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CHANGES OF BLOOD LEUKOGRAMS IN TRANSPORT STRESS-FACTOR OF HORSES

Abstract

The work is based on the evaluation of the influence of transport stress on hematological parameters of horses. During transportation, changing the conditions of keeping and feeding, the regime of the day, changing the environment, noise, climate and physical loads can serve as stress factors, which subsequently drastically changes the hematological parameters of the horses blood. The stress factor can easily be determined with the help of a leukogram of horses.

***Key words:** blood leukogram under stress, stress factor in horse breeding, seasonal stress in horses.*

Introduction. The need for transportation of farm animals occurs mainly in commercial agriculture and, to a lesser extent, in the home. These animals must be moved for a number of reasons, including selling, slaughtering, transferring from arid areas to green pastures or changing owner. Typically, the methods used to move animals are the distillation, by road, rail, water and air.

Historically, cattle were moved by gon, but with the growth of urbanization of the population and the commercialization of livestock, the transhumance of livestock by road and rail exceeded it.

In the modern specialized veterinary system, most animals raised for food production are transported to different places on the basis of their breeding or fattening. At a minimum, animals are transported from the farm to the slaughterhouse, and many of them are subjected to additional stress when selling live weight.

Even in the most controlled conditions in the meat-breeding industry, transport is a stress factor. Farm animals are deprived of food, water and other conditions during transportation. For farms in which all the necessary conditions for transportation of horses are not fulfilled, such stress factors can arise when animals can not rest and are able to trample or fight with each other in search of space. The risk of injury is particularly high during loading and unloading, when electric propulsion and other methods of abuse are often used to move aggressive and disoriented animals. A serious problem is also the trucks waiting for the queue for unloading. Animals in trucks that linger in queues or get stuck in traffic, especially on asphalt in hot weather, are extremely tense and as a result, a fatal outcome can occur.

Transport of livestock is undoubtedly the most stressful and stressful stage in the chain of operations between farms and slaughterhouses and contributes significantly to the negative state of animals and the loss of production.

The problem of stress has now acquired one of the primary values. According to the concept of one of the domestic scientists, the stress reaction, formed in the course of evolution, is the most important link in adapting the organism to environmental factors [1]. Such adaptation becomes possible with the development of adequate metabolic and morphofunctional changes in response to stress, leading to an increase in nonspecific and specific resistance of the organism, i.e. to its adaptation [2].

In case of excessive intensive or inadequate long-term effects, the stress response can be a source of tissue and organ damage [3]. At present, the role of stress as the main etiologic factor in the development of many diseases has been proved.

Nonspecific reactions characteristic of all types of stress are mainly the reactivity of the hypothalamic-pituitary-adrenocortical system and autonomic functions, in particular the cardiovascular system and hematopoiesis [4,5].

The native scientist defined "stress" as a nonspecific reaction of an organism that develops under the influence of various causative factors. All exogenous and endogenous factors that create heightened demands on the body are called stressors. Despite their diversity, the body responds to a

stereotyped form of biochemical functional and structural changes, adaptation to new situations [6,7,8]. It was also found that when the stressors (physical activity, any poison, anxiety or conflict) are affected, the body responds with nonspecific defense reactions: the pulse is increased, blood pressure rises, and the content of hormones, corticosteroids, increases in the blood [9].

Identification of patterns of stress development and adaptive abilities of the animal organism is one of the urgent problems in veterinary medicine. In this connection, the search for methods of stress diagnostics that simultaneously meet the requirements of efficiency, reliability and simplicity acquires special importance.

Physicochemical properties of blood reflect the state of the whole organism as a whole, since they have a strong connection with its various functions [10].

Activation of the adrenal cortex as the center of stress reactions is accompanied by numerous changes in the composition of the blood. By many scientists, these changes were perceived as criteria (leukocytes, eosinophils, lymphocytes, blood sugar, blood viscosity) assessing the stress state of animals, which make it possible to identify the stressful effect on their organism of various factors, including stress during transport, and determine the intensity and duration of stress. When stress is identified by the evaluation of these criteria based on an intense and constant reactive response, the first place is occupied by eosinophilic and neutrophilic leukocytes. Leukocyte indices, based on the determination of the ratio of white blood cells in the leukocyte formula, open the possibility of conducting operational diagnostics [11].

The stress state is characterized by depression of the general state, changes in behavioral reactions, increased GSS, HD and maximum blood pressure, as well as changes in hematological parameters (increase in hematocrit, erythrocyte, leukocyte, hemoglobin, eosino- and lymphocytopenia, neutrophilia with a shift of the nucleus to the left, decrease in the ratio of lymphocytes to segmented neutrophils) [12].

Objects of research. The animals were studied from the "Sabit" farm in the village of Alabas to study the stress factor. An experimental group of 15 horses was created.

