowth is followed by an improvement of IBS symptoms.¹⁰ Patients with diarrhoea-predominant IBS (D-IBS) are more likely to have SIBO than those without diarrhoea. Since, IBS is diagnosed by Rome III Consensus Criteria based on combination of symptoms, which are common in patients with SIBO.¹¹ It is possible that some of patients with the latter condition maybe misdiagnosed as IBS. There are several methods for evaluation of SIBO.¹²⁻¹⁵ Lactulose Hydrogen Breath Test (LHBT), Glucose Hydrogen Breath

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Test (GHBT) and culture of jejunal aspirate are common tests used to diagnose SIBO. Breath tests are more acceptable method to diagnose SIBO in clinical practice as it is non-invasive as compared with quantitative jejunal aspirate culture.

Aims and Objectives- This study aims to study the prevalence of SIBO in our population of patients with IBS using Lactulose Hydrogen Breath Test (LHBT) compared to healthy controls.

MATERIALS AND METHODS

Study Design- This is a single centre prospective observational study conducted in Department of Gastroenterology, Government Medical College, Kottayam.

Diagnostic Criteria- IBS patients will be defined by the Rome III Criteria, which must be fulfilled for the last 3 months with symptom onset at least 6 months prior to diagnosis, which must include one or more of the following- Recurrent abdominal pain or discomfort at least 2 days in a week in the last 3 months associated with two or more of the following-

1. Improvement with defecation.
2. Onset associated with a change in frequency of stool.
3. Onset associated with a change in form (appearance) of stool.

Inclusion and Exclusion Criteria

All IBS patients more than 18 years irrespective of sex will be included in the study. Patients with severe cardiac disease, severe respiratory disease, renal failure and recent intake of antibiotics and history of lactose intolerance were excluded.

Lactulose Hydrogen Breath Test- All symptoms of patients and routine blood examinations were recorded in the first medical visit. The patients will undergo a "breath test" and will be completely fasted and smoking is forbidden on that day. In the fasting state, two samples of expired air will be taken at a 10 minutes interval to assay the basal hydrogen concentration. Then, 75 g of lactulose will be administered and the expired air will be sampled every 15 minutes in the next 3 consecutive hours. A positive test requires an elevated breath hydrogen concentration higher than 10 ppm over basal values. These concentrations are indicative of a bacterial colonisation of the small intestine where bacteria can metabolise non-absorbable sugars, thus producing an increased hydrogen amounts, which is eliminated through expired air.

RESULTS

Total number of IBS patients in the study was 120. 87 of the patients were males and 33 were females. The mean BMI was 23.34. The mean duration of illness was 25.85 months (range 7-150 months). Abdominal pain was present in 62 patients (51.66%) and bloating was the predominant symptom in 89 patients (74.16%). The mean stool

frequency was 3.9. The stool type by the Bristol stool chart was type 4 in 52 patients, type 6 in 34, type 7 in 21, type 5 in 7 and type 3 in 6 patients. Flatulence was present in 53 (44.16%) and tenesmus was present in 37 (30.83%) patients. The IBS was predominantly diarrhoeal type in 56 (46.66%) and mixed type in 64 (53.33%) patients. 9 patients were lactulose hydrogen breath test positive compared to none in the 120 were LHBT positive in the normal control population (P <0.01) prevalence of SIBO in IBS patients in this study was 7.5%. Among the IBS patients, LHBT positivity was correlated well with the increased frequency of stools (p<0.01). There was no correlation noted with sex (p=0.47) abdominal pain (p=0.098) or flatulence (p=0.45) or bloating (p=0.42).

