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жазылуды қамтамасыз ететін тігіс түрлері мен тігіс материалдарын таңдау мақсатында мысықтарға құрсақтық операциялар жүзеге асырылды.

Мақалада зерттеуге қолданылған тігіс салу әдістерінің клиникалық және жазылу үрдісінің морфологиялық көрсеткіштері сипатталған. Салыстырмалы тұрғыда зерттелген әдістердің ішінде лапаротомиялық тіліктерді жабуда Реверден-Мультановский және Холстедтің тігістері зерттеу әдістемелеріне сәйкес жоғары нәтиже көрсетті. Клиникалық зерттеу нәтижелері бақылау мерзімінде қалыпты жағдайдағы физиологиялық көрсеткіштердің қалыпты нормалар шегінен ауытқуы байқалмады.

РЕЗЮМЕ

Основная проблема на сегодняшний день заключается в неконтролируемом размножении бездомных собак и кошек, что может существенно повлиять на экологическую и санитарно-эпидемиологическую ситуацию в Уральске. Недооценка данного факта может привести к неожиданным и, что еще опаснее, необратимым последствиям.

В связи с изложенным, актуальной задачей нашей исследовательской работы является выбор видов швов и шовных материалов, обеспечивающих эффективное и быстрое заживление, с целью минимизации осложнений после закрытия медианных лапаротомных разрезов при абдоминальных операциях на кошках. Это позволит создать оптимальные условия для полного закрытия швов в оперированной области до момента повторного возвращения животных в их естественную среду обитания.

В статье рассматриваются клинические и морфологические показатели процесса наложения швов, которые были использованы для исследования. Среди сравнительно изученных методов высокие результаты в заживлении лапаротомных разрезов продемонстрировали швы Ревердена-Мультановского и Холстеда по методикам исследования. Результаты клинического исследования за весь период наблюдения показали отсутствие физиологических отклонений, что соответствовало норме.

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THE IMMUNOLOGICAL PARAMETERS OF BLOOD IN EIMERIOSIS-STRONGYLATOUS INVASION OF SHEEP IN PAVLODAR REGION

ANNOTATION

In this article, the authors present the results of his research on the spread of eimeriotic helminthic infestations in small cattle in Pavlodar region.

In sheep farms of various forms of ownership, the authors conducted experiments on a large number of sheep, and in their research they used clinical, biochemical and other methods that contributed to obtaining scientifically reliable facts.

The article describes the epizootology of the spread of eimeriosis-strongylatous, eimeriosis-bunostomous and eimeriosis-trichostrongylosis invasion of sheep in Pavlodar region. The components of eimeriosis-bunostomous and eimeriosis-trichostrongylosis invasion of sheep have been determined. The seasonal and age dynamics of eimeriosis-bunostomous and eimeriosis-trichostrongylosis invasion of sheep in this region has been studied. The clinical course and pathogenesis of eimeriosis strongylatous invasion of sheep have been studied in detail. Morphological, biochemical and

immunobiological studies of blood parameters in experimental and spontaneous infection with eimeriotic strongylatous invasion of sheep in Pavlodar region were carried out.

Our goal was to study the types of eimeria that are components of parasitocenosis, their morphological features in eimeria-bunostomous and eimeria-trichostrongylosis invasions in sheep in Pavlodar region.

As a result of our research, we identified 7 types of eimeria components of parasitocenosis: *Eimeria arloingi*, *Eimeria parva*, *Eimeria cran-dallis*, *Eimeria ahsata*, *Eimeria intracata*, *Eimeria faurei*, *Eimeria ninakohlyakimovae*.

Key words: *Eimeriosis-bunostomosis*, *eimeriosis-trichostrongylosis*, *eimeria-strongylidosis*, *T-Lymphocytes*, *B-Lymphocytes*.

Introduction. During these years, a selection-clone theory of immunity was created, patterns of functioning of a number of links of the lymphoid system as a single and integral immune system were found. Two independent effector mechanisms in a specific immune response have been discovered [1, 2, 3]. One is associated with B lymphocytes, responsible for humoral immunity (synthesis of immunoglobulins), the second with the system of T lymphocytes (thymus-dependent cells) responsible for cellular immunity (accumulation of sensitized lymphocytes) [4, 5, 6]. The obtained research results suggest that the immunological system is an important link in the complex mechanism of adaptation of the body, a violation of homeostasis may be the cause of the penetration of foreign antigens [7, 8, 9].