Materials and methods of research. First of all, we investigated the etiology of the stress factor.

Proceeding from the reason, the stresses are climatic, technological: rank, transport, fodder, weeding foals, vaccination, the process of animal boning, experimental, etc.

It is well known that clinical manifestations of stress are defined as an adaptation syndrome, which includes 3 stages: anxiety (mobilization, stimulation), resistance (adaptation), and exhaustion.

In a stressful reaction as a result of the effect of the action of glucocorticoids in blood in stressful animals, the lymphocytes, monocytes, basophils and eosinophils significantly decrease because of the transition to tissues (bone marrow, lymph nodes) in the destruction of lymphoid tissue. At the same time, the number of neutrophils in the blood increases due to their release from the bone marrow, as well as the number of erythrocytes due to stimulation of erythropoiesis.

Proceeding from this (cause-effect relationship), there are different methods for determining the types of stress reactivity: by the concentration in the blood of insulin, ascorbic acid in the adrenal glands and corticosteroids, incl. glucocorticoids; the load of halothane; physical and emotional stress; changes in the activity of transferases, creatine kinase, lactate dehydrogenase; reaction of the body to intradermal injection of turpentine. The most simple and affordable test of the onset of a stress reaction is an eosinophilic test, stress is accompanied by eosinopenia.

Revealing of stressful reactions allows to take necessary measures for elimination and reduction of negative consequences caused by stresses.

Seasonal studies of leucograms of Kushumian horses were carried out by the period method.

The onset of the stress response was assessed by the eosinophilic test according to the method of IS. Piralishvili (1962).

Table 1 shows that hematological parameters vary with the season. This is evidenced by the fact that the stress factor in the fall has a greater impact on the body.

Table 1 – Seasonal leukogram of horses blood (M ± m) n = 15

Indicators	Seasons	
	autumn	winter

Leucocytes 109/л	6,82±0,79	6,64±1,21
Basophils109/л	0,008±0,001	0,009±0,002
Eosinophils109/л	0,049±0,004*	0,021±0,003*
Neutrophils109/л	4,95±0,11	5,02±0,96
Lymphocytes109/л	1,24±0,55	1,02±0,01
Monocytes 109/л	0,60±0,03	0,58±0,07

* P<0,05

For transportation to other regions and the city of KR horses have to overcome huge distances.

To reliably determine the stress factors of the technological period with the eosinophilic test, summer data of the leukogram (background) were taken for control so that there would be no distortion of climatic (cold) stress.

The results of the research and their discussion. Analyzing Table 1, we see that in the autumn there is a sharp decrease in the number of eosinophils to $0.049 \pm 0.003 \cdot 10^9 / l$, which is 46.7% less than summer indices.

With further decrease in temperature, eosinopenia continues, reaching the minimum values in winter to $0.021 \pm 0.003 \cdot 10^9 / l$, which is 76.67% less than summer data.

Thus, horses experience climatic (cold) stress.

Analyzing Table 2, we found out that the leukocytes, as a percentage of the background and transportation, changed by 9.3%, basophils by 55.5%, eosinophils by 47.1%, neutrophils by -5.37%, lymphocytes changed by 49, 75% and monocytes by 5.17%.

Thus, for horses in our conditions, transportation, changing the conditions of keeping and feeding, the regime of the day, changing the situation, noise (music, cries of the public) and physical stress are stressors.

Table 2 – Changing the blood leukogram of horses with a transport stress factor ($M \pm m$) $n = 15 (10^9 / l)$

Indicators, 109/л	Background	Technologicalperiod
		After 6 hours of transporting
Leukocytes	6,64±1,21	6,02±0,08
Basophils	0,009±0,002	0,004±0,001
Eosinophils	0,021±0,003*	0,011±0,005*
Neutrophils	5,02±0,96	5,29±0,089
Lymphocytes	1,02±0,01	2,01±0,511
Monocytes	0,58±0,07	0,55±0,07

*note – (P<0,05)

In addition to all kinds of stress, horses are also exposed to climatic stress.

Determination of stress factors for horses in moderately climatic zones allows us to make organizational and technological decisions and apply pharmacocorrection to reduce their negative impact.

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ТҮЙІН

Жұмыс жылқының гематологиялық көрсеткіштеріне көлік жағдайының әсерін бағалауға негізделді. Тасымалдау кезінде, сақтау және азықтандыру жағдайларын өзгерту, күн режимі, қоршаған ортаны өзгерту, шу, климат және физикалық жүктеме стресстік факторлар болып табылады, бұл жылқы қанының гематологиялық параметрлерін түбегейлі өзгертеді. Стресстік фактор жылқының лейкограмма көмегімен анықталуы мүмкін.

RESUME

Работа основывается на оценке влияния транспортного стресса на гематологические показатели лошадей. При транспортировке изменение условий содержания и кормления, режима дня, смена обстановки, шум, климат