УДК 616.345-036.2-085.25.12

ISSN 1727-5725 (Print)
ISSN 2521-649X (Online)

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Irritable bowel syndrome: risk factors and treatment features in persons of organized student population

Objective — to identify the most important trigger factors of development of irritable bowel syndrome in student population and to increase the effectiveness of treatment through lifestyle and diet modifications and addition of an herbal medicine.

Materials and methods. 305 persons from organized student population (mean age — 20.8 ± 0.1 years) were included in this study. Irritable bowel syndrome was diagnosed in 36 (11.8 %) individuals. Patients with irritable bowel syndrome were divided into two groups depending on the intended treatment. Group «A» (n = 18) — combined therapy with the appointment of non-pharmacological measures, low FODMAPs diet and prescription of phytopreparation Iberogast (Steigerwald Arzneimittelwerk GmbH, Germany). Treatment of group «B» (n = 18) differed by the absence of prescription of an Iberogast. In order to assess the severity of clinical manifestations of irritable bowel syndrome patients were examined using a scale «Irritable bowel syndrome Severity Scoring System».

Results. In patient of group «A» were observed more clear positive changes for complaints like flatulence (p = 0.009) and overall impact on life (p = 0.041) after 56 days of treatment. The percentage of the dynamics of total points by «Irritable bowel syndrome Severity Scoring System» was significantly different (–88.7 ± 1.8 % — in the group «A» and –78.3 ± 2.3 % — in the group «B», p = 0.001). That is, the additional prescription of phytopreparation led to the improvement of therapeutic effect on average by 10.4 %. These were confirmed by cluster analysis.

Conclusions. The additional prescription of Iberogast that characterized by the ability to normalize motility of the gastrointestinal tract, reduced of visceral hypersensitivity manifestations, soft choleretic action, anti-inflammatory properties of the impact on the digestive system is recommended at a dose of 20 drops 3 times a day during 8 weeks.

Key words: irritable bowel syndrome, the population of students, risk factors, treatment.

In modern conditions the student population is a special category of patients that require careful attention concerning the necessity of primary prevention of chronic noncommunicable diseases, early diagnosis of early manifestations of a disease state and implementation of a comprehensive treatment approach taking into account lifestyle, learning environment, possible bad habits and sociological and economic characteristics. During training at high school students are exposed to the whole complex of environmental factors that affect the state of their physical and mental health, including permanent mental and emotional stress, information stress, lack of material security, the need to combine study with work, frequent violations of regime of work, rest, sleep and food.

Development and implementation of prevention programs, integration system of estimation of comorbidity, increase medical knowledge have become an basic part of modern treatment standards [1—3, 11]. Due to the fact that the current socioeconomic conditions do not create a favourable ground for a healthy way of life, the problem of preservation and strengthening of health of students is complex and multifaceted.

The violations of the regulation, nervous and humoral, can lead to motor disorders of the gastrointestinal tract that causes the functional disease state. Functional disorders of the gastrointestinal tract are one of the most common groups of func-

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tional pathology, covering a massive number of patients, including adolescents.

The total prevalence of irritable bowel syndrome (IBS) is 10—20 % of adults and adolescents [4] and is considered from the standpoint of multifactor models of pathogenesis. Thus, motor disorders at IBS are closely associated with the phenomenon of visceral hypersensitivity that manifest with development of pathological response of the intestinal motility even at slight intensity stimulus that is perceived extremely painful and inadequate. This category of patients is more susceptible to the effects of stress and psychotraumatic factors [16]. According to M. N. Womble et al. (2013) on the basis of survey of 83 students of two south-eastern universities in the United States the health stability is positively correlated with such accentuation of character as extraversion, pleasure, good faith and spirituality, and is negatively correlated with neuroticism [17]. The role of infectious agents and violation of intestinal microflora in the development of functional disorders of the digestive system is actively discussed [8, 12]. Visceral hypersensitivity may also change with microbiota modulation [13]. Interesting results were obtained by P. Bercik et al. (2011): the action of the intestinal microbiota applies not only to the intestine and immune system, but also to central nervous system [5]. On the other hand, there were obtained the data about possible impact of some forms of psychological stress on the composition of the intestinal bacteria that leads to changes in cytokine response and intestinal permeability [4].

