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Efficiency of management of patients with irritable bowel syndrome with constipation and autoimmune thyroiditis with hypothyroidism using rifaximin

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Abstract. ***Background.*** *Irritable bowel syndrome (IBS) is a common gastrointestinal sign of gut-brain axis disorder, which occurs with abdominal pain, bloating and abnormal bowel motility, and may be divided onto subtypes: with prevalence of constipation (IBS-C), diarrhea and mixed. Autoimmune thyroiditis (AIT) is the most prevalent endocrine disorder diagnosed in young patients, which can often coexist with IBS and influence its clinical course. Small intestinal bacterial overgrowth (SIBO) is usually registered in both disorders. SIBO treatment can improve the course of IBS. The purpose of the study is to assess the efficiency of additional use of rifaximin in treating patients with IBS-C and AIT with hypothyroidism.* ***Materials and methods.*** *It is a prospective single-centered study, which included 77 patients with IBS-C and AIT with hypothyroidism. All participants were divided into 2 groups: 46 people received clinical guideline IBS treatment (group I), and 31 patients took rifaximin additionally (group II). The intensiveness of gastrointestinal symptoms such as abdominal pain, bloating, nausea, vomiting, heartburn and epigastric pain was evaluated with the use of Likert 5-grade scale. The mental status was assessed with the Ukrainian version of Hospital Anxiety and Depression Scale. The quality of life was analyzed due to the score on the Ukrainian version of SF-36 survey. SIBO was diagnosed with the help of glucose hydrogen breath test. Statistical analysis was performed using IBM SPSS Statistics 17 software carried on Windows Vista (32-bit).* ***Results.*** *Patient group, which additionally used rifaximin for 14 days, demonstrated higher efficiency in abdominal pain relief ($p = 0.037$), decrease of anxiety ($p = 0.01$) and depression ($p = 0.0007$) level, and lower prevalence of SIBO ($p \leq 0.05$) on the day 45 of the study. The hydrogen level in the exhaled air was significantly lower in this group. The quality-of-life domains "Bodily pain", "Role emotional" and "Role physical" were significantly better in patients who received rifaximin ($p \leq 0.05$). The significant difference was not observed in the intensiveness of bloating, heartburn, nausea, vomiting, and epigastric pain ($p \geq 0.05$).* ***Conclusions.*** *The additional use of non-systemic antibiotic rifaximin demonstrated higher efficiency in decreasing abdominal pain intensiveness, improving anxiety and depression and quality of life levels in patients with IBS-C and AIT with hypothyroidism compared to the clinical guideline IBS-C management. SIBO prevalence and H_2 levels were significantly lower on the day 45 of the study in patients who received rifaximin.*

Keywords: *irritable bowel syndrome; constipation; autoimmune thyroiditis; hypothyroidism; rifaximin; gut microbiome; small intestinal bacterial overgrowth*

Introduction

Irritable bowel syndrome (IBS) is a common gastrointestinal sign of gut-brain axis disorder, which flows with abdominal pain, bloating and abnormal bowel motility, and may be divided onto subtypes: with prevalence of constipation (IBS-C), diarrhea (IBS-D) and mixed (IBS-M). The world prevalence of IBS due to the different sources is from 1.1 to 45 % [1]. According to the survey using ROME IV diagnostic criteria conducted among citizens of different countries assessed the IBS prevalence in population and women in particular: 5.5 and 7.5 % (United Kingdom), 5.7 and 7.8 % (Canada), 6.1 and 7.1 % (USA) [2]. Analysis of 1966 survey respondents demonstrates a strong influence on the quality of life and everyday activity limitations for almost

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73 days annually [3]. The prevalence of small intestinal bacterial overgrowth (SIBO) is between 23 and 36 % in patients with IBS and may severely influence its clinical flow [4, 5]. Autoimmune thyroiditis (AIT) is a common autoimmune endocrine pathology that affects working age patients. Autoimmune thyroiditis prevalence was 7.5 (95% CI 5.7–9.6 %) in high income level patients' group, while the prevalence was 11.4 (95% CI 2.5–25.2 %) in low- and medium-income patients' group [6]. Hypothyroidism is the most common complication of AIT. The hypothyroidism signs can severely affect the IBS symptoms [7].

