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### MODERN ASPECTS OF CLINIC, DIAGNOSTIC AND TREATMENT OF GIARDIASIS

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Analysis of the pain, dyspeptic, intoxication and allegro-dermatological syndromes in patients with giardiasis was conducted. Secretory component of the immunoglobulin A was determined by ELISA in coprofiltrates. A significant increase in the content of the secretory component of immunoglobulin A in patients with giardiasis was demonstrated, which can be regarded as a compensatory mechanism for giardiasis and its relation to clinical manifestations. The study determined the efficacy of sausalin. It was more pronounced than the drug Ornisd, which most commonly used at the modern treatment of giardiasis.

*Keywords:* giardiasis, ELISA, immunoglobulin A, coprofiltrate

Giardiasis is widespread human disease caused by protozoa, which may be asymptomatic or symptomatic form, often with long-term persistence [1, 13, 14].

Giardia affects mainly the gastrointestinal tract. The defeat of the duodenum, biliary tract and small intestine are dominant in the clinical picture of the disease in giardiasis [2, 5].

Secretory immunoglobulin A (sIgA) is an important immunoglobulin in the gastrointestinal tract [4, 9, 14]. Secretory immunoglobulin A directly provides a «first line of defense» of the intestinal mucosa against foreign antigens and is the «main cleaner» of the intestine. According to A. K. Makovetskaya et al. (2005), reducing sIgA may indicate insufficiency of the local immune functions and increase of sIgA indicates a disbalance in the immune system [6]. However, several studies have shown that with a decrease in local immunity, particularly sIgA, develop chronic pathology. The study of M. Calvo et al. (1990) showed that healthy children with normal levels of sIgA had the risk of chronic obstructive pulmonary diseases, including asthma, is 46%, when low sIgA increased risk to 86% [9]. There is a decrease of sIgA in oropharyngeal secretions in frequently and chronically ill children with asthma [10, 11, 15, 16].

Taking into account the limited results of studies on the role of sIgA in giardiasis, we thought it is currently important to study the humoral immunity in the intestine. The complexity of the treatment of patients with giardiasis largely is conditioned by the symptoms of the disease. Despite great progress in the development of highly effective antiparasitic drugs, the treatment of giardiasis remains one of the unresolved and complex issues [11]. At present, the number of giardicidal drugs increases, however, there is a gradual adaptation and the development of re-

sistance of Giardia. In connection with this important interest is the use of herbal remedies. The advantages of herbal remedies are their low toxicity and the possibility of prolonged use without significant side effects [3, 12].

Phytochemical studies of *Saussure saline* extract have been conducted in the International scientific-production holding «Phytochemistry» in Karaganda. *Saussure* is a species of plant widespread in Kazakhstan. It was developed experimental-industrial regulations to receive the drug «Sausalin», which has anti-inflammatory, anti-giardic, antitrihomonad, antiparasitic activity. In the process of experimental toxicological and morphological studies of mice and rats were conducted to identify possible toxic *Saussure saline*. A single maximum technically achievable dose of a 10% suspension *Saussure saline* (2 g/kg) did not cause the death of rats. The results of the immunological tests and a set of indicators used to detect toxic effects, have revealed that extracts of *Saussure saline* do not adversely impact on the integral, immunological, hematological parameters. In addition, the pharmacological properties of the extract *Saussure saline* were studied, it anti-giardic, antitrihomonad, antiopisthorchosis activity was established [7, 8].

The purpose of the study was to investigate the aspects of the clinical picture, the content of secretory immunoglobulin A in giardiasis and therapeutic efficacy and safety of the drug «Sausalin» as anti-giardic drug.

#### MATERIALS AND METHODS

The study group was formed by 250 patients aged from 18 to 60 years with a diagnosis of «Giardiasis, chronic intestinal form in the acute stage». Verification of the diagnosis was based on clinical and medical history and laboratory and instrumental methods of examination (stool microscopy, the result of duodenal intubation, PCR

diagnostics). Vegetative forms of lamblia were detected in the duodenal contents and feces, cysts were found in the feces within 2 hours after collection of analysis. We have identified secretory immunoglobulin A (sIgA) in the feces in 40 patients aged from 18 to 60 years (mean age  $38,5 \pm 1,2$  years) to study the state of humoral immunity in the intestine. The study involved 16 (40%) men and 24 women (60%). The comparison group consisted of 22 patients of comparable sex and age and the presence of comorbidities. Patients were identified comorbidities, which are dominated by: food allergy to obligate allergens, chronic pathology of the upper respiratory tract (chronic tonsillitis, adenoids), mild normochromic anemia. All patients had manifestations of intestinal dysbiosis in varying degrees, according to the results of clinical and anamnestic data, results of physical examination and coprological research.

To investigate the IgA coprofiltrates it was used chromogenic enzyme immunoassay with using a commercial kit «Vector-Best» on equipment Bio-Rad with 96-well plate in accordance with the instructions attached to the kit in 96-well plate. Stool samples were stored at  $20\text{ C}^{\circ}$  prior to the study. We used 20% suspension of stool in a phosphate buffer for the preparation coprofiltrates which was purified by centrifugation at 1300 g. The coprofiltrates prepared on the day of the study.