The authors conducted tests and proved that erythrocytes decrease to 6.8 million, hemoglobin to 37%, and eosinophilic indices increase to 35%. According to the authors, an increase in the amount of albumins at the beginning of the eimeriotic disease, and an increase in the amount of gamma globulins with a slight shift in alpha and betaglobulins at the end of the disease, is associated with a strong immunobiological process occurring in the body, which is closely related to the course of eimeriotic invasion [10-14].

The authors believe that a sharp decrease in intestinal enzymes, silk phosphatase and enterokinase, with a simultaneous decrease in serum albumins from 50.34 to 43.95% in lambs, is due to their disease eimeriosis [15-17].

Eimerious and strongylatous invasion occurs with visible clinical and pathological signs. Mainly during pathological anatomical autopsy, changes in eimeriosis and strongylatous invasion are mainly observed in the small and large intestine, and changes in blood composition also occur. Thus, eimerious and strongylatous invasion proceeds with visible clinical and pathological changes [18-20].

Materials and methods of research. To study the morphological, biochemical, and immunological parameters of blood, lambs of the experimental group aged 5-6 months were injected with a suspension with a syringe with a rubber probe attached to it. The suspension contained 7 species of eimeria: *Eimeria arloingi*, *Eimeria parva*, *Eimeria crandallis*, *Eimeria ahsata*, *Eimeria intracata*, *Eimeria faurei*, *Eimeria ninakohlyakimovae* and larvae of strongylates.

Morphological, biochemical and immunobiological blood tests in lambs aged 5-6 months were carried out to determine the degree of influence of eimeriosis-strongylatous invasion on the animal's body, before the start of the study and after the experimental infection.

The determination of the number of erythrocytes, leukocytes, hemoglobin in the blood, and the excretion of the leukoformula were carried out according to generally accepted methods. The total protein was determined by the biuretic method (a green light filter against a biuretic reagent was used). The quantitative determination of sugar was carried out by the enzymatic method (a 500 light filter against water was used).

The catalytic concentration of AST and ALT enzymes in blood serum was determined using the BIO-TEST 'AMINOTRANSFERASE ALT' (the method is based on measuring the optical density of hydrazones of 2-oxoglutaric and pyruvic acids in an alkaline medium).

The number of B-lymphocytes was determined in the reaction of complementary tissue formation (EAC-ROCK). T-lymphocytes were determined by spontaneous rosette formation (E-ROCK) with sheep erythrocytes.

The therapeutic effectiveness of the drugs has been tested on lambs spontaneously infected with eimeriosis-strongylatous invasion of 5-6 months of age. The effectiveness of the drugs was determined by the degree of reduction of eimeriosis-strongylatous invasion in lambs, with the determination of the extent and intensity of the effectiveness of drugs against eimeria and helminths.

As a result of the study, the effectiveness of drugs was clarified as clinical signs and coprological changes were observed.

Results and Discussion. Our aim of the study was to find out how the eimeriosis-strongylatous invasion affects the immunological parameters of the blood of lambs. The study was conducted on 10 lambs 5-6 months old, divided into 2 groups, experimental and control. The experiments were conducted on lambs taken from the farm of a prosperous one for infectious diseases. Lambs in the experimental group were orally administered a suspension containing 150,000 oocysts of *Eimeria* and 3,000 infective larvae of *bunostomum*, as well as 3,000 larvae of *trichostrongylus*. The lambs in the control group were not given a suspension of oocysts of *eimeria* and invasion larvae of *bunostome*, *trichostrongil*. Prior to the start of the experiment, the young were dewormed with panacur granulate at a dose of 20 mg/kg and sulfamethoxine at a dose of 20 mg/kg during two five-day courses with an interval of 3 days. According to the results of immunological studies of spontaneously infected lambs, the following results were obtained and are given in the form of Table 1.