According to the Ukrainian clinical guidelines of functional bowel disorders and irritable bowel syndrome management, approved in 2017 (Guideline No. 00184), IBS-C patients management may include the combination of dietary adjustment, psychotherapy, and symptomatic drug therapy with the limited effect [8]. Considering that the basis of IBS pathogenesis is the disorder of gut-brain axis, the use of tricyclic antidepressants, anticholinergic medications, and selective serotonin reuptake inhibitors (SSRIs) with high evidence level, is recommended. Visceral hypersensitivity, increased gut permeability and gut microbiome changes play a significant role in the development of the disease at the same time. AGA clinical recommendations for IBS-C management includes the following groups of medications: inhibitor of the gastrointestinal sodium/hydrogen exchange (tenapanor), guanylate cyclase C agonists (plecanatide, linaclotide), partial agonists of the 5-HT_4 receptor (tegaserod), chloride channel type 2 activator (lubiprostone), PEG laxatives, tricyclic antidepressants (duloxetine) and antispasmodics [9]. However, most of those medications are not registered in Ukraine that induces the following search of medical treatment of IBS symptoms. The studies of different ways to influence the gut microbiome, including the use of antibacterial medications and probiotics, demonstrates controversial data. SIBO treatment can improve the IBS symptoms. Despite that SIBO treatment is usually empiric, the 7-day use of antibiotics can decrease the clinical signs and normalize the breath test results for the period from 1 to 3 months in up to 90 % of patients [10]. Rifaximin is a semisynthetic non-systemic broad spectrum antibacterial medication which can inhibit the synthesis of RNA and proteins in gram-positive and gram-negative, aerobic, and anaerobic flora. Rifaximin is not completely absorbed in gastrointestinal tract, which leads to its high concentration in gut lumen. It demonstrated high efficiency in IBS-D treatment and was approved for management of this IBS subtype since 2015 [11–14]. The data for rifaximin use in patients with IBS-C is limited and doesn't provide the exact evidence for its efficiency [15, 16].

The **purpose of the study** is to assess the efficiency of additional use of rifaximin in treating patients with IBS-C and AIT with hypothyroidism.

Materials and methods

This prospective single-centered study was carried out from April 2023 to December 2024 in Kyiv City Clinical Hospital 4. It included randomly selected patients over 18 years old who met Rome IV criteria for irritable bowel syndrome with constipation (IBS-C). Exclusion criteria were presence of inflammatory bowel disease and recent antibacterial or probiotic therapy (3 months before enrollment), history of cancer, pregnant women, presence of any other comorbid autoimmune disorder, history of acute mental disorders. History of hypothyroidism due to the violation of triiodothyronine (T3), thyroxine (T4) and thyroid-stimulating hormone (TSH), thyroid peroxidase, thyroglobulin antibodies blood levels, and thyroid ultrasound were used to confirm the diagnosis of AIT with hypothyroidism. The included patients achieved the compensation level of hypothyroidism. Thyroid-stimulating hormone level from 1.0 to 2.5 mcU/ml was considered a compensation criterion for hypothyroidism due to L-thyroxine replacement therapy.

The study included 77 patients, which were recommended the dietary adjustment and receiving 600 mg of trimebutine maleate (the synthetic agonist of opioid receptors) distributed for 3 doses daily, and 400 mg of the prolonged mebeverine distributed for 2 doses daily. 31 random patients were additionally prescribed 1200 mg of rifaximin daily (3 doses of 400 mg daily). The treatment course was 14 days. The efficiency of management was assessed by the surveying and examining patients before treatment and on the day 45.

The clinical status evaluation was provided by assessment of the intensiveness of gastrointestinal symptoms such as abdominal pain, bloating, nausea, vomiting, heartburn, and epigastric pain with the use of Likert 5-grade scale, where 1 point — absence of the symptom, 2 points — low intensiveness, 3 points — medium intensiveness, 4 points — severe intensiveness, 5 points — very severe intensiveness. The mental status was analyzed with the use of Ukrainian version of Hospital Anxiety and Depression Scale (HADS). The values of all items were summarized to receive the general value, which could be from 0 to 21 points separately on 2 scales. The result interpretation was the following: 0–7 — absence of the pathology, 8–10 — subclinical anxiety/depression, 11–21 — clinical anxiety/depression.

