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INFLUENCE OF DIFFERENT PARASITIC FACTORS ON HEMATOLOGICAL INDICATORS OF ANIMAL ORGANISMS

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Abstract:
This article studies the effects and consequences of parasites on the hematological mechanisms at different stages of invasion development in the bodies of black lambs infected with helminthosis.

Keywords. Hemoglobin indicator of Karakol lambs, EChT, preimaginal, postimaginal period, helminthosis, habertia, nematodirosis, marshallagiosis.

Relevance of the topic. It is known that "the pathogenic effect of helminths on the animal body is multifaceted and includes not only mechanical, toxic, but also immunopathological effects. When infected with helminths, the immunity decreases and susceptibility to infectious diseases increases, as well as infectious and other diseases will increase" Morphological and biochemical blood tests are of great diagnostic value in the study of the pathogenesis of any disease [2,3]. Therefore, according to the results of morphological and biochemical indicators of blood, it is necessary to determine the functional activity of the body systems of a sick animal possible.

Research materials and methods. The experiments were carried out on Karakol lambs of the "Qarnab" factory type. All lambs used in the experiment were kept in healthy conditions, free from natural helminths and other infectious and non-infectious diseases. 20 Karakol lambs aged 3-4 months were selected for experimental marshallagiosis and nematodirosis and habertiosis studies, and divided into groups.

Group 1: The 5 head of lambs were infected with marshallagia invasion larvae, using 5000 larvae samples for each organism;

Group 2: The 5 head of lambs were infected with nematodirosis invasion larvae (5000 samples per head of sheep).

Group 3: 5 individuals infected with 2-4 habertiosis larvae (5000 samples per head of sheep).

Group 4: 5 were not affected and served as the control group.

In all experimental animals, blood was taken from the jugular vein in the morning before feeding for 70-75 days of observation. Hematological indicators are the amount of blood-forming elements (blood cells), hemoglobin index, hematocrit coefficient - on an automatic hematological analyzer (Mendray BC-5000b Chinese GOST-20790-93), erythrocyte sedimentation rate (EChT) by the Panchenkov-Nevidov method was determined.

Research results

The analysis of the obtained results shows that the number of erythrocytes and the amount of hemoglobin decreased in lambs with experimental marshallagiosis and nematodirosis in the first days of invasion. Their lowest level in the blood was recorded on the 10th day of invasion, that is, at the histotrophic stage of parasite development. Later, their recovery was slow and only on days 45-60 of the invasion period reached the level of the initial and control animals. (Table 1).

Table 1 Blood picture in Karakul lambs with experimental marshallagiasis (n=5)

Research time		Before infection	days				
			5th	10th	20th	45th	70th
Mathematical parameters							
red blood cells,	Experience.	8.9±0.5	6.49±0.39	4.25±0.5	6.44±0.12	11.2±0.6	10.72±1.1
million/mm3	Control	8.7±0.5	8.8±0.4	8.9±0.5	8.9±0.5	8.8±0.5	9.0±0.6
Hemoglobin,%	Experience.	9.02±0.42	6.92±0.09	5.14±0.11	6.90±0.3	8.10±1.0	8.4±1.2
	Control	8.9±0.7	9.6±0.6	8.7±0.6	9.0±0.6	8.7±0.5	9.1±0.5
ROE, mm/day	Experience.	8.8±0.75	20.4±1.68	21.25±1.5	32.0±1.5	8.50±0.7	10.5±0.4
	Control	9.0±0.8	9.7±0.65	8.95±0.7	9.4±0.7	9.0±0.7	9.1±0.3
Leukocytes thousand/ml3	Experience.	8.65±0.55	9.25±0.52	10.14±0.85	12.2±1.53	12.0±1.1	13.7±1.1
	Control	9.0±0.4	9.6±0.5	8.9±0.4	9.1±0.5	9.3±0.7	9.1±0.5

leukoformula	neutrophils	M,%	-	-	-	-	-	-
		YU,%	1.4±0.05	1.0±0.09	1.0±0.13	1.5±0.04	1.0±0.1	1.0±0.1
		P,%	2.8±0.18	3.5±0.17	4.8±0.17	5.0±0.29	4.0±0.1	3.5±0.27
		WITH,%	39.6±1.24	40.4±1.6	39.2±1.9	40.5±2.7	38.0±1.41	40.5±1.27
	Eosinophils,%		2.6±0.12	4.0±0.28	3.1±0.15	2.7±0.09	3.0±0.17	3.0±0.4
	Monocytes,%		3.2±015	3.1±0.1	3.4±0.13	3.4±0.13	3.5±0.15	3.0±0.3