We have formed a comparable group of patients for treatment with «Sausalin» and «Ornisid». The patients were randomly divided into two groups. The I<sup>st</sup> group included 125 patients with a diagnosis of giardiasis, which was used in the treatment herbal drug «Sausalin» (0,12 g) in a therapeutic dose of 2 tablets per 3 times a day for 10 days (the I<sup>st</sup> study group). In the II<sup>nd</sup> group of 125 patients used antiparasitic drug «Ornisid» (0,5 g), manufacturer «Abdi Ibrahim» (Turkey), 1 tablet 3 times a day for 7 days.

Statistical analyze of the results of the study was conducted using the methods of mathematical statistics. The significance of differences in mean values was assessed using t-test.

### RESULTS AND DISCUSSION

The study of local immunity identifies some important differences in the state of local immunity in patients with giardiasis in a comparative perspective with the results of the control group.

The study revealed that the content of the secretory immunoglobulin A in coprofiltrates of patients with giardiasis was increased, representing 88,40 mg/l ( $p < 0,05$ ), while in the control group content of the secretory immunoglobulin A was to 45,6 mg/l (fig. 1).

The stimulating effect of Giardia trophozoites was confirmed by comparing the results of the analysis of the processes of synthesis sIgA intestinal mucosa, depending on gender. We obtained the following results of content sIgA depending on the sex of patients. The content of sIgA was 88,0 mg/l in women with giardiasis, while the content of sIgA was 42,0 mg/l ( $p < 0,05$ ) in women of the control group (fig. 2).

Comparative analysis of the content of sIgA in group of men (65,0 mg/l) and the control group (52,5 mg/l) had a similar trend of increasing the amount of sIgA in men with giardiasis as well as women. However, increasing the sIgA in male patients was not significant, unlike the data obtained in women with giardiasis. These data allow us to note consistent pattern of the study population as a whole, and for women and men in the form of a high content of sIgA in feces.

Comparative analysis of the content of the secretory component of immunoglobulin A in women is shown in fig. 3, according to which the content of secretory immunoglobulin A was 88,0 mg/l in a group of patients with giardiasis (study group), while the content of sIgA was 42,0 mg/l ( $p < 0,05$ ) in women of the control group. A significant increase in the content of sIgA among patients of study group points to the stimulation of the local immune system, the body's ability to cope with the invasion intruded and improvement of the patients.

Comparative analysis of the content of sIgA in group of men (65,0 mg/l) and the control group (52,5 mg/l) had a similar trend of increasing the amount of sIgA in men with giardiasis as well as women (fig. 4). However, increasing the sIgA in male patients was not significant, unlike the data obtained in women with giardiasis. These data allow us to note consistent pattern of the study population as a whole, and for women and men in the form of a high content of sIgA in feces.

Thus, the basis of giardiasis pathogenesis are disturbances in the immune system of the intestine. Certainly, the formation of giardiasis is in the process of mutual potentiation of effects of several etiopathogenetic factors. These factors include: the invasion of trophozoites, atrophy of the intestinal microvilli, the associated change in the function of immune response, implementation of corrosive properties of Giardia in the area of local atrophy of the intestinal mucosa against the background of increased secretion of secretory component of immunoglobulin A.

As is known, the failure of «the first line» of defense produce a massive infiltration of microbial antigens from the lumen of the digestive

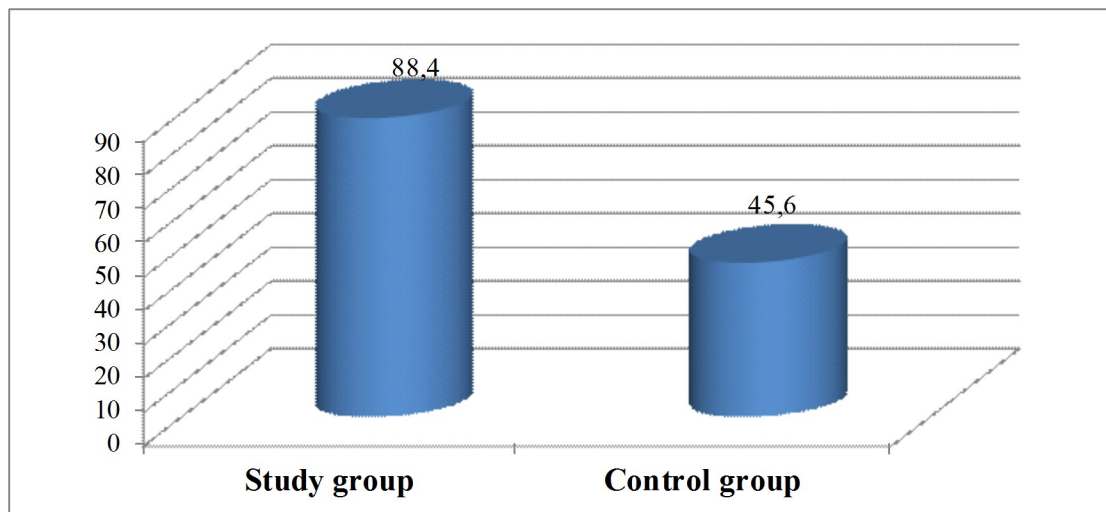


Figure 1 — The content of secretory immunoglobulin A in coprofiltrates (mg/l)

