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CHANGES IN HEMATOLOGICAL AND BIOCHEMICAL BLOOD PARAMETERS OF CALVES WITH PNEUMOENTERITIS

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Abstract

The article summarizes the results of studying the hematological parameters of mother cows, their housing and feeding conditions, and identified predisposing factors for infectious gastrointestinal and respiratory diseases in calves.

It has been established that the content of carotene and total protein, including gammaglobulins, decreases in the blood of mother cows during pregnancy. With the physiological norm of carotene in winter ranging from 4 to 7 g% in the blood of the cows we studied, this figure was 1.3 ± 0.06 g%, and in some animals it was less than 0.5 g%, which indicates the cause of diarrhea in newborns calves with vitamin deficiency and immunodeficiency state of the body.

In calves with pneumoenteritis, the intensity of phagocytosis decreases, and there is a tendency to decrease IgG and bactericidal activity of blood serum.

Keywords

blood, hematological and biochemical studies, erythrocytes, leukocytes, hemoglobin, total protein, Ig G.

Introduction.

Blood tests are the most accurate way to diagnose problems related to animal health, as well as a necessary condition for the prevention of possible diseases. Under the influence of external and internal influences, blood is able to change its composition, which helps to see an objective picture of the animal's health, make a correct diagnosis and draw up the most correct plan for combating the disease.

There are many types of laboratory tests of blood, consisting of plasma and formed elements suspended in it. Pathological processes occurring in the body cause sudden changes in all indicators. Quite often, specialists resort to a series of

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studies to monitor the dynamics of the disease, as well as evaluate the effectiveness of the chosen therapy.

Literature analysis and methodology.

To monitor the physiological state of animal health, blood was taken from pregnant cows for hematological and biochemical studies. The number of erythrocytes and leukocytes in the blood was determined in the Goryaev chamber, the hemoglobin content was determined according to Sali, and the total protein content in the blood serum was determined by the refractometric method.

When studying the hematological parameters of mother cows, their housing and feeding conditions, predisposing factors for infectious gastrointestinal and respiratory diseases in calves were identified.

It has been established that the content of carotene and total protein, including gammaglobulins, decreases in the blood of mother cows during pregnancy. With the physiological norm of carotene in winter ranging from 4 to 7 g% in the blood of the cows we studied, this figure was 1.3 ± 0.06 g%, and in some animals it was less than 0.5 g%, which indicates the cause of diarrhea in newborns calves with vitamin deficiency and immunodeficiency state of the body.

In calves with pneumoenteritis, the intensity of phagocytosis decreases, and there is a tendency for IgG and bactericidal activity of blood serum to decrease (Table 1).

Table 1

Immunological parameters of healthy and sick calves with pneumoenteritis (M±m)

	Group of animals	
	healthy (n=120)	**sick (n=122)**
Lysozyme, %	20,7±1,3	21,4±1,7
BAC, %	23,4±1,2	22,5±1,7
Ig G, g/l	13,1±0,7	12,3±0,8
Phagocytic index	6,7±0,4	5,1±0,3

When determining hematological parameters in black-and-white calves (n=120), it was revealed that the number of blood elements in healthy and sick animals was almost the same. There was a tendency for a slight increase in the number of erythrocytes in sick calves and a slowdown in ESR, which was determined by dehydration of the body.

In calves with an acute course of the disease (group 1, n=63), pronounced symptoms of diarrhea (began on the 1st – 2nd day after birth, accompanied by

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elevated temperature at the beginning of the disease, profuse diarrhea, cough) and pneumonia were observed. The animals experienced a sharp decrease in body weight, dehydration, and increased breathing. On days 4–5, the number of formed elements in the blood, the concentration of hemoglobin, the content of total protein and glucose increased by 20.6 and 16.2%, respectively (erythrocytes and leukocytes); 3,6; 10,5 и 18,4% (P<0,05) (table 2).

Table 2

Clinical and hematological parameters in calves with acute pneumoenteritis (M±m)

	Observation period, days		
	1 – 2-e	**4 – 5-e**	**10 – 15-e**
Red blood cells, 10^{12}/l	8,8±0,6	10,6±0,9	5,4±0,3
Leukocytes, 10^9/l	11,7±0,9	13,6±1,1	9,3±0,5
Hemoglobin, g/l	137±8,7	142±9	106±7
Glucose, g/l	5,7±0,3	6,3±0,4	6,0±0,3
Total protein, g/l	92±6	109±6	84±3
Average daily weight gain, g	108,0±6,9	100,0±10,0	150,0±11,1

In some animals, on days 4–7, cyanosis of the mucous membranes developed, a decrease in body temperature, a weakening of the pulse, and a decrease in the respiratory rate occurred; 6 calves in the group died and 2 animals were forced to be killed. Disruption of enzematic and absorption processes in the gastrointestinal tract was accompanied by a decrease in glucose concentration.

During the autopsy of dead and forcedly killed calves, catarrhal and catarrhal-hemorrhagic gastroenteritis, pneumonia, uneven staining of the liver, a slight reaction from the lymph nodes, and dehydration were observed.

Bacteriological examination of the pathological material identified enterotoxic serotypes E. coli, S. dublin, P. multocida and Pr. vulgaris. During the subacute course of the disease in calves (group 2, n=32), signs of gastroenteritis and pneumonia, as in animals of group 1, appeared on the 1st – 2nd day after birth, but their intensity was much less pronounced. No increase in body temperature was observed; pulse and respiration rates changed unreliably. The number of hemoglobin, leukocytes and erythrocytes in calves of this group did not increase as

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significantly as in group 1 (Table 3). On the 4th – 5th days of observation, the content of hemoglobin was 13.74%, leukocytes by 10.11, erythrocytes by 15.28% higher than in the previous observation period. On days 10–12, the number of erythrocytes, hemoglobin and leukocytes decreased by 27.69, respectively; 13.28 and 21.92%.

Table 3

Clinical and hematological parameters in calves with subacute pneumoenteritis (M±m)

	Observation period, days		
	1 – 2	**4 – 5**	**10 – 15**
Red blood cells, 10^{12}/l	7,2±0,6	8,3±0,7	6,5±0,2
Leukocytes, 10^{9}/l	8,0±0,9	8,9±0,9	7,3±0,4
Hemoglobin, g/l	113±11	128±9	111±7
Glucose, g/l	6,0±0,3	7,0±0,5	6,0±0,5
Total protein, g/l	58±4	69±6	60±6
Average daily weight gain, g	108,0±6,9	100,0 ±10,0	150,0±11,1

The content of total protein and glucose in animals on the 5th day increased by 18.96 and 16.66%, respectively, and on the 12th day it decreased by 13.04 and 14.29%. Signs of dehydration in calves of the 2nd group were weak; all animals survived.

During the autopsy of animals killed for diagnostic purposes (n=2), catarrhal and mucocatarrhal gastroenteritis were noted; the liver is unevenly colored. Bacterial and viral pathogens were not identified.

In calves with a subclinical course of the disease (group 3, n=27), signs of gastroenteritis and pneumonia appeared on the 10th day after birth: diarrhea, as well as nasal discharge and cough, sometimes intensifying, persisted for 15–20 days, profuse No diarrhea was noted. The average daily weight gain did not exceed 140.0 – 145.0 g.

Conclusion.

Thus, as a result of our research, it was established that the incidence of pneumoenteritis in calves depended to the greatest extent on the sanitary and zoohygienic conditions of keeping animals, their feeding, and natural resistance, which determine the level of protective functions of the body of young cattle against pathogens.

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