



THE ASSOCIATION BETWEEN IRRITABLE BOWEL SYNDROME AND LACTOSE INTOLERANCE

İrritabl Barsak Sendromu ve Laktoz İntolerans Arasındaki İlişki

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Abstract

Aim: Irritable bowel syndrome (IBS) and lactose intolerance (LI) may co-exist and readily cause diagnostic confusion due to similar symptomatology. This study aims to examine the frequency of LI in healthy controls and in participants diagnosed with IBS based on Roma III criteria, as an effort to investigate the association between IBS and LI.

Materials and Methods: The patient population consisted of individuals between 18 and 80 years of age who attended between June-December 2013. Patients diagnosed with IBS based on Roma III criteria comprised the IBS group, and subtypes of IBS. Control group was healthy volunteers over 18 years of age with no IBS-like symptoms. All participants ingested 25 g of lactose dissolved in 250 ml of water within 5 minutes after 8 hours of fasting, in order to evaluate the LI via hydrogen breath test (0, 15, 30, 60, 90, and 120 minutes).

Results: Of the total 200 participants, 100 (50%) were in the IBS group and 100 (50.0%) were in the control group. Of the total 70 patients (35.0%) with LI, 47 (47.0%) were in the IBS group and 23 (23.0%) were in the control group (p=0.001). Symptoms related to IBS were more common in participants with LI in both groups (p=0.001, p=0.001 respectively).

Conclusion: A significantly increased frequency of LI was found among IBS patients than in controls. In addition, symptoms associated with lactose intake occurred at a higher frequency in IBS patient, although the difference was insignificant.

Keywords: Irritable bowel syndrome, Lactose intolerance, Abdominal pain, Diarrhea.

Öz

Amaç: İrritabl barsak sendromu (İBS) ve laktoz intoleransı (Lİ) birlikte görülebilmekte ve aynı zamanda benzer semptomlara neden olabildiği için sıklıkla karışabilmektedir. Bu çalışmada Roma III kriterlerine göre İBS tanısı alan hastalarda ve sağlıklı bireylerde Lİ'nin sıklığı ve İBS ile Lİ ilişkisinin incelenmesi amaçlanmaktadır.

Materyal ve Metot: Çalışmaya Haziran-Aralık 2013 tarihleri arasında başvuran 18 – 80 yaş arasındaki hastalar dahil edilmiştir. İBS grubundaki hastalar Roma III kriterlerine göre İBS tanısı konan hastalardan oluşmakta olup, İBS alt tipleri değerlendirilmiştir. Çalışmanın kontrol grubuna ise İBS benzeri şikayetleri olmayan, 18 yaş ve üzerindeki sağlıklı gönüllüler dahil edilmiştir. Tüm katılımcılara 8 saat açlık sonrası 250 ml suda çözündürülen 25 gr laktoz 5 dk'da içirilerek hidrojen nefes testi (0, 15, 30, 60, 90, ve 120 dakikada) ile Lİ değerlendirilmiştir.

Bulgular: Çalışmadaki toplam 200 katılımcının 100 (%50.0)'i İBS grubuna ve 100 (%50.0)'i kontrol grubuna dahil edildi. Katılımcıların toplam 70 (%35.0)'inde Lİ mevcut iken İBS grubunda katılımcıların 47 (%47.0)'inde ve kontrol grubundaki katılımcıların 23 (%23.0)'ünde Lİ saptanmıştır (p=0.001). İBS ile ilgili semptomlar her iki grupta Lİ olan katılımcılarda daha yaygın olarak saptanmıştır (sırasıyla, p=0.001 ve p=0.001).

Sonuç: İBS hastalarında Lİ kontrol grubuna göre anlamlı yüksek bulunmuştur. Ayrıca, laktoz alımına bağlı semptomlar istatistiksel anlamlı olmamakla beraber İBS grubunda daha sık saptanmıştır.

Anahtar Kelimeler: İrritabl barsak sendromu, Laktoz intoleransı, Karın ağrısı, İshal.

INTRODUCTION

Lactose intolerance (LI) represents a common disorder that is caused by the reduced activity of lactase during adulthood in the world 1,2. While geographical variation seems to affect the variation in incidence, the Mediterranean area represents one of the most heavily

affected regions in the world with an incidence up to 70% 2,3. Irritable bowel syndrome (IBS) is a functional gastrointestinal disorder that is characterized by chronic and recurrent abdominal pain, diarrhea, constipation and/or flatulence 4. According to defecation pattern, it is divided into constipation-predominant (IBS-

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C), diarrhea-predominant (IBS-D), mixed (IBS-M), or unspecified (IBS-U) sub-types 4.