Quality of life was assessed by the Ukrainian version of SF-36 survey, which includes 36 questions distributed onto 8 domains: physical functioning, role-physical, bodily pain, general health, social functioning, vitality, role-emotional, and mental health. The result was interpreted with the help of the online kit: https://orthotoolkit.com/sf-36/.

SIBO test was provided in 36 patients of the group I and in 30 patients of group II. Glucose hydrogen breath test was used to diagnose SIBO. Gastro+ Gastrolyzer SN GP 020893 (Bedfont Scientific Ltd, Great Britain) was used to measure H_2 concentration in the exhaled air. All patients were recommended to follow the dietary recommendations described in the tool's manual. After baseline measurement the patient ingested 50 g of glucose diluted in 250 mL of water. Measurements were taken every 15 minutes. A rise of H_2 level ≥ 20 ppm (parts per million) over baseline was considered as a positive test result for SIBO [17, 18]. The test duration was 120 minutes.

The patients' examination was completed before treatment and on the day 45 of the study. The clinical efficiency of treatment in each group was assessed by the number of patients with a positive response to medications.

Statistical analysis

Statistical analysis was performed using IBM SPSS Statistics 17 software carried on Windows Vista (32-bit). The normality of the continuous variables distribution was assessed by Shapiro-Wilk test. During the patient data comparison before and after receiving the medication, the data determined as dependent and corresponding to the normal distribution, combines 2 measurement sets of the same persons. The parametric criterion for Student's t-test was used to verify the significant dynamical changes within the groups. The Mann-Whitney U-test was used to compare differences between two groups (I and II). P-values < 0.05 were considered statistically significant. The values are presented in M ± m, where M is an average value, m is a standard deviation of average value.

Ethical approval

The study was approved by the Bioethical Expertise and Scientific Research Ethics Committee of Bogomolets National Medical University (approval number: 152; date of approval: November 15, 2021) and was conducted in accordance with the Declaration of Helsinki of the World Medical Association (2013). A written informed consent was obtained from all patients enrolled in the study.

Results

There was no difference among the patients of both groups in terms of the age, sex, BMI, and smoking habits. The results are presented in Table 1.

When comparing the average intensiveness of gastrointestinal symptoms values of patients of both groups before and after the treatment, the significant decrease was observed in the intensiveness of epigastric pain, heartburn, nausea, bloating and abdominal pain withing each of the groups ($p \leq 0.05$). The significant difference in the intensiveness of vomiting was not observed in patients receiving rifaximin ($p \geq 0.09$). The comparison results are presented in Fig. 1.

According to the treatment efficiency results analysis on the day 45 of the study 80.4 % (n = 37) patients of group I reported the decrease or absence of the abdominal pain, while the same indicator was 96.8 % (n = 30) in the group II ($p \leq 0.05$). There was no significant difference in changes of intensiveness of bloating, heartburn, nausea, vomiting and epigastric pain ($p \geq 0.05$). The treatment efficiency comparison results by different symptoms are shown in Table 2.

According to the mental status analysis both groups showed significant decrease in anxiety and depression levels withing the group after the treatment. The changes in anxiety and depression values of patients of both groups before and after the treatment are presented in Fig. 2.

37 patients (80.43 %) of group I reported the decrease of the anxiety symptoms from the clinical/subclinical to subclinical/absence, 2 patients (4.3 %) reported the increase of the anxiety levels. All 31 patients (100 %) of the group II reported the decrease of the anxiety. The depression symptoms improved in 27 patients (58.7 %) of the group I, and 15 patients (48.4 %) of the group II. At the same time, 7 patients (15.2 %) of the group I and 1 patient (3.2 %) of the group II reported the worsening of the depression. Statistical analysis showed the significant difference in the change of mental status in patients of both groups ($p < 0.01$). The results are presented in Table 3.