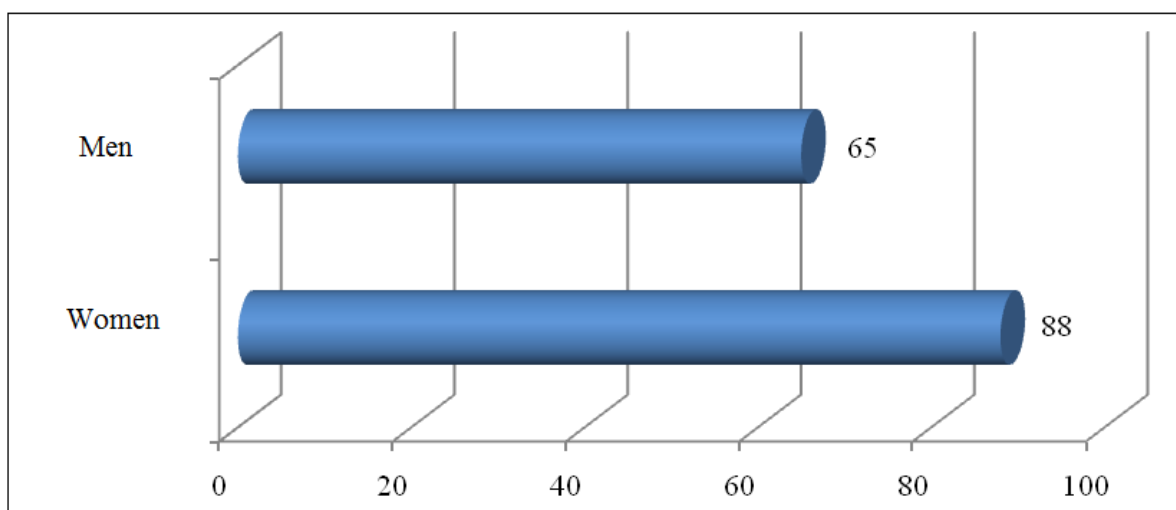


Figure 2 — The content of secretory immunoglobulin A in patients with giardiasis (mg/l)

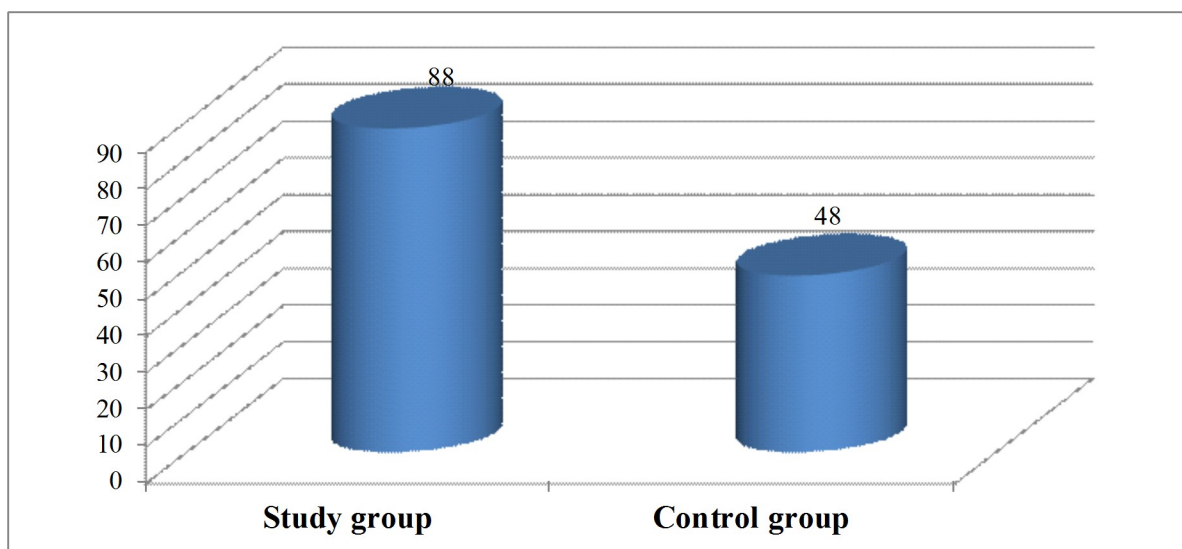


Figure 3 — The content of secretory immunoglobulin A in women of study group and the control group

tract in its wall, and it is accompanied by a parallel increase in the clinical manifestations of the disease. In connection with what we have studied the clinical features of the period of the disease, the severity of the major syndromes of giardiasis among the patients.

A number of patients (17,5%) had an average severity of Giardiasis, 82,5% – a mild degree of severity. We must assume that, in spite of the fact that all patients confirmed the diagnosis – intestinal Giardiasis with years of recurrent course they are characterized by mild severity. Apparently, one of the factors that can explain the preva-

lence of mild is the potential of local immunity in the form of increased secretion of secretory component A to block the attachment of trophozoites to the microvilli of the intestinal mucosa and facilitate their rapid elimination. As a result there is minimal cytopathic effect of parasite's metabolites, large frequency of atrophic changes of the brush border and the intestinal mucosa.