IBS and LI may co-exist and readily cause diagnostic confusion due to their similar symptomatology 2,5. Previous studies have reported the presence of LI in 24% to 45% of IBS patients 2,3,6. However, recent studies suggest that intestinal bacterial overgrowth observed in IBS patients may lead to abnormalities in intraluminal lactose fermentation as well as lactose hydrogen breath test and lactose tolerance test results 3,7. In another study, therapeutic interventions aimed at correcting intestinal bacterial overgrowth were found to improve LI in IBS patients 8.

The present study aimed to assess the frequency of LI in healthy controls and in participants diagnosed with IBS based on Roma III criteria, as an effort to investigate the association between IBS and LI.

MATERIAL and METHODS

Participants and Measurements

The IBS group consisted of newly diagnosed IBS patients over the age of 18 years, who attended to the Gastroenterology Outpatient Unit, Dr. Lütfi Kırdar Research and Training Hospital between 1st June 2013 and 1st December 2013. Patients diagnosed with IBS based on Roma III criteria comprised the IBS group, and subtypes of IBS included constipation-predominant, diarrhea-predominant, mixed, and unspecified. The control group was composed of healthy volunteers over 18 years of age who attended to the same unit with no IBS-like symptoms. Cigarette smoking was prohibited on the day of study investigations for all participants.

All participants completed a questionnaire developed by the researchers that provided sociodemographic features. Subsequently, all participants ingested 25 g of lactose dissolved in 250 ml of water within 5 minutes after 8 hours of fasting, in order to evaluate the LI via hydrogen breath test. All measurements were performed using a gastrolyzer device (Bedfont Scientific Ltd. Maidstone, England). The H⁺ concentration within the exhaled air was measured at 0, 15, 30, 60, 90, and 120 minutes as particle per million using electrochemical sensors. A minimum increase of 20 ppm relative to baseline in two or more samples within a measurement frame was considered a positive test result, and symptoms arising during the test were assessed. The study protocol was approved by the Clinical Research and Ethics Committee of Dr. Lütfi Kırdar Research and Training Hospital (Approval date: 11 Feb 2014, Approval no:14/2014) and informed consent forms were obtained from all patients.

Exclusion Criteria

Patients with the following conditions were excluded from the study in order to rule out other causes of bacterial overgrowth and rapid intestinal transit time: gastrointestinal malignancy, inflammatory bowel disease, Coeliac disease, diabetes mellitus, cirrhosis, multiple sclerosis, presence of diarrhea (as it affects the test results due to increased intestinal motility, whether inflammatory or not), cerebrovascular conditions, central nervous system tumors, use of PPI, use of excessive laxatives, use of narcotic drugs or substances, or use of antibiotics within 2 weeks after test. Participants who underwent abdominal surgery due to intestinal resection or other indications were also excluded from the study.

Statistical Analysis

Statistical analysis was performed using NCSS 2007 software (Number Cruncher Statistical System). While assessing the study data, in addition to descriptive statistics (mean, standard deviation, frequency, and rate), Chi-Square, Fisher's Exact Test, and Yates Continuity Correction Test were used for the comparison of categorical data. Student-t Test was utilized for the comparison of continuous variables. A p-value less than 0.05 was considered significant.

RESULTS

Of the total 200 participants, 100 (50%) were in the IBS group and 100 (50.0%) were in the control group. There were 133 females (66.5%), and the mean age was 40.5 ± 12.3 years. The mean age in the IBS and the control groups were 38.9 ± 13.2 and 42.0 ± 11.1 years, respectively ($p=0.072$). Sixty two (62%) of the participants in the IBS group and 71 (71.0%) in the control group were female ($p=0.181$). According to IBS subtypes, there were 50 (50%), 23 (23.0%), 22 (22.0%), and 5 (5.0%) patients with IBS-D, IBS-C, IBS-M, and IBS-U, respectively in the overall IBS group. Of the total 70 patients (35.0%) with LI, 47 (47.0%) were in the IBS group and 23 (23.0%) were in the control group ($p=0.001$). A comparison of the two groups with regard to symptomatology after the test showed the presence of complaints in 35 (35.0%) in the IBS group as compared to 24 (24.0%) in the control group ($p=0.092$). The symptoms of participants in the IBS and control groups is summarized in Table 1.

The mean age of participants with or without LI were 39.4 ± 12.8 years and 38.5 ± 13.7 years in the IBS group, respectively ($p=0.734$). Besides, the mean age in participants with or

without LI in the control group were 43.4 ± 12.5 and 43.4 ± 12.1 years, respectively ($p=0.991$). According to gender distribution, 32 (68.1%) of participants with LI and 30 (56.6%) of participants without LI were female in the IBS group ($p=0.663$). Similarly, 15 (65.2%) of participants with LI and 56 (72.7%) of participants without LI in the control group were female ($p=0.663$). The symptoms according to the presence or absence of LI is summarized in Table 2.