Quality of life analysis after the treatment resulted in group I demonstrated improvement in the following do-

Table 1. Baseline characteristics of enrolled participants

Characteristics	Group I (n = 46)	Group II (n = 31)	p-value
Age, years	35.96 ± 1.79	39.04 ± 2.01	0.23
Sex: male/female, n (%)	15 (32.6)/31 (67.4)	12 (38.7)/19 (61.3)	0.58
BMI, kg/m^2	28.50 ± 0.73	28.49 ± 1.04	0.111
Smoking, n (%)	28 (60.9)	17 (54.8)	0.816

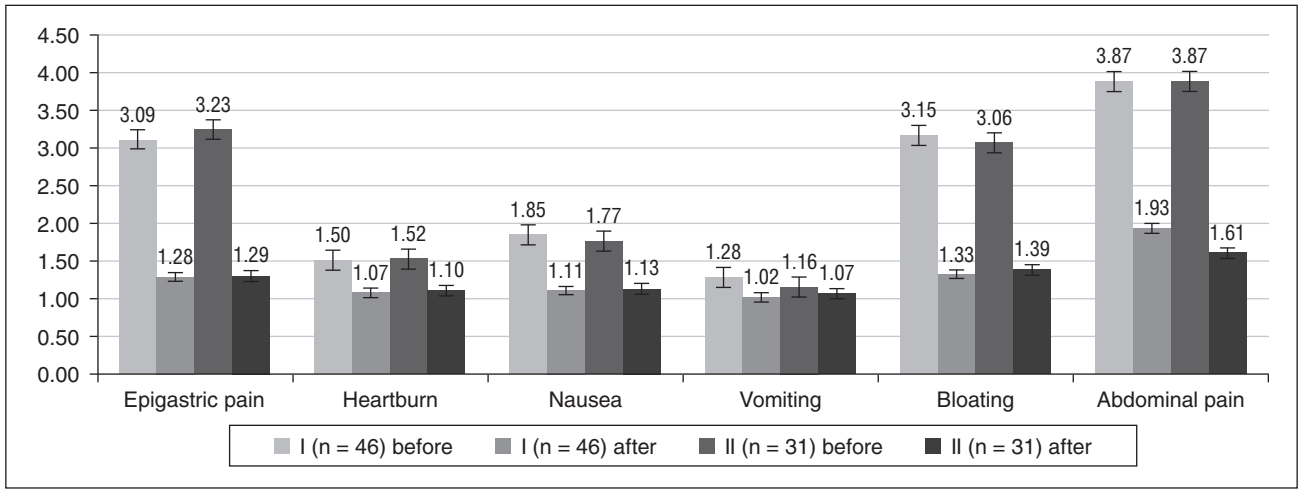

Figure 1. Dynamics for gastrointestinal symptoms data within both groups before and after treatment, points

Table 2. Dynamics of gastrointestinal symptom intensiveness in patients of both groups on the day 45 of the study, M ± m

Symptoms	Group I (n = 46)		Group II (n = 31)	
	No changes	Improvement/symptom resolved	No changes	Improvement/symptom resolved
Bloating	n = 5	n = 41	n = 2	n = 29
	5.00 ± 0.23	41.00 ± 1.88	2.00 ± 0.09	29.00 ± 1.28
p	0.51			
Abdominal pain	n = 9	n = 37	n = 1	n = 30
	9.00 ± 0.18	37.00 ± 0.81	1.00 ± 0.03	30.00 ± 0.95
p	0.037*			
Epigastric pain	n = 5	n = 41	n = 1	n = 30
	5.00 ± 0.23	41.00 ± 1.88	1.00 ± 0.03	30.00 ± 0.95
p	0.22			
Heartburn	n = 29	n = 17	n = 19	n = 12
	29.00 ± 2.06	17.00 ± 1.21	19.00 ± 1.66	12.00 ± 1.05
p	0.88			
Nausea	n = 21	n = 25	n = 17	n = 14
	21.00 ± 1.54	25.00 ± 1.84	17.00 ± 1.52	14.00 ± 1.25
p	0.43			
Vomiting	n = 34	n = 12	n = 28	n = 3
	34.00 ± 2.20	12.00 ± 0.78	28.00 ± 1.49	3.00 ± 0.16
p	0.08			

Note: * — the difference is significant compared to group 1 (p < 0.05).

mains: physical functioning, role-physical, bodily pain, general health, vitality, role-emotional. There was no significant difference in the domains social functioning, and mental health. Group II demonstrated the improvement in all domains of quality of life.

The detailed quality of life dynamics in patients of both groups by separate domains before and after the treatment are presented in Table 4.

The improvement in "Bodily pain" domain after the treatment in group I was reported by 35 patients (76 %), and 29 patients (93.5 %) of group II. "Role-physical" score was improved in 21 patients (45.6 %) of group I and 22 patients (70.96 %) of group II. "Mental health" score was better in 29 patients (63 %) of group I and 26 patients (83.9 %) of group II. The results are presented in Table 5.