The clinical picture of giardiasis among the patients was characterized by various symptoms. Most of the patients had manifestations of abdominal pain syndrome. Localization of pain was different, but more often it was located in the

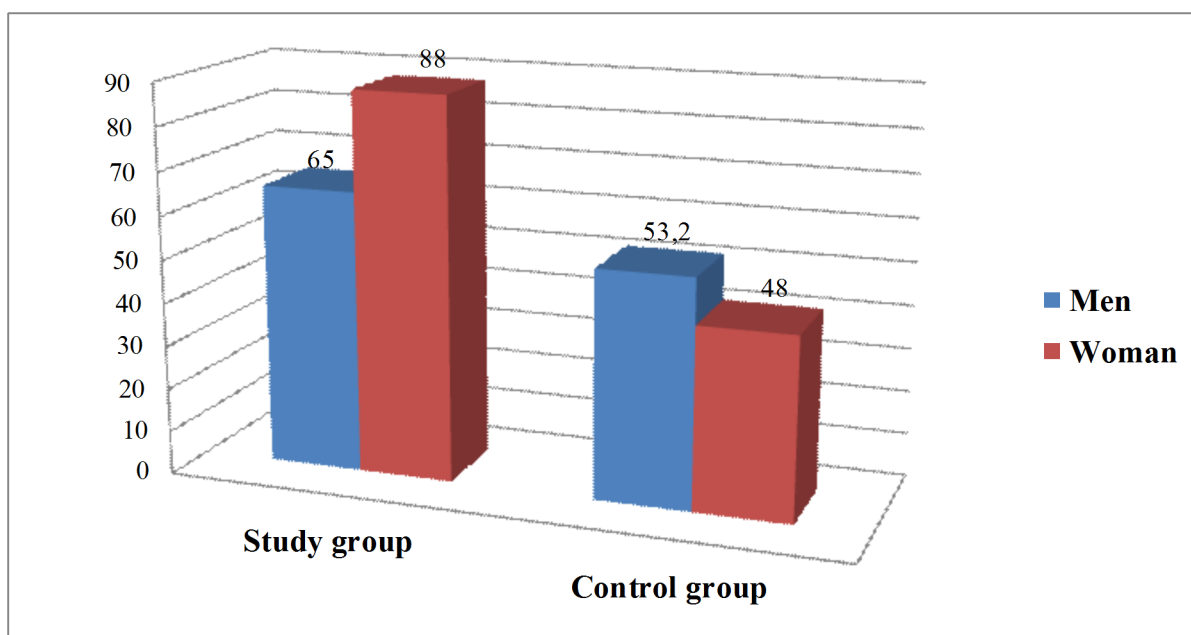


Figure 4 — The content of the secretory immunoglobulin A (mg/l)

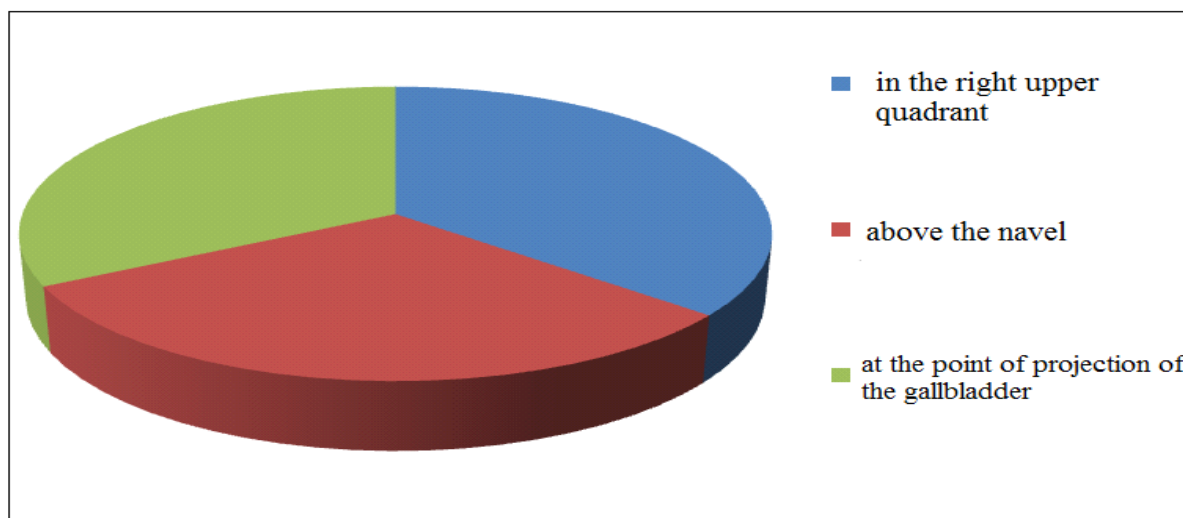


Figure 5 — The prevalence of pain

right upper quadrant, at the point of projection of the gall bladder and in the area above the navel. The absence of pain indicated  $12,5 \pm 9,6$  ( $p < 0,05$ ) of the patients. Pain syndrome was characterized by dull, aching pain in the stomach more often after eating ( $83,3 \pm 8,1\%$ ;  $p < 0,05$ ), in the remaining cases, it was colicky pain, lancinating pain, not related to food intake. Data about the prevalence of pain are presented in figure 5.