Table 1. The symptoms of participants in the IBS and control groups

	IBS group (n=100) n (%)	Control group (n=100) n (%)	p
Abdominal pain	10 (10.0%)	7 (7.1%)	0.631 [†]
Diarrhea	8 (8.0%)	4 (4.0%)	0.384 [†]
Gas, bloating, discomfort	12 (12.0%)	12 (12.1%)	1.000 [†]
Nausea and vomiting	5 (5.0%)	1 (1.0%)	0.212 [†]

[†]Yates' Continuity Correction Test, [†]Fisher's Exact Test
IBS: Irritable Bowel Syndrome

Table 2. Symptoms in study groups according to the presence of lactose intolerance

	Lactose Intolerance		p		
	Yes, n (%)	No, n (%)			
IBS group	No symptoms	18 (38.3%)	47 (88.7%)	0.001 [†]	
	Symptoms positive	29 (61.7%)	6 (11.3%)		
	Abdominal pain	10 (21.3%)	0 (0.0%)		0.001 [†]
	Diarrhea	4 (8.5%)	4 (7.5%)		1.000 [†]
	Gas, bloating, discomfort	11 (23.4%)	1 (1.9%)		0.003 [†]
Nausea-Vomiting	4 (8.5%)	1 (1.9%)	0.181 [†]		
Control group	No symptoms	6 (26.1%)	70 (90.9%)	0.001 [†]	
	Symptoms positive	17 (73.9%)	7 (9.1%)		
	Abdominal pain	5 (21.7%)	2 (2.6%)		0.007 [†]
	Diarrhea	4 (17.4%)	0 (0.0%)		0.002 [†]
	Gas, bloating, discomfort	7 (30.5%)	5 (6.6%)		0.006 [†]
Nausea-Vomiting	1 (4.3%)	0 (0.0%)	0.231 [†]		

[†]Yates' Continuity Correction Test, [†]Fisher's Exact Test
IBS: Irritable Bowel Syndrome

According to IBS subtypes, the frequency of LI was found 27 (57.4%) in IBS-D, 7 (4.9%) in IBS-C, 10 (21.3%) in IBS-M, and 3 (6.4%) in IBS-U ($p=0.161$, $p=0.124$, $p=1.000$, and $p=0.661$ respectively)

DISCUSSION

Both IBS and lactose syndrome are common conditions among adult individuals worldwide, with a significant overlap in terms of abdominal

symptoms 2,3. On the other hand, several studies have reported higher rates of LI among IBS patients than in the general population 5,7,9,10. The objective of the present study was to examine the frequency of LI between IBS patients and healthy individuals and to assess the association between these two conditions.

In previous studies, IBS patients were reported to have significantly higher rates of LI as compared to control group 5,9,10. Moreover, one of these studies reported that 56% of the IBS patients had significantly higher rates of LI than the control group 9. Generally, the reported incidence of LI among IBS patients ranges between 24.3% and 53.8% in these studies 10,11. Results of some other studies show no statistical difference between IBS and control groups, despite higher numbers of LI were observed in IBS patients 5. In a study, conducted in our country, the frequency of LI was 42.5% in patients with IBS 12. In the present study, 47% of IBS patients had LI and the difference with control group was statistically significant.

Patients with IBS were also reported to have significantly higher occurrence of symptoms related to the consumption of lactose as compared to control group 5. In another study, IBS and control groups did not differ significantly with regard to flatulence during the test, while bloating was more common among IBS patients 10. In a study involving IBS patients with LI, patients were followed to for 5 years, during which a significant improvement was noted in symptoms with a lactose-restricted diet 6. In another study, bloating, abdominal pain, diarrhea, and nausea were present in 72%, 9.5%, 4.8%, and 3.6% of the patients, respectively, and the two symptoms

that were found to be associated with LI were bloating and abdominal pain 9. In our study, although IBS and control groups were not significantly different in symptoms such as abdominal pain, diarrhea, bloating, and nausea/vomiting, the symptoms were found to occur at a significantly higher rate in individuals with LI in both groups. IBS patients with LI experienced abdominal pain and bloating more frequently, while participants in the control group with LI mostly had abdominal pain, diarrhea, and bloating.

In contrast with some studies reporting no significant association between IBS sub-types and the incidence of LI, others reported significantly higher rates of LI in IBS-D patients 2,3,5,13,14. On the other hand, the IBS sub-types did not differ significantly between groups in our study.

Limitation of the present study is that intestinal bacterial overgrowth is frequently observed in IBS patients and this condition may lead to abnormalities in intraluminal lactose fermentation 3,7. For this reason, lactose hydrogen breath test and lactose tolerance test may cause incorrect results in IBS patients 3,7. A significantly increased frequency of LI was found among our IBS patients than in the control group. In addition to, symptoms associated with lactose intake occurred at a higher frequency in IBS patient, although the difference was insignificant. In conclusion, both IBS and LI are common conditions that are associated with similar symptoms. Since the two conditions commonly co-exist despite different management strategies, it may be plausible to assess LI in the differential diagnosis of IBS for better therapeutic decisions.

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