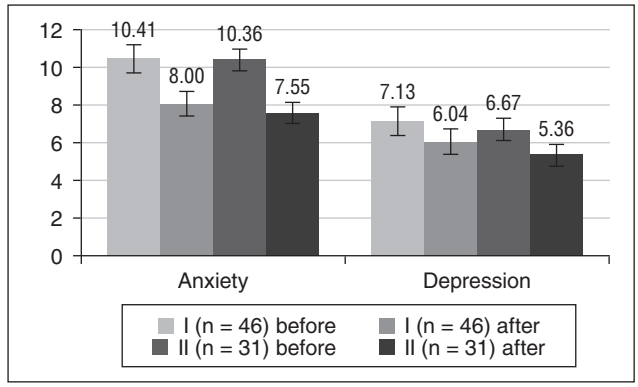

Figure 2. Anxiety and depression level dynamics in patients of both groups before and on the day 45 of the study, points

Table 3. Mental status changes of patients of both groups on the day 45 of the study, M ± m

	Group I (n = 46)			Group II (n = 31)		
	No changes	Decrease/ resolved	Increase	No changes	Decrease/ resolved	Increase
Anxiety	n = 7	n = 37	n = 2	n = 0	n = 31	n = 0
	7.00 ± 0.37	37.00 ± 2.16	2.00 ± 0.06	0.00 ± 0.00	31.00 ± 0.00	0.00 ± 0.00
p	0.01*					
Depression	n = 12	n = 27	n = 7	n = 15	n = 15	n = 1
	12.00 ± 0.78	27.00 ± 1.96	7.00 ± 0.37	15.00 ± 1.35	15.00 ± 1.35	1.00 ± 0.78
p	0.0007*					

Note: * — the difference is significant compared to group 1 (p < 0.05).

Table 4. Quality of life dynamics in patients of both groups by separate domains before and on the day 45 of the study, points (M ± m)

Items	Group I (n = 46)		Group II (n = 31)	
	Before	After	Before	After
Physical functioning	73.91 ± 1.55	81.20 ± 2.17	72.58 ± 2.00	81.94 ± 1.16
p	≤ 0.01*		≤ 0.01*	
Role-physical	64.67 ± 4.46	80.98 ± 2.66	60.48 ± 3.99	79.03 ± 2.94
p	≤ 0.01*		≤ 0.01*	
Role-emotional	63.89 ± 3.50	79.87 ± 2.88	55.90 ± 4.40	80.77 ± 3.11
p	≤ 0.01*		≤ 0.01*	
Bodily pain	63.00 ± 2.62	75.72 ± 1.86	62.87 ± 2.54	76.13 ± 2.10
p	≤ 0.01*		≤ 0.01*	
General health	62.50 ± 2.49	73.91 ± 2.03	56.94 ± 2.90	73.06 ± 2.10
p	≤ 0.01*		≤ 0.01*	
Vitality	43.04 ± 3.53	57.07 ± 2.61	46.94 ± 3.40	59.84 ± 2.48
p	≤ 0.01*		≤ 0.05*	
Social functioning	76.70 ± 2.27	81.37 ± 1.93	71.66 ± 3.01	83.03 ± 1.98
p	≥ 0.09		≤ 0.05*	
Mental health	66.17 ± 3.37	74.43 ± 2.25	57.74 ± 3.49	71.90 ± 2.06
p	≥ 0.07		≤ 0.01*	

Note: * — the difference is significant compared to the indicator before treatment (p < 0.05).

Table 5. Changes in quality of life domains in patients of both groups at the day 45 of the study, M ± m