Before infection of lambs in the experimental group, the leukocyte index was $6.2 \times 10^9 \pm 0.48$, the lymphocyte index was $68.8 \pm 4.07\%$, the absolute number of lymphocytes was $4338.2 \pm 569.7\%$, the absol index. from T-lymphocytes $7 \pm 0.71\%$, absol. from % T-lymph. $319.6 \pm 70.8\%$, B-lymphocyte index $6.8 \pm 1.16\%$, absol index. from % of I-lymphocytes $274.4 \pm 29.4\%$. In the control group, the leukocyte count was $7.08 \times 10^9 \pm 1.27$, the lymphocyte count was $68.8 \pm 1.16\%$, the absolute number of lymphocytes was $4751 \pm 443.5\%$, the absol index. from T-lymphocytes $12.2 \pm 0.86\%$, absol. of % T-lymph. $587.6 \pm 83.54\%$, the indicator of B-lymphocytes is $11 \pm 0.63\%$, the index is absolute. of % I-lymphocytes $524.2 \pm 58.41\%$. *Eimeria* oocysts and strongylate eggs were not found in samples from lambs' feces.

After driving the lambs together with the flock to graze, the lambs on the pasture in natural conditions become infected with *eimeria* oocysts and strongylate eggs. 7 days after infection of lambs with suspension in the experimental group, the leukocyte index was $8.26 \times 10^9 \pm 0.78$, the lymphocyte index was $72 \pm 2.59\%$, the absolute number of lymphocytes was $6007 \pm 732.9\%$, the absol index. of T-lymphocytes $16.6 \pm 2.09\%$, absol. from % T-lymph. $413.6 \pm 110.8\%$, B-lymphocyte index $12 \pm 0.71\%$, absol index. from % of I-lymphocytes $715 \pm 81.6\%$. In the control group of spontaneously infected lambs, the leukocyte count was $6.38 \times 10^9 \pm 0.44$, the lymphocyte count was $67.5 \pm 1.6\%$, the absolute number of lymphocytes was $4370 \pm 289.6\%$, the absol index. from T-lymphocytes $14.4 \pm 0.51\%$, absolute. from % T-lymph. $626 \pm 37.03\%$, the index of B-lymphocytes $11.2 \pm 0.58\%$, the index of absol. of % I-lymphocytes $487.2 \pm 35.33\%$.

In samples from the faeces of lambs, the oocysts of *eimeria* and eggs of strongylate from 50 to 100 per microscopic field.

14 days after infection of lambs with suspension in the experimental group, the leukocyte count was $9.66^9 \times 10 \pm 0.68$, the lymphocyte count was $76.4 \pm 4.58\%$, the absolute lymphocyte count was $5756 \pm 1328.5\%$, the absol index. from T-lymphocytes $13.8 \pm 0.58\%$, absol. from % T-lymph. $369 \pm 150.4\%$, B-lymphocyte index $6.8 \pm 0.37\%$, absol index. of % I-lymphocytes $513 \pm 59.9\%$. In the control group of spontaneously infected, the leukocyte index was $7.0 \times 10^9 \pm 0.2$, the lymphocyte index was $81.6 \pm 1.36\%$, the absolute number of lymphocytes was $5634.4 \pm 218.6\%$, the absol index. from T-lymphocytes $20.2 \pm 3.76\%$, absol. from % T-lymph. $362.8 \pm 132\%$, B-lymphocyte index $22.6 \pm 3.93\%$, absol index. from % of I-lymphocytes $440.2 \pm 177.3\%$.

By the 30th day after infection of lambs with suspension in the experimental group, lambs No. 1 and No. 3 die from the acute form of eimeriosis-strongiosis invasion. In a sample taken from feces, the number of oocysts of *eimeria* and strongylate eggs is over 250 per microscopic field. This is probably due to the fact that with weakened immunity, a secondary infection joined, which caused the death.