Erythrocyte sedimentation rate (EChT) increased continuously during the preimaginal development of parasites in lambs infected with marshallagiosis, reaching a maximum level on the 20th day of infestation (32.0 mm/h) and then slowing down again during the imaginal development, approaching the initial level. This change of ECT is due to a decrease in the number of red blood cells in the early stages of invasion and an increase again by the end of the observation. From the results obtained during the experiment, it can be seen that after entering the body, invasive larvae of marshallages jump and enter the wall of the udder, the integrity of the mucous membrane of the udder is broken, opening the door for microorganisms (Table 1).

The products of Marshallagia larvae and the infectious microflora entering through the "gate" opened by them enter the blood and cause intoxication and allergic reactions. This situation leads to a decrease in the number of leukocytes killed in the fight against helminths, microorganisms and antigens in the first days of invasion, and later, due to the excitability of the reticuloendothelial system, leukocytosis, i.e., the number of neutrophils with rods in the blood increases. Underlying the anemia observed in marshallagiosis and nematodirosis is a pathological condition in the digestive tract, mainly in the rennet and small intestine (Table 2). Poorly digested food, in turn, causes inflammation of the small intestine and disrupts the absorption of nutrients from the intestine into the blood. This condition, in turn, affects the exchange of proteins and mineral substances, causing the dysfunction of hematopoietic organs, that is, the lack of components considered necessary for the synthesis of hemoglobin in the body, which slows down its synthesis. In sick animals, parasites are especially manifested in the preimaginal stage of development; clinical signs such as shortness of breath, panting, general weakness, thirst, diarrhea, anemia of mucous membranes indicate deep pathological changes in the body of invasive animals, i.e. weakening of protective functions of blood elements.

Table 2 Blood picture in Karakul lambs with experimental nematodirosis (n=5)

Research time			Before infection	days				
				5th	10th	20th	45th	70th
Mathematical parameters								
red blood cells,		Experience.	8.79±0.7	5.88±0.28	5.62±0.68	6.87±0.1	9.38±1.1	10.0±0.77
million/mm3		Control	8.7±0.5	8.8±0.4	8.9±0.6	8.9±0.5	8.8±0.5	9.0±0.6
Hemoglobin,%		Experience.	9.03±0.26	6.73±0.04	7.72±0.09	7.6±0.11	8.50±0.1	8.7±0.14
		Control	8.9±0.7	9.6±0.6	8.7±0.6	9.0±0.6	8.7±0.5	9.1±0.5
ROE, mm/day		Experience.	9.55±1.17	12.0±41	29.0±1.24	28.6±1.60	10.5±1.30	10.34±0.87
		Control	9.0±0.8	9.7±0.65	8.95±0.7	9.4±0.7	9.0±0.7	9.1±0.5
Leukocytes thousand/ml3		Experience.	9.41±0.77	9.0±0.8	11.2±0.46	11.4±1.0	11.7±0.6	10.1±0.3
		Control	9.0±0.4	9.6±0.5	8.9±0.4	9.1±0.5	9.3±0.7	9.1±0.5
leukoformula	neutrophils	M,%	-	-	-	-	-	-
		YU,%	1.0±0.05	1.0±0.1	1.5±0.12	1.7±0.3	101±0.07	1.2±0.1
		P,%	2.7±0.17	3.8±0.17	4.1±0.2	6.0±0.3	3.9±0.12	3.4±0.2
		WITH,%	40.9±2.0	41.3±1.7	40.0±1.7	10.3±1.4	39.0±1.2	39.0±1.24
	Eosinophils,%		2.7±0.2	4.5±0.3	4.1±0.15	3.8±0.3	3.1±0.18	3.0±0.17
	Monocytes,%		3.2±0.1	3.4±0.12	3.0±0.13	3.0±0.1	3.1±0.12	3.7±0.2
	Basophils,%		0.8±0.01	1.0±0.04	1.3±0.05	1.2±0.03	0.8±0.03	0.87±0.07
	Lymphocytes,%		48.7±1.7	45.0±2.0	46.1±1.8	44.0±1.9	49.0±2.0	49.0±1.9

In experimental habertiosis, the symptoms of acute anemia developed due to a sharp decrease in the amount of erythrocytes and hemoglobin and damage to intestinal capillary blood vessels by habertia larvae, bloody stools were released. It is peculiar that such changes in the blood of lambs infected with khabertiosis coincide with the beginning of the imaginal period of helminths, not on the 10-15th day of infection, but on the 25th day.