Domains	Group I (n = 46)		Group II (n = 31)	
	No changes	Improvement	No changes	Improvement
Physical functioning	n = 11	n = 35	n = 9	n = 22
	11.00 ± 0.69	35.00 ± 2.20	9.00 ± 0.73	22.00 ± 1.79
p	0.62			
Role-physical	n = 25	n = 21	n = 9	n = 22
	25.00 ± 1.84	21.00 ± 1.70	9.00 ± 0.73	22.00 ± 1.79
p	0.028*			
Role-emotional	n = 24	n = 22	n = 13	n = 18
	24.00 ± 1.77	22.00 ± 1.62	13.00 ± 1.15	18.00 ± 1.60
p	0.38			
Bodily pain	n = 11	n = 35	n = 2	n = 29
	11.00 ± 0.69	35.00 ± 2.20	2.00 ± 0.09	29.00 ± 1.28
p	0.045*			
General health	n = 5	n = 41	n = 3	n = 28
	5.00 ± 0.23	41.00 ± 1.88	3.00 ± 0.16	28.00 ± 1.49
p	0.87			
Vitality	n = 8	n = 38	n = 7	n = 24
	8.00 ± 0.45	38.00 ± 2.12	7.00 ± 0.53	24.00 ± 1.80
p	0.57			
Social functioning	n = 22	n = 24	n = 10	n = 21
	22.00 ± 1.62	24.00 ± 1.77	10.00 ± 0.84	21.00 ± 1.76
p	0.17			
Mental health	n = 17	n = 29	n = 5	n = 26
	17.00 ± 1.21	29.00 ± 2.06	5.00 ± 0.33	26.00 ± 1.72
p	0.047*			

Note: * — the difference is significant compared to group 1 (p < 0.05).

Table 6. SIBO frequency in patients of both groups before and on the day 45 of the study, M ± m

Group I (n = 36)				Group II (n = 30)			
Before treatment		After treatment		Before treatment		After treatment	
≥ 20 ppm	< 20 ppm	≥ 20 ppm	< 20 ppm	≥ 20 ppm	< 20 ppm	≥ 20 ppm	< 20 ppm
n = 25	n = 11	n = 20	n = 16	n = 18	n = 12	n = 9	n = 21
25.00 ± 1.92	11.00 ± 0.84	20.00 ± 1.66	16.00 ± 1.43	18.00 ± 1.19	12.00 ± 0.84	9.00 ± 0.75	21.00 ± 1.73
p = 0.037*							

Note: * — the difference is significant compared to group 1 (p < 0.05).

Table 7. Breath test results of patients of both groups before and on the day 45 of the study, ppm (M ± m, n = 66)

Groups	I (n = 36)		II (n = 30)	
	Before	After	Before	After
Value	21.53 ± 0.62*	20.19 ± 1.02*,**	25.30 ± 0.75*	16.20 ± 0.75*,**
p*	≤ 0.01		≤ 0.01	
p**	≤ 0.019			

Notes: * — the difference is significant compared to the indicator before treatment (p < 0.05); ** — the difference is significant compared to group 1 (p < 0.05).

The frequency of SIBO-positive cases after the treatment was significantly higher in group I (n = 20, 55.6 %) comparing to the group II (n = 9, 30 %) (p = 0.037). The results of SIBO frequency among patients of both groups are presented in Table 6.

H_2 level in exhaled air was higher in group I compared to group II (p ≤ 0.019). The results of statistical analysis are presented in Table 7.

Discussion

The combined treatment with the use of non-systemic antibiotic rifaximin demonstrated higher efficiency in decreasing the intensiveness of the abdominal pain in patients with IBS-C and AIT with hypothyroidism on the day 45 of the study. The same efficiency of rifaximin was shown in a study of 72 patients with different IBS subtypes, where 64 % of patients with IBS-C had their gastrointestinal symptoms decreased after 10–12 weeks of the treatment ending [19]. In the study of 33 patients with IBS-C, the abdominal pain intensiveness was two times lower in those who received rifaximin compared to those treated with antispasmodics [20].

Several studies report the improvement in quality of life among patients with IBS treated with rifaximin [15]. The results of our study demonstrated the same tendency. In recent studies patients with IBS-C and AIT with hypothyroidism demonstrated high prevalence of SIBO [21, 22]. In the current research prevalence of SIBO and H_2 level was significantly lower in patients treated with rifaximin. Such results of symptom improvement and decrease in SIBO prevalence were demonstrated in 2014 during the study of antibacterial treatment with the use neomycin and rifaximin, which enrolled 31 patients with IBS-C [23].

The powerful meta-analysis by A. Deljavan Ghodrati published in 2024 showed significant advantages of rifaximin use in patients with different subtypes of IBS for resolving gastrointestinal symptoms and decrease in SIBO prevalence [24]. A number of studies reported about high prevalence of SIBO in patients with hypothyroidism [25–27]. Rifaximin efficiency in decreasing the intensiveness of gastrointestinal symptoms and decreasing the level of anti-thyroid antibodies was also shown in another study that enrolled patients with AIT and SIBO [28]. However, Zhu X. et al speak about the new treatment opportunities for improvement AIT symptoms by modulation of gut microbiome confirming the presence of gut-thyroid gland axis [27].