In the remaining lambs of the control group spontaneously infected, immunological blood parameters showed the following, leukocyte index $83.03 \times 10^9 \pm 0.07$, lymphocyte index $74.3 \pm 1.81\%$, absolute lymphocyte count $5974 \pm 179\%$, absol. of T-lymphocytes $10.7 \pm 0.26\%$, absol. from % T-lymph. $637 \pm 26.1\%$, B-lymphocyte index $10.7 \pm 0.51\%$, absol index. of % I-lymphocytes $637 \pm 93.8\%$. In the control group, the leukocyte count was $5.6 \times 10^9 \pm 0.24$, the lymphocyte count was $72.8 \pm 2.92\%$, the absolute number of lymphocytes was $4101 \pm 329.9\%$, the absol index. from T-lymphocytes $12.8 \pm 1.157\%$, absol. of % T-lymph. $515.8 \pm 44.7\%$, the indicator of B-lymphocytes is $10.6 \pm 0.51\%$, the index is absolute. of % I-lymphocytes $431 \pm 30.4\%$. In the sample taken from their feces, the number of oocysts of *eimeria* and eggs of strongylates is from 80 to 100 (Table 1).

Table 1 – Immunological parameters of the blood of lambs infected experimentally and spontaneously with eimeriosis-strongylatous invasion

№	Group	Leuco-cytes x10 ⁹	% Lympho-cytes	% of absolute number of lymphocytes	% T-lymphocytes	Absolute from T-lympho-cytes	% B-lymphocytes	of absolute from % I-lipids	
1.	Exper-t	4.7	58	2726	5	136	10	273	Before the experiment
2.	Exper-t	7.3	81	5913	9	532	6	355	
3.	Exper-t	6.0	70	4200	7	294	5	210	
4.	Exper-t	7.2	73	5256	8	420	4	210	
5.	Exper-t	5.8	62	3596	6	216	9	324	
M±m		6.2±0.48	68.8±4.07	4338.2±569.7	7±0.71	319.6±70.8	6.8±1.16	274.4±29.4	
1.	Control	8.2	72	5904	12	708	10	590	On the 7th day of infection
2.	Control	5.0	68	3400	11	374	10	340	
3.	Control	7.9	70	5530	15	829	12	664	
4.	Control	7.5	69	4500	13	585	13	585	
5.	Control	6.8	65	4420	10	442	10	442	
M±m		7.08±1.27	68.8±1.16	4751±443.5	12.2±0.86	587.6±83.54	11±0.63	524.2±58.41	
1.	Exper-t	6.3	64	4032	15	604	12	484	On the 7th day of infection
2.	Exper-t	8.7	77	6699	10	669	10	670	
3.	Exper-t	10.6	78	8268	22	182	11	909	
4.	Exper-t	8.9	69	6141	20	123	13	798	
5.	Exper-t	6.8	72	4896	16	490	14	685	
M±m		8.26±0.78	72±2.59	6007.2±732.9	16.6±2.09	413.6±110.8	12±0.71	715±81.6	
1.	Control	5.3	65	3445	14	482	12	413	On the 7th day of infection
2.	Control	7.7	65	5005	13	651	10	500	
3.	Control	6.5	69	4485	15	673	13	583	
4.	Control	6.9	71	4899	14	686	11	539	
5.	Control	5.5	73	4015	16	642	10	401	
M±m		6.38±0.44	67.5±1.6	4370±289.6	14.4±0.51	626.8±37.03	11.2±0.58	487.2±35.33	

Continuation of Table 1.

№	Group	Leuco- cytes x10 ⁹	% Lymphocytes	% of absolute number of lymphocytes	% T-Lympho- cytes	of absolute from T-lympho- cytes	% B- lymphocytes	of absolute from % I-lipids	After 14 days
1.	Exper-t	9.7	84	8148	15	122	6	489	
2.	Exper-t	8.2	64	5248	12	630	7	367	
3.	Exper-t	11.9	88	1047	15	157	7	733	
4.	Exper-t	10.8	78	8424	13	109	6	505	
5.	Exper-t	8.7	68	5916	14	828	8	473	
M±m		9.66±0.68	76.4±4.58	5756.±1328.5	13.8±0.58	369.2±150.4	6.8±0.37	513.4±59.9	
1.	Control	7.7	83	6391	9	575	13	831	
2.	Control	6.9	80	5520	30	166	35	193	
3.	Control	7.1	81	5751	26	149	28	161	
4.	Control	6.5	78	5070	15	760	18	913	
5.	Control	6.8	86	5440	21	114	19	103	
M±m		7±0.2	81.6±1.36	5634.4±218.6	20.2±3.76	362.8±132	22.6±3.93	440.2±177.3	
1.	Exper-t	-	-	-	-	-	-	-	After 30 days
2.	Exper-t	8.0	70	5600	11	616	10	560	
3.	Exper-t	-	-	-	-	-	-	-	
4.	Exper-t	7.9	75	5925	10	592	12	711	
5.	Exper-t	8.2	78	6396	11	703	10	640	
M±m		8.03±0.07	74.3±1.81	5974±179	10.7±0.26	637±26.1	10.7±0.51	637±33.8	
1.	Control	6.0	80	4800	10	480	11	528	
2.	Control	4.8	64	3072	16	491	11	338	
3.	Control	5.7	78	4446	11	489	10	445	
4.	Control	5.2	69	3588	12	430	12	430	
5.	Control	6.3	73	4599	15	689	9	414	
M±m		5.6±0.24	72.8±2.92	4101±329.9	12.8±1.17	515.8±44.7	10.6±0.51	431±30.4	