In khabertiosis, EC was accelerated from the first days of invasion, but, unlike marshallagiosis and nematodirosis, the deceleration was weak and did not reach the initial and control levels until the end of invasion. This process is associated with a significant decrease in the amount of red blood cells and hemoglobin in the blood compared to the initial level in the imaginal stage of the development of Habertia. In addition, the amount of leukocytes, which provide the protective function of the blood, also increased sharply on the first day of the invasion. Mainly, due to the increase in the number of rod-shaped neutrophils, leukocytosis was evident on the 15th day of invasion damage (19.53±0.33), and a gradual decrease was observed from the 50th day of invasion.

Table 3 Blood picture in Karakul lambs with experimental habertiosis (n=5)

Research time			Before infection	days				
				5th	10th	25th	40th	70th
Red blood cells, million/mm3		Experience.	10.11±0.77	6.8±0.18	9.36±0.49	4.87±0.26	7.38±0.46	8.16±0.34
		Control	10.0±0.7	10.9±0.7	11.0±0.6	9.9±0.5	10.3±0.57	10.4±0.6
Hemoglobin,%		Experience.	11.21±0.38	9.2±0.26	9.25±0.3	6.81±0.24	9.1±0.21	9.0±0.43
		Control	11.1±0.4	10.9±0.47	10.8±0.51	10.7±0.6	10.3±0.54	10.9±0.8
ROE, mm/day		Experience.	12.9±0.7	26.6±1.3	22.1±0.9	19.5±0.84	30.9±1.75	20.0±0.9
		Control	12.0±0.3	12.0±0.9	11.9±0.8	12.9±0.7	12.4±0.6	12.4±0.9
Leukocytes thousand/ml3		Experience.	8.9±0.39	13.95±0.63	14.85±0.6	14.15±0.86	14.85±0.6	8.95±0.38
		Control	9.0±0.4	9.3±0.5	9.0±0.41	9.1±0.42	9.0±0.4	9.4±0.45
leukoformula	neutrophils	M,%	-		-	-		-
		YU,%	-	0.6±0.01	0.7±0.01	0.2±0.01	0.1±0.01	
		P,%	3.0±0.13	6.3±0.1	5.0±0.2	4.0±0.2	3.6±0.2	3.3±0.2
		WITH,%	43.9±1.4	40.3±1.36	44.1±1.41	37.4±1.09	41.0±1.3	40.1±2.4
	Eosinophils,%		3.1±0.17	2.3±0.07	4.0±0.1	1.8±0.1	2.5±0.14	3.7±0.2
	Monocytes,%		3.9±0.21	3.6±0.1	2.1±0.08	3.3±0.17	3.5±0.2	3.0±0.2
	Basophils,%		0.3±0.01	0.3±0.02	0.2±0.01	0.1±0.01	0.1±0.01	0.9±0.01
	Lymphocytes,%		49.9±1.78	46.9±1.9	43.9±2.0	53.5±3.1	48.7±2.7	49.0±2.6
	Basophils,%		0.8±0.01	1.0±0.05	1.5±0.02	0.9±0.03	0.7±0.01	1.0±0.07
	Lymphocytes,%		49.6±1.9	47.0±1.07	47.00±1.78	46.0±1.83	49.8±1.91	48.0±1.81

This situation can be explained by the fact that the intestines, especially in the large intestine, are rich in various representatives of the microorganism flora that develop local and general inflammatory processes, and due to the strengthening of the body's protective reactions against them, the phagocytic activity of the blood increases.

In general, after analyzing the obtained results, we can conclude that marshallagiosis, nematodirosis and habertiosis in Karakol sheep are specific clinical signs, pathological and anatomical changes, as well as physico-chemical and blood physico-chemical and are helminthic diseases characterized by corresponding changes in morphological indicators.

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