Another leading clinical syndrome in patients with giardiasis was dyspeptic syndrome. The predominant symptoms of dyspeptic syndrome among patients were shown in fig. 6. Nausea, belching, bloating, feeling of fullness in the intestine were the most common symptoms.

Intoxication syndrome most often manifested by weakness, fatigue, irritability, headache, sleep disorders, joint pain, weight loss (fig. 7). Low-grade fever was rare in patients ( $33,33 \pm 19,24$ ;  $p < 0,05$ ) compare with other syndromes.

The main manifestations allergic dermatologic syndrome among patients were follows: skin pigmentation of neck, belly button and a white line of the abdomen ( $87,49 \pm 9,63$ ;  $p < 0,05$ ), skin rash ( $76,26 \pm 7,73$ ;  $p < 0,05$ ), the defeat of the red portion of lips as peeling, dryness, cracking ( $59,57 \pm 8,43$ ;  $p < 0,05$ ), itching of the skin ( $57,78 \pm 6,89$ ;  $p < 0,05$ ), marble nose ( $66,67 \pm 19,24$ ;  $p < 0,05$ ), follicular hyperkeratosis ( $46,37 \pm 9,74$ ;  $p < 0,05$ ) (fig. 8).

An objective examination, 65,6% patients had pale skin and 45% patients had ochrodermia. The analysis of the comparability of clinical manifestations and the content of the secretory component of immunoglobulin A, showed great severity of dyspeptic, intoxication and allergic dermatologic syndromes among the patients. The prevalence of pain was lower, compared with dyspeptic,

intoxication and allergeo-dermatologic syndrome. Consequently, the absence of pain symptoms, or their lack of intensity did not cause a lot of suffering patients, thereby not reduced the quality of life. In our opinion, the high content of secretory immunoglobulin A, as a compensatory response of the organism, could determine the lack of manifest pain syndrome

Data of dynamics of clinical symptoms of patients before treatment with «Sausalin» and «Ornisid» presented in table 1.

Analysis of clinical symptoms in patients shows that the clinic of giardiasis consisted symptoms of the general condition as asthenovegetative syndrome, which was observed in 77,83% of cases in the study group, and in 70,42% of cases in the control group. The defeat of the digestive system in 86% of cases observed in the study group and in 75% of cases – in the control group. Toxic-allergic syndrome in 50% of cases observed in the study group and in 54% of cases – in the control group.

Clinical symptoms in patients with chronic giardiasis manifested gastroenterocolitic, holepatic, asthenonevrotic, toxic-allergic and dyspeptic syndromes. Among the clinical forms were predominant intestinal giardiasis, also it were detected mixed forms.

As shown in table 1 and diarrheal syndromes gastroenterocolitic and dyspeptic syndromes manifested in the form of reduction or increase of appetite, belching, heartburn, coated tongue, nausea, vomiting, feeling of fullness in the stomach, flatulence and rumbling in the bowels, constipation, mushy stool with undigested lumps.

Pain syndrome manifested by the following symptoms: abdominal pain, often in the right upper quadrant, pain above the navel abdomen,