Eimeria and strongylates, being immunosuppressants, affect the immune system. There is a decrease in immunological activity, the consequence of which is the appearance of secondary immunodeficiency in sick lambs. On the 30th day of infection with eimeriosis-strongylatous invasion, the following result was obtained: after infection of lambs with suspension in the experimental group, lambs No. 1 and No. 3 die from the acute form of eimeriosis-strongylatous invasion. In a sample taken from feces, the number of eimeria oocysts and eggs is over 250 per microscopic field. In the remaining lambs of the control group spontaneously infected, immunological blood parameters showed the following, leukocyte index $83.03 \times 10^9 \pm 0.07$, lymphocyte index $74.3 \pm 1.81\%$, absolute lymphocyte count $5974 \pm 179\%$, absol. of T-lymphocytes $10.7 \pm 0.26\%$, absol. of % T-lymph. $637 \pm 26.1\%$, the indicator of B-lymphocytes is $10.7 \pm 0.51\%$, the index is absolute. of % I-lymphocytes $637 \pm 93.8\%$. In the control group, the leukocyte count was $5.6 \times 10^9 \pm 0.24$, the lymphocyte count was $72.8 \pm 2.92\%$, the absolute number of lymphocytes was $4101 \pm 329.9\%$, the absol index. from T-lymphocytes $12.8 \pm 1.157\%$, absol. from % T-lymph. $515.8 \pm 44.7\%$, B-lymphocyte index $10.6 \pm 0.51\%$, absol index. of % I-lymphocytes $431 \pm 30.4\%$. In the sample taken from their feces, the number of oocysts of eimeria and eggs of strongylates from 80 to 100, the leukocyte index $83.03 \times 10^9 \pm 0.07$, the lymphocyte index $74.3 \pm 1.81\%$, the absolute number of lymphocytes $5974 \pm 179\%$, the absol index. of T-lymphocytes $10.7 \pm 0.26\%$, absol. from % T-lymph. $637 \pm 26.1\%$, B-lymphocyte index $10.7 \pm 0.51\%$, absol index. of % I-lymphocytes $637 \pm 93.8\%$. In the control group, the leukocyte count was $5.6 \times 10^9 \pm 0.24$, the lymphocyte count was 72.8 ± 2.92 , the absolute lymphocyte count was $4101 \pm 329.9\%$, the absol index. from T-lymphocytes $12.8 \pm 1.157\%$, absol. from % of T-lymph. $515.8 \pm 44.7\%$, the index of B-lymphocytes is $10.6 \pm 0.51\%$, the indicator is absol. of % I-lymphocytes $431 \pm 30.4\%$.

Conclusion. Immunological research has shown immunological shifts, such as a decrease in the absolute number of lymphocytes, stimulation of the T-cell link and suppression of the B-immune system.

An increase in temperature and the presence of moisture accelerate the process of sporogony of eimeria, ensuring the invasion of lambs by them.

The results of the research showed a high degree of spread of acute strongylatous invasion among sheep in Pavlodar region. The primary source of eimeriosis-strongylatosis infestation is infected and previously infected sheep, which contaminate the environment with their feces. The number of oocysts and eggs of strongylates depends on the degree of infection by feces and conditions for sporulation of oocysts and the development of invasive larvae.