Baseline Comparison of Cases			
Variables		Diarrhoea Predominant IBS	Mixed IBS
Sex	Male	47 (83.9%)	40 (62.5%)
	Female	9 (16.1%)	24 (37.5%)
Mean weight		62.89 ± 13.46	58.95 ± 10.92
Mean height		164.14 ± 9.73	159.55 ± 10.70
Mean BMI		23.51 ± 5.54	23.20 ± 3.86
Mean duration in months		34 ± 34	19 ± 16
Bristol stool type	3	0	6 (9.4%)
	4	1 (1.8%)	51 (79.7%)
	5	0	7 (10.9%)
	6	34 (60.7%)	0
	7	21 (37.5%)	0
Bloating	Absent	15 (26.8%)	16 (25.0%)
	Present	41 (73.2%)	48 (75.0%)
Abdominal pain	Absent	28 (50.0%)	30 (46.9%)
	Present	28 (50.0%)	34 (53.1%)
Frequency	2	0	1 (1.6%)
	3	22 (39.3%)	36 (56.2%)
	4	14 (25.0%)	20 (31.2%)
	5	9 (16.1%)	6 (9.4%)
	6	9 (16.1%)	0
	7	0	1 (1.6%)
Flatulence	10	2 (3.6%)	0
	Absent	30 (53.6%)	37 (57.8%)
Tenesmus	Present	26 (46.4%)	27 (42.2%)
	Absent	41 (73.2%)	42 (65.6%)
LHBT	Present	15 (26.8%)	22 (34.4%)
	Positive	7 (12.5%)	2 (3.1%)
		Negative	49 (87.5%)
			62 (96.9%)

DISCUSSION

The present study showed that SIBO was more common in patients with IBS and with a prevalence of 7.5%. Various studies have pointed out that there can be considerable overlap of symptoms between IBS and SIBO. In India, Ghoshal et al¹⁶ using glucose hydrogen breath tests compared frequency of SIBO in IBS and Chronic Non-Specific Diarrhoea (CNSD) to healthy controls. SIBO was commoner in IBS than HC 13 (8.5%) vs. 1 (2%).¹⁶

Previous studies reported contradictory results on the prevalence of SIBO in patients with IBS. The difference in the geographical origin of the studied population, criteria for

diagnosis of IBS, methods for diagnosis of SIBO and methods of breath tests (substrate, instrument, gases analysed and diagnostic criteria) might explain the variation in prevalence of SIBO in different studies. Prevalence of SIBO in IBS in our study was 7.5%, which is lower compared to the Ghoshal et al study,¹⁶ but there is a significant difference in prevalence of SIBO in IBS compared to normal controls. This maybe because lactulose HBT has lower sensitivity than glucose HBT, which was used in the Ghoshal et al study (31% vs. 40%). In the present study, we have used the most recent Rome Criteria instead of Manning's criteria for diagnosis of IBS in order to have a good comparison with western studies, which have used Rome Criteria.

Higher prevalence of SIBO in patients with IBS is not at all unexpected. Almost, half of patients with malabsorption syndrome have been shown to have SIBO, which is due to small intestinal stasis and large quantity of nutrient-rich fluid in the intestinal lumen. There may be an aetiological and pathophysiologic overlap between malabsorption syndrome and D-IBS. This is seen in patients with PI-IBS who have organic basis more frequently are more often diarrhoea-predominant like post-infective malabsorption syndrome. Also, patients with D-IBS have higher prevalence of SIBO and lactose malabsorption. These findings may suggest that patients with chronic diarrhoea including IBS should be tested for SIBO. Our study also showed that LHBT positivity is associated with increased frequency of stools and diarrhoea. If SIBO is found in patients with chronic diarrhoea, specific treatment with antibiotics may benefit them. Since older patients had SIBO more commonly, it is suggested that patients older than 40 years should be investigated for SIBO.

Gastrointestinal symptoms like bloating, flatulence and pain, which are common in patients with IBS can result from excess gas production from bacterial fermentation of undigested carbohydrates. Patients with SIBO produce excess gases like hydrogen. Gas distribution in the gut is abnormal in them with accumulation in small intestine, which may lead to symptom development due to its limited capacity to distend in contrast to colon, which can accommodate large amount of gas without discomfort. But, our study did not find any association between presence of SIBO and flatulence or abdominal pain.

CONCLUSION

There is a higher prevalence of SIBO in patients with IBS compared to control population in this study. Therefore, clinicians treating patients with IBS should consider testing for SIBO in those patients.

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