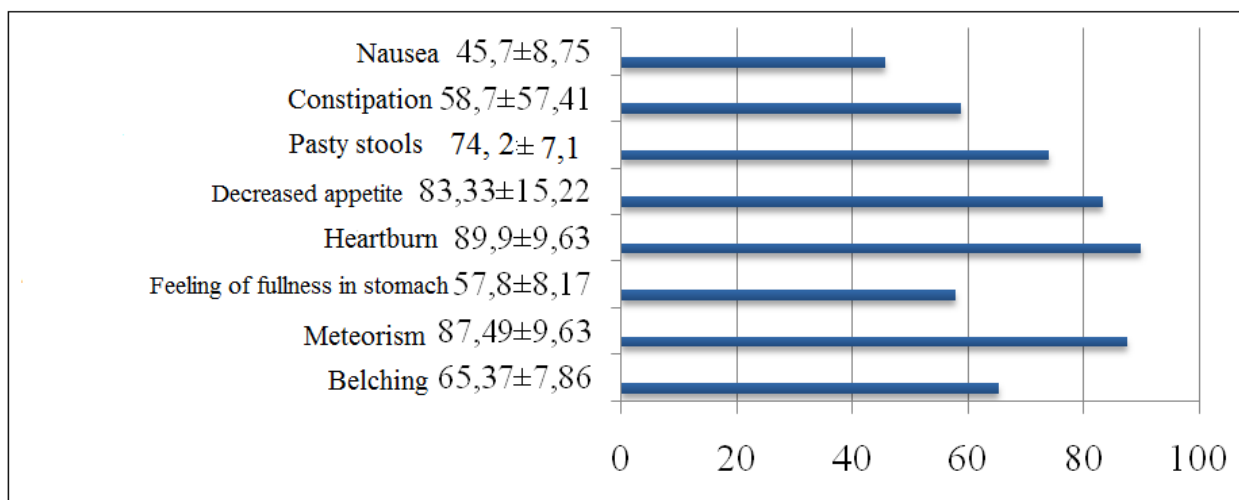


Figure 6 — The characteristics of dyspeptic syndrome

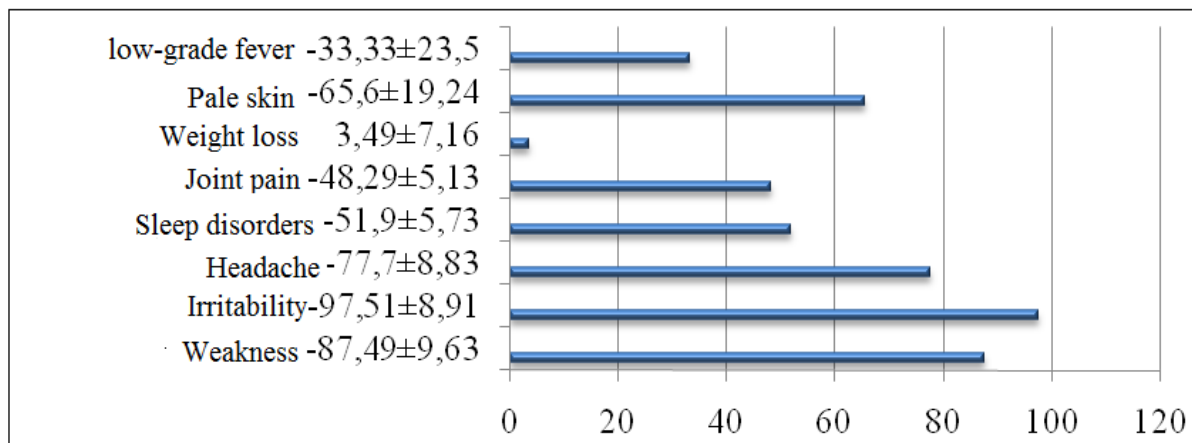


Figure 7 — The manifestations of intoxication syndrome

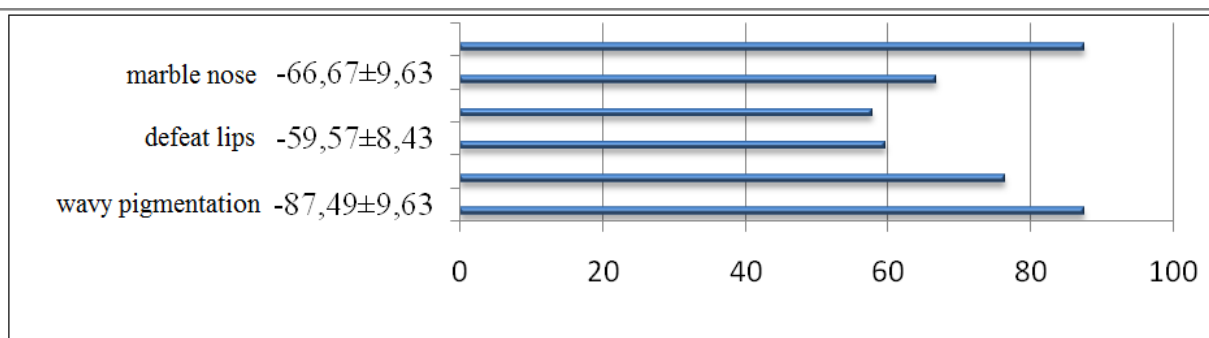


Figure 8 — Manifestations of allergic dermatologic syndrome

pain in the projection point of the gall bladder, respectively, 67,49%, 63,05%, 71,43% of the cases in the study group and in the control group, 47,89%, 50,70%, 59,15% respectively. In 17,29% of the patients of study group and 15,09% of the control group were detected a slight increase in liver and moderately painful.

Asthenovegetative syndrome manifested as the following syndromes: weakness, fatigue in 79,31%, spleen in 63,55% the of cases in the study group. In the control group, respectively – 67,61%, 47,89%. Headache was observed in 57,14% of cases the study group and 40,85% in the control group. Sleep disorders was detected in 46,31% and weight loss was detected in 36,75% of cases in the study group and respectively in 32,39%, and 30,19% of patients in the control group.

Clinical manifestations of toxico-allergic syndrome were noted at 50% of patients in both groups. There was a pallor of integuments at 29,56% of patients of the main group and at 26,76% of group of control as one of clinical manifestations of a toxico-allergic syndrome. Unevenness of coloring of skin in combination with a subicteric were noted in 15,76% of cases, defeat of a red border of lips (a peeling, dryness, cracks) at 43,35% of patients of the study group and

respectively at 15,49% and 50,70% of patients of group of control. Atopic dermatitis, rash on skin met in the study group in 44,33% of cases, in the group of control in 45,07% of cases. There were itch of integuments in 52,71% of cases, low-grade fever at 15,13%, joint pain at 41,62% of patients in the study group and at 50,70%, 18,87%, 62,42% of patients in control group respectively.

After receiving a 10-day course of the drug «Sausalin» all patients had improvement of the general condition (reduced fatigue), normalized stool, almost all patients improved appetite, decreased symptoms of atopic dermatitis. Data of dynamics of clinical symptoms of patients after treatment with «Sausalin» and «Ornisid» presented in table 2.

Manifestations of asthenovegetative syndrome are less in the group of patients receiving «Sausalin» than in the control group.