Oocysts were found in samples from feeders, litter from pens, and feed residues on the soil. The results confirming them as the main sources of infection of sheep with eimeria are given.

In sheep farms of various forms of ownership in Pavlodar region, eimeriosis-strongylatous invasion was noted at different times of the year, but the highest degree of infection was noted in the spring and summer period

In order to identify effective drugs for the complex therapy and prevention of eimeria-bunostomous and eimeria-trichostrongylosis invasion, various antiemeria drugs in combination with anti-helminths have been tested.

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ТҮЙІН

Бұл мақалада авторлар Павлодар облысында ұсақ мал арасында эймериозды құрт инвазияларының таралуы бойынша өз зерттеулерінің нәтижелерін ұсынады.

Меншіктің әртүрлі нысандарындағы қой шаруашылықтарында авторлар көптеген қойларға эксперименттер жүргізді және өз зерттеулерінде ғылыми сенімді фактілерді алуға ықпал ететін клиникалық, биохимиялық және басқа әдістерді қолданды.

Мақалада авторлар Павлодар облысында қойлардың эймериозды-стронгилатозды, эймериозды-буностомозды және эймериозды-трихостронгилезді инвазиясының таралуының эпизоотологиясы туралы сипаттаған. Қойлардың эймериозды-буностомозды және эймериозды-

трихостронгилозды инвазиясының компоненттері анықталды. Осы аймақтағы қойлардың эймериозды-буностомозды және эймериозды-трихостронгилозды инвазиясының маусымдық және жас динамикасы зерттелді. Сирек кездесетін қой инфекциясының клиникалық ағымы мен патогенезі егжей-тегжейлі зерттелген. Павлодар облысында қойларды эймериотикалық стронгилят инвазиясымен эксперименттік және өздігінен жұқтырған кезде қан көрсеткіштеріне морфологиялық және биохимиялық, онымен қоса иммунобиологиялық зерттеулер жүргізілді.

Біздің мақсатымыз паразитоценоздың құрамдас бөлігі болып табылатын аймерия түрлерін, олардың Павлодар облысындағы қойлардың аймериялық-буностомиялық және аймериялық-трихостронгилездік инвазияларындағы морфологиялық ерекшеліктерін зерттеу болды. Зерттеу нәтижесінде біз паразитоценоздың эймериялық компоненттерінің 7 түрін анықтадық олар: *Eimeria arloingi*, *Eimeria parva*, *Eimeria cran-dallis*, *Eimeria ahsata*, *Eimeria intracata*, *Eimeria faurei*, *Eimeria ninakohlyakimovae*.

РЕЗЮМЕ

В данной статье авторы представляют результаты своих исследований по распространению эймериозных глистных инвазий среди мелкого рогатого скота в Павлодарской области.

В овцеводческих хозяйствах различных форм собственности авторы проводили эксперименты на большом количестве овец, а в своих исследованиях использовали клинические, биохимические и другие методы, которые способствовали получению научно достоверных фактов.

В статье описана эпизоотология распространения эймериозно-стронгилятозной, эймериозно-буностомозной и эймериозно-трихостронгилезной инвазии овец в Павлодарской области. Определены компоненты эймериозно-буностомозной и эймериозно-трихостронгилезной инвазии овец. Изучена сезонная и возрастная динамика эймериозно-буностомозной и эймериозно-трихостронгилезной инвазии овец в этом регионе. Подробно изучены клиническое течение и патогенез редкой стронгилятозной инвазии овец. Проведены морфологические, биохимические и иммунобиологические исследования показателей крови при экспериментальном и спонтанном заражении овец эймериотической стронгилятозной инвазией в Павлодарской области.

Нашей целью было изучение видов эймерий, являющихся компонентами паразитоценоза, их морфологических особенностей при эймерийно-буностомозной и эймерийно-трихостронгилезной инвазиях овец в Павлодарской области. В результате наших исследований мы выделили 7 видов эймерийных компонентов паразитоценоза: *Eimeria arloingi*, *Eimeria parva*, *Eimeria crandallis*, *Eimeria ahsata*, *Eimeria intracata*, *Eimeria faurei*, *Eimeria ninakohlyakimovae*.

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