The limitations of our study were the single-center, cross-sectional design, and small sample size.

Conclusions

The additional use of non-systemic antibiotic rifaximin demonstrated higher efficiency in decrease of abdominal pain intensiveness, improvement of anxiety and depression and quality of life levels in patients with IBS-C and AIT with hypothyroidism compared to the clinical guideline IBS-C management at the day 45 of the study. SIBO prevalence and average H_2 level were significantly lower in patients who received rifaximin at the day 45 of the study. The following studies with the bigger sample size are required to confirm the current conclusions.

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Ефективність рифаксиміну в лікуванні пацієнтів із синдромом подразненого кишечника із запором та автоімунним тиреоїдитом з гіпотиреозом

Резюме. ***Актуальність.*** Синдром подразненого кишечника (СПК) є поширеною гастроінтестинальною ознакою розладу осі «кишечник — головний мозок», що проявляється у вигляді абдомінального болю, здуття живота та розладів випорожнень і може перебігати з переважанням запорів (СПК-З), діареї або в змішаній формі. Автоімунний тиреоїдит (АІТ) є найпоширенішим ендокринним розладом серед осіб молодого віку, що часто співіснує з СПК і впливає на його клінічний перебіг. Синдром надмірного бактеріального росту (СНБР) часто реєструється при обох захворюваннях. Лікування СНБР може поліпшити перебіг СПК. ***Метою дослідження*** є оцінка ефективності додаткового застосування препарату рифаксимін у лікуванні пацієнтів із СПК-З та АІТ з гіпотиреозом. ***Матеріали та методи.*** Це пілотне одноцентрове дослідження включало 77 пацієнтів із СПК-З та АІТ з гіпотиреозом. Усі учасники були розподілені на 2 групи: першу — 46 осіб, які отримували лікування згідно з клінічними настановами щодо ведення СПК, та другу — 31 пацієнт, який додатково отримував несистемний антибіотик рифаксимін. Визначення інтенсивності гастроінтестинальних симптомів: абдомінального болю, здуття живота, нудоти, блювання, печії та болю в епігастрії — проводилось із застосуванням 5-ступеневої шкали Лікерта. Для аналізу показників психологічного статусу використовували українську версію госпітальної шкали тривоги та депресії. Якість життя оцінювали за допомогою української версії опитувальника SF-36. Для діагностики СНБР було застосовано водневий дихальний тест з глюкозою. Статистичний аналіз виконано із використанням програмного забезпечення IBM SPSS Statistics 17 під управлінням Windows Vista (32-га редакція). ***Результати.*** Група пацієнтів, які додатково отримували препарат рифаксимін протягом 14 днів, продемонструвала вищу ефективність у зменшенні інтенсивності абдомінального болю ($p = 0,037$), проявів тривоги ($p = 0,01$) та депресії ($p = 0,0007$), нижчу поширеність СНБР ($p \leq 0,05$) через 30 днів після завершення лікування (45-й день дослідження). Рівень водню в повітрі, що видихається, був вірогідно нижчим у цій групі. Показники якості життя за доменами «Біль», «Емоційне благополуччя» та «Обмеження ролі через фізичний стан» також були вірогідно кращими в групі рифаксиміну ($p \leq 0,05$). Не спостерігалося вірогідної різниці в зміні проявів здуття живота, печії, нудоти, блювання та болю в епігастрії ($p \geq 0,05$). ***Висновки.*** Додаткове застосування несистемного антибіотика рифаксимін продемонструвало вищу ефективність у зниженні інтенсивності абдомінального болю, проявів тривоги й депресії та поліпшенні показників якості життя в пацієнтів із СПК-З та АІТ з гіпотиреозом порівняно з терапією відповідно до клінічних настанов щодо ведення СПК-З. На 45-й день дослідження поширеність СНБР і рівень H_2 були вірогідно нижчими в групі пацієнтів, які додатково отримували рифаксимін.
Ключові слова: синдром подразненого кишечника; запор; автоімунний тиреоїдит; гіпотиреоз; рифаксимін; кишкова мікробіота; синдром надмірного бактеріального росту