Weakness, headache of patients in the study group was half that of the control group. Reducing toxic-allergic syndrome in the study group was more dynamic, than in the control group.

So, itching of the skin completely stopped in the study group of patients. In the control group, the symptom decreases slightly. However,

Table 1 — Comparative characteristics of clinical symptoms in patients with giardiasis in the study and control groups before treatment

Clinical symptoms	Study group (n=125)	Control group (n=125)
	%	%
<i>Syndromes of gastrointestinal disorders</i>	85,71	74,65
Coated tongue	87,19	70,42
Meteorism and rumbling in the gut	68,47	53,52
Soreness in the abdomen in the right upper quadrant	67,49	47,89
Soreness in the abdomen above the navel	63,05	50,70
Soreness at the point of projection of the gallbladder	71,43	59,15
Hepatomegaly	17,29	15,09
Belching	27,09	18,31
Feeling of fullness in stomach	51,72	39,44
Nausea	72,41	61,97
Vomiting	22,17	21,13
Heartburn	33,00	30,99
Decreased or increased appetite	43,84	45,07
Pasty stools with undigested lumps	52,22	53,52
Constipation	38,42	38,03
Weight loss	36,75	30,19
<i>Asthenovegetative syndrome</i>	77,83	70,42
Weakness, fatigue	79,31	67,61
Irritability	63,55	47,89
Headache	57,14	40,85
Sleep disorders	46,31	32,39
Low-grade fever	15,13	18,87
<i>Toxic-allergic syndrome</i>	50,25	53,52
Joint pain	41,62	26,42
Pale skin ( facial skin )	29,56	26,76
The skin pigmentation in combination with icterus	15,76	15,49
The defeat of the red portion of lips (peeling, dryness, cracks )	43,35	50,70
Atopic dermatitis, a skin rash	44,33	45,07
Itching of the skin	52,71	50,70

Table 2 — Comparative characteristics of clinical symptoms in patients with giardiasis in the study and control groups after treatment

Clinical symptoms	Study group «Sausalin» (n=125) (p±m <sub>p</sub> ) (%)	Control group «Ornisid» (n=125) (p±m <sub>p</sub> ) (%)	t-test
Syndromes of gastrointestinal disorders	43,35±4,43	65,63±4,25	-3,63*
Coated tongue	46,8±4,46	65,63±4,25	-3,06*
Meteorism and rumbling in the gut	35,96±4,29	51,56±4,47	-2,52*
Soreness in the abdomen in the right upper quadrant	34,48±4,25	32,81±4,2	0,28
Soreness in the abdomen above the navel	28,57±4,04	32,81±4,2	-0,73
Soreness at the point of projection of the gallbladder	29,06±4,06	37,5±4,33	-1,42
Hepatomegaly	3,78±1,71	0±0	2,22*
Belching	9,36±2,61	17,19±3,37	-1,84
Feeling of fullness in stomach	19,21±3,52	25±3,87	-1,11
Nausea	20,69±3,62	31,25±4,15	-1,92
Vomiting	4,93±1,94	12,5±2,96	-2,14*
Heartburn	6,9±2,27	17,19±3,37	-2,53*
Decreased or increased appetite	16,26±3,3	29,69±4,09	-2,56*
Pasty stools with undigested lumps	21,67±3,69	20,31±3,6	0,26
Constipation	13,3±3,04	35,94±4,29	-4,31*
Weight loss	7,03±2,29	17,39±3,39	-2,53*
<i>Asthenovegetative syndrome</i>	<i>51,23±4,47</i>	<i>51,56±4,47</i>	<i>-0,05</i>
Weakness, fatigue	39,41±4,37	48,44±4,47	-1,44
Irritability	26,11±3,93	42,19±4,42	-2,72*
Headache	28,08±4,02	35,94±4,29	-1,34
Sleep disorders	12,32±2,94	6,25±2,17	1,66
Low-grade fever	1,08±0,92	2,17±1,3	-0,68
<i>Toxic-allergic syndrome</i>	<i>19,7±3,56</i>	<i>25±3,87</i>	<i>-1,01</i>
Joint pain	8,65±2,51	8,7±2,52	-0,01
Pale skin ( facial skin )	9,36±2,61	10,94±2,79	-0,41
The skin pigmentation in combination with icterus	1,97±1,24	7,81±2,4	-2,16*
The defeat of the red portion of lips (peeling, dryness, cracks )	16,26±3,3	15,63±3,25	0,14
Atopic dermatitis, a skin rash	22,66±3,74	32,81±4,2	-1,80
Itching of the skin	10,84±2,78	32,81±4,2	-4,36*

it should be noted that in both groups was atopic dermatitis.

Single Giardia was detected in duodenal intubation of 40 (45,7%) patients of the study group and 15 (35,5%) patients of the control group before treatment. Giardia cysts were found in 100% of patients in both groups at the scato-

logical study.

Sanitation of Giardia cysts was observed in almost all patients in the study group, compared with the control group. This confirms the results of research feces and duodenal intubation in two days from the time of stopping treatment. Data presented in table 3.