The frequency of requests for medical aid regarding the symptoms of IBS is largely determined by social status of patients. In most cases, the disease remains not diagnosed, which leads either to self-treatment or to the absence of any therapeutic measures.

In SI «L. T. Mala National Therapy Institute of NAMS of Ukraine» there was conducted the study aimed to the establishment of the most important trigger factors of IBS in patients of student population and to increasing the effectiveness of treatment of functional disorders through lifestyle modifications, diet and additional prescription of herbal medicine.

Materials and methods

The study involved 305 persons of organized student population who underwent preventive outpatient examination or, if necessary, out-patient treatment. The diagnosis of «irritable bowel syndrome» is established according to the standard protocol (Order N 271, 13.06.2005, Ministry of Health of Ukraine), according to the diagnostic Rome Criteria III (2006) [15] and to the recommendations of the World Gastrointestinal Organisation (WGO, 2009) [10].

All patients were representatives of organized student population, mean age 20.8 ± 0.1. All persons were divided into three groups according to the presence of functional digestive diseases: patients with IBS (n = 20), persons with other functional disorders of the gastrointestinal tract (functional dyspepsia (n = 51), functional disorders of the gallbladder (n = 7), «overlap syndrome» of functional disorders of the gastrointestinal tract (n = 18)), individuals who did not have complaints of the digestive system (n = 209). It should be noted that only 127 (41.6 %) persons were not have any complaints at the time of the survey (control group). Analysis of group of patients with «overlap syndrome» revealed the following distribution of functional disorders: the most frequent combination was «functional dyspepsia and IBS» — 14 persons, simultaneous presence of functional dyspepsia and biliary dyskinesia observed in 2 patients, the combination of IBS and biliary dyskinesia was found in one case, and at last, one patient had complaints that are inherent in functional dyspepsia, IBS and biliary dyskinesia at the same time. Thus, among the surveyed students the IBS was diagnosed in 36 (11.8 %) individuals, 16 of which — as the «overlap syndrome».

According to the Rome Criteria III (2006) it was determined the clinical forms of the disease. The number of patients with IBS and constipation syndrome (the frequency of hard/rough stool і 25 % of defecations and soft/watery stool < 25 %) was prevailed (30.6 % (11 persons)). Much less was the patients with IBS and diarrhea (the frequency of soft/watery stool ≥ 25 % of defecations and hard/rough stool < 25 %) — namely, 13.9 % (5 persons). The same number of patients suffered from combined form of IBS (the frequency of hard/rough stool and soft/watery stool і 25 % of defecations) — 13.9 % (5 persons). In the subgroup the patients with IBS of undifferentiated form (disorders of stool consistency are insufficient for use of criteria of the first three variants of IBS) were involved the majority of patients — 41.6 % (15 persons).

The patients with IBS depending on prescribed treatment were divided into two groups. Treatment of the group «A» (n = 18) included combined therapy with the prescription of non-drug measures (correction of learning mode and mode of rest, adequate physical activity (exercise duration — more than 4 hours per week), adequate sleep (at least 8 hours per day), giving up smoking and alcohol, sufficient consumption of drinking water (1.5—2.0 L per day)), low FODMAPs diet [9, 14] and phytoprepa-

ration *Iberogast* (Steigerwald Arzneimittelwerk GmbH, Germany). Treatment of the group «B» (n = 18) distinguished by the absence of additional prescription of herbal preparation *Iberogast*. The total duration of treatment was 8 weeks. The randomization of patients depending on the schemes of therapy was performed by method of consistent numbers, and it was not found the significant differences between formed groups of patients by sex, age and clinical signs ($p > 0.05$). To assess the severity of clinical manifestations of IBS in surveyed patients it was used the scale «Irritable bowel syndrome Severity Scoring System» (IBS-SSS) [7]. Electrocardiogram was performed using a three-channel electrocardiograph «Fukuda». Ultrasound examination of the digestive organs was performed using a diagnostic ultrasound device «Aloka SSD-280LS». Statistical analysis of the results was done by creating an electronic database using the program «Microsoft Office Excel» and «SPSS 20.0».

Results and discussion

The results of the survey of students regarding lifestyle characteristics are shown in Table 1, which compares the data of group of patients with functional disorders of the digestive organs (FDDO) and those who did not have complaints at the time of the survey.