Table 3 — Dynamics of antiparasitic efficacy, depending on the therapy

Indicators of groups	Basic group «Sausalin» (n=125)		Control group «Ornisid» (n=125)	
	before treatment	after treatment	before treatment	after treatment
	%	%	%	%
feces analysis on parasite	100	14,29±3,13*	100	57,81±4,42*

The effectiveness of treatment was 85,71% in the study group and 42,19% in the control group. The reisolation of Giardia cysts was observed in 57,81% of patients in the control group, in the study group it was observed only 14,29%. Percentage of elimination lamblia cysts in the study group is 4 times higher than in the control group, which indicates a high efficacy of «Sausalin».

Due to the fact that the efficiency of treatment in the control group did not exceed 42,19% patients were retreated.

Antigiardic effectiveness was evaluated on the results of reexamining stool for Giardia cysts in 21 days after treatment. The reisolation of Giardia cysts was observed in 2 (7,4%) patients in the study group, in the control group it was observed in 8 (33,3%) patients.

Thus, the analysis of the clinical manifestations of giardiasis indicates its polymorphism, a significant prevalence and diversity of manifestations of pain, dyspeptic and intoxication syndromes. It is particularly important to point out the high incidence of various forms of allergic-dermatologic syndrome among patients with giardiasis, which is an external attribute of the immune disturbances that occur in the body of patients with giardiasis.

We think, that the increase in the level of secretory immunoglobulin A in the intestine in patients with giardiasis is an important compensatory reserve of the body, which provides protections against trophozoites of Giardia and promotes the elimination of the causative agent of giardiasis. The high levels of secretory immunoglobulin A in patients points to an existing imbalance in the immune system of this patients, as evidenced by significant prevalence allegro-dermatologic syndrome among them.

In addition, severe symptoms of pain, dyspeptic, intoxication and allergic dermatologic syndromes, increased secretory component of immunoglobulin A in patients are signs not only immunity disorders in the intestine, but all over the body. But at the same time they point to a strengthening of compensatory mechanisms of

local immunity in the form of increased production of the basic «main cleaner» of the intestine-secretory immunoglobulin A. It is important to note pattern was found between the severity of clinical symptoms and the level of increasing the content of SIgA, which appear to be greatest among women.

Obviously, an increased amount of sIgA, primarily prevents adhesion of Giardia trophozoites in food microvilli intestinal epithelium, the second – it neutralizes in the intestinal mucosa lamblia waste products, thereby promoting remission and improvement of quality of life patients with giardiasis.

The results of the present study give evidence of clinical and parasitological efficacy of therapy using as a causal treatment with «Sausalin». Sanitation of the body from parasites to 85% in the study group in comparison with 55% in the control group and the indicators of a prospective effect in 3 months after treatment (positive scatoscopy 8% and 25%, respectively) indicate a high effect of therapy with «Sausalin».

First of all, the positive effect of this drug due to the fact that the plant *Saussurea* have a wide spectrum of activity in terms of creating herbal medicines. The biological activity of these plants is high due to the presence in their structure of sesquiterpene lactones gvaianic series. The spectrum of biological activity of sesquiterpene lactones is wide, covering antiparasitic, antimicrobial, anti-inflammatory, choloretic and other pharmacological properties.

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ЛЯМБЛИОЗДЫҢ ЗАМАНАУИ КЛИНИКАЛЫҚ ЕРЕКШЕЛІКТЕРІ, ДИАГНОСТИКАСЫ ЖӘНЕ ЕМІ*

Зерттеуден өткен лямблиозбен сырқат науқастардағы ауырсыну, диспепсиялық, интоксикациялық және аллергодерматологиялық синдромдарға талдау жүргізілді. Иммуноферменттік анализ әдісімен копрофильтраттағы А иммуноглобулиндердің секреторлық компонентінің құрамы зерттелді. Лямблиозбен сырқаттанған науқастарда А иммуноглобулиннің секреторлық компонентінің құрамының дәлелді жоғарылағаны көрсетілген, оны лямблиоз кезінде компенсаторлық механизм ретінде бағалауға және оның клиникалық көріністерімен байланыстыруға болады.

Зерттеу барысында лямблиоздың еміне қазіргі уақытта жиі қолданып жүрген дәрі Орнисидке қарағанда саусалиннің тиімділігі анықталды.

*Кілт сөздер:* лямблиоз, иммуноферменттік анализ, А иммуноглобулин, копрофильтрат

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СОВРЕМЕННЫЕ ОСОБЕННОСТИ КЛИНИКИ, ДИАГНОСТИКИ И ЛЕЧЕНИЯ ЛЯМБЛИОЗА*

Проведен анализ болевого, диспептического, интоксикационного и аллергодерматологического синдромов у пациентов, больных лямблиозом. Методом твердофазного иммуноферментного анализа исследовано содержание секреторного компонента иммуноглобулина А в копрофильтрате. Показано достоверное повышение содержания секреторного компонента иммуноглобулина А у больных лямблиозом, который можно расценивать как компенсаторный механизм при лямблиозе и его связь с клиническими проявлениями.

В ходе исследования определена эффективность препарата «Саусалин», которая была более выражена, чем наиболее часто используемый на современном этапе лечения лямблиоза препарат «Орнисид».

*Ключевые слова:* лямблиоз, иммуноферментный анализ, иммуноглобулин А, копрофильтрат