For patients with IBS it were conducted the control monitoring of complaints intensity according to the IBS-SSS scale prior to treatment, on the 28th and 56th days of therapy (Table 2). All persons noted the improving health and reducing the intensity of complaints both on the 28th day of treatment — from 210.1 ± 11.3 to 96.8 ± 7.2 points according to IBS-SSS scale ($r = 0.776$, $p < 0.001$) and on the 56th day — to 35.6 ± 4.2 points ($r = 0.601$, $p < 0.001$).

The evaluation of the total score IBS-SSS after 4 weeks of therapy allowed to reveal a certain tendency to a better therapeutic response in patients who received combined treatment of the group «A»: 83.6 ± 8.8 compared to 110.0 ± 10.7 points in the group «B» ($p = 0.066$). After calculating the total value of the dynamics of IBS-SSS score in percentage on the 28th day it was established the existence of differences with high reliability.

On the 56th day of study the repeated survey of complaints on IBS-SSS scale in patients with IBS had the following results: significantly greater positive changes in patients of group «A» were observed for such complaints as distension ($p = 0.009$) and interference with life in general ($p = 0.041$). A comparison of the total IBS-SSS score on the 56th day of therapy did not reveal significant differences in the study groups. However, the percentage of the

Table 1. **The results of survey of examined patients regarding lifestyle, %**

Risk factor	Patients with FDDO (n = 96)	Control group (n = 127)	p
Failure to comply with diet	78.1	55.1	< 0.001
Stress	71.9	22.8	< 0.001
Food toxicoinfections in anamnesis	51.0	14.2	< 0.001
Number of used glasses of drinking water less than 3 glasses/day	50.0	18.1	< 0.001
Long intervals between meals (eating less than 3 times per day)	45.8	26.0	< 0.001
Uncontrolled consumption of nonsteroidal anti-inflammatory drugs	43.8	7.1	< 0.001
Lack of physical activity	35.4	9.5	< 0.001
The duration of sleep — 6 hours/day or less	28.1	6.3	< 0.001
Food allergies in anamnesis	25.0	10.2	0.003
Smoking	14.6	13.4	0.017
Fast food	46.9	35.4	> 0.05
Regular consumption of sweet carbonated drinks	37.5	37.8	> 0.05
Refusal of fresh fruits and vegetables	30.2	24.4	> 0.05
The last meal after 2200	22.9	22.1	> 0.05
Alcohol	13.5	13.4	> 0.05

Table 2. **The score evaluation of intensity of complaints according to IBS-SSS scale in patients with irritable bowel syndrome on the 28th and the 56th days of therapy**

Characteristic	0 day	28th day			56th day		
		Scheme «A» (n = 18)	Scheme «B» (n = 18)	p	Scheme «A» (n = 18)	Scheme «B» (n = 18)	p
Abdominal pain	42.2 ± 3.8	12.8 ± 2.5	22.8 ± 3.4	0.023	4.4 ± 1.2	8.1 ± 2.0	0.135
Distension	40.1 ± 4.4	10.8 ± 2.8	26.1 ± 4.2	0.005	2.8 ± 1.1	8.9 ± 1.9	0.009
Stool frequency	45.1 ± 3.9	18.9 ± 2.4	17.8 ± 3.5	0.797	6.7 ± 1.7	6.3 ± 1.5	0.808
Stool consistency	44.0 ± 4.0	21.4 ± 2.7	18.1 ± 3.4	0.435	7.2 ± 1.8	6.1 ± 1.7	0.649
Interference with life in general	38.8 ± 2.6	19.7 ± 2.2	25.3 ± 2.3	0.087	7.5 ± 2.0	13.3 ± 1.9	0.041
IBS-SSS sum	210.1 ± 11.3	83.6 ± 8.8	110.0 ± 10.7	0.066	28.6 ± 5.6	42.5 ± 6.0	0.099
Dynamics, %		–64.9 ± 2.2	–43.5 ± 2.0	< 0.001	–88.7 ± 1.8	–78.3 ± 2.3	0.001

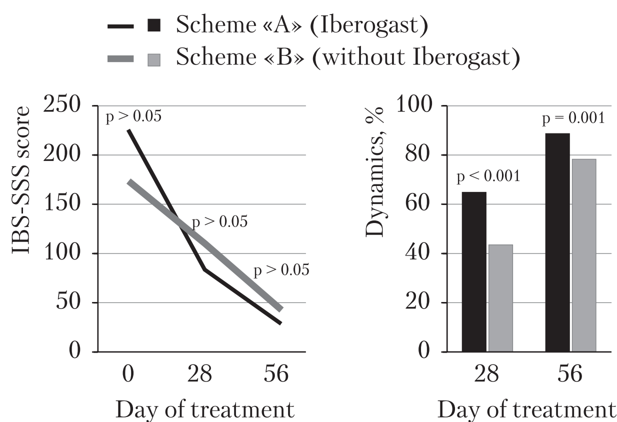

Figure. **The total IBS-SSS score and its dynamics in patients with irritable bowel syndrome depending on scheme of treatment**

dynamics of IBS-SSS score was significantly different — –88.7 ± 1.8 and –78.3 ± 2.3 % respectively, p = 0.001. So, the additional prescription of phytopreparation leads to improvement of therapeutic effect on average by 10.4 % (Figure).

As a result of the distribution of patients it was revealed two clusters at the end of course of treatment using cluster analysis. The patients with the best response to treatment were included in the second cluster (the average total IBS-SSS score was 23.3 ± 2.8 that was on 88.3 ± 1.4 % lower than before treatment). The cluster 1st was characterized by worse indicators on the 56th day of treatment, namely: the average total IBS-SSS score was 67.5 ± 5.9, the percentage of reduction — 71.2 ± 1.9 %.

To the 2nd cluster (the effect of therapy was better) were involved 84.2 % of individuals who additionally received *Iberogast* (scheme of treatment «A») and 58.8 % of those who followed only non-drug treatment (scheme of treatment «B»). Regarding cluster of patients with worse indicators of the IBS-SSS scale at the end the 8th week of therapy, it included respectively 15.8 % of patients in the group «A» and 41.2 % — in the group «B».

The discovered peculiarities of response to treatment in patients with IBS suggest the significant effectiveness of complex treatment including prescription of herbal medicine in combination with lifestyle modifications and diet. The additional prescription of herbal drug with multifactorial effect on the digestive system (*Iberogast* that showed its performance after 4 weeks of therapy) contributed to a considerable leveling of clinical manifestations of IBS after an eight week course of treatment.

Conclusions

The frequency of IBS among surveyed persons was 11.8 % (IBS with predominant constipations — 30.6 %, IBS with predominant diarrhea — 13.9 %, mixed form of IBS — 13.9 %, undifferentiated form of IBS — 41.6 %).

The most crucial trigger factors of the development of functional diseases of digestive system in students are failure to comply with diet ($p < 0.001$), chronic psycho-emotional stress ($p < 0.001$), food toxicoinfections in anamnesis ($p < 0.001$), the number of used glasses of drinking water less than 3 glasses per day ($p < 0.001$), uncontrolled consumption of nonsteroidal anti-inflammatory drugs ($p < 0.001$), lack of physical activity ($p < 0.001$), the duration of sleep — 6 hours per day or less ($p < 0.001$), food allergies in anamnesis ($p = 0.003$), smoking ($p = 0.017$).

The modification of trigger factors of lifestyle is a priority direction in the treatment of IBS in adolescents patients and includes a waiver of smoking,

regular dynamic exercises, sleep at least 8 hours per day, compliance with the diet, the duration of intervals between meals not more than 3 hours, consumption of 1.5—2.0 liters of drinking water and 400—500 g of fresh fruit and vegetables per day, monitoring the appointment of nonsteroidal anti-inflammatory drugs.

It is recommended the additional prescription of phytopreparation *Iberogast*, which is characterized by ability to normalize the motility of the gastrointestinal tract, reduce of visceral hypersensitivity, mild choleretic action, anti-inflammatory, antioxidant and cytoprotective properties of the impact on the digestive system, at a dose of 20 drops 3 times per day during 8 weeks.

It is recommended the control survey by «Irritable bowel syndrome Severity Scoring System» scale to assess the effectiveness of the combined therapy.

Conflicts of interest: none.
Authorship contributions: conception and design, critical revision of the article — G. F.; acquisition of data, analysis and interpretation of data, drafting the article — A. N., O. B.

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Синдром подразненого кишечника: чинники ризику та особливості лікування осіб організованої студентської популяції

Мета — визначити найважливіші чинники розвитку синдрому подразненого кишечника в осіб студентської популяції та підвищити ефективність лікування шляхом модифікації способу життя і харчування та додаткового призначення фітотерапії.

Матеріали та методи.. Обстежено 305 осіб організованої студентської популяції (середній вік — (20,8 ± 0,1) року). Синдром подразненого кишечника діагностовано у 36 (11,8 %) пацієнтів. Залежно від лікування пацієнтів розподілили на дві групи: А (n = 18) — комплексна терапія із застосуванням немедикаментозних методів корекції, дієти low FODMAPs і призначення фітопрепарату «Іберогаст» (Steigerwald Arzneimittelwerk GmbH, Німеччина), Б (n = 18) — комплексне лікування без фітотерапії. Для оцінки тяжкості клінічних виявів синдрому подразненого кишечника використовували шкалу Irritable bowel syndrome Severity Scoring System.

Результати. На 56-ту добу терапії при повторному опитуванні скарг за шкалою Irritable bowel syndrome Severity Scoring System статистично значуще вираженіші позитивні зміни спостерігали у пацієнтів групи А для таких показників, як інтенсивність метеоризму (p = 0,009) і загальний вплив захворювання на життя (p = 0,041). Зміна сумарного бала наприкінці 8-тижневого курсу терапії статистично значуще відрізнялася: −(88,7 ± 1,8) % для групи А і (−78,3 ± 2,3) % для групи Б (p = 0,001). Призначення фітопрепарату сприяло поліпшенню терапевтичного ефекту в середньому на 10,4 %.

Висновки. Рекомендовано у складі комплексного лікування синдрому подразненого кишечника призначати фітопрепарат «Іберогаст», який нормалізує моторику шлунково-кишкового тракту, зменшує вияви вісцеральної гіперчутливості, має м'яку жовчогінну та кармінативну дію, протизапальні властивості, у дозі 20 крапель тричі на добу протягом 8 тиж.

Ключові слова: синдром подразненого кишечника, студентська популяція, чинники ризику, лікування.

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Синдром раздраженного кишечника: факторы риска и особенности лечения у лиц организованной студенческой популяции

Цель — определить наиболее важные факторы развития синдрома раздраженного кишечника у лиц студенческой популяции и повысить эффективность лечения путем модификации образа жизни и питания и назначения фитотерапии.

Материалы и методы. Обследованы 305 лиц организованной студенческой популяции (средний возраст — (20,8 ± 0,1) года). Синдром раздраженного кишечника диагностирован у 36 (11,8 %) пациентов. В зависимости от лечения пациенты были распределены на две группы: А (n = 18) — комплексная терапия с применением немедикаментозных методов коррекции, диеты low FODMAPs и фитопрепарата «Иберогаст» (Steigerwald Arzneimittelwerk GmbH, Германия), Б (n = 18) — комплексное лечение без фитотерапии. Для оценки тяжести клинических проявлений синдрома раздраженного кишечника использовали шкалу Irritable bowel syndrome Severity Scoring System.

Результаты. На 56-й день терапии при повторном опросе жалоб по шкале Irritable bowel syndrome Severity Scoring System статистически значимо более выраженные положительные изменения наблюдали у пациентов группы А по таким показателям, как интенсивность метеоризма (p = 0,009) и общее влияние заболевания на жизнь (p = 0,041). Изменение суммарного балла в конце 8-недельного курса терапии статистически значимо отличалось: (−88,7 ± 1,8) % для группы А и (−78,3 ± 2,3) % для группы Б (p = 0,001). Дополнительное назначение фитопрепарата способствовало улучшению терапевтического эффекта в среднем на 10,4 %.

Выводы. Рекомендовано в составе комплексной терапии синдрома раздраженного кишечника назначать фитопрепарат «Иберогаст», нормализующий моторику желудочно-кишечного тракта, уменьшающий проявления висцеральной гиперчувствительности, обладающий мягкими желчегонным и карминативным действием, противовоспалительными свойствами, в дозе 20 капель 3 раза в сутки в течение 8 нед.

Ключевые слова: синдром раздраженного кишечника, студенческая популяция, факторы риска, лечение.

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Стаття надійшла до редакції 3 жовтня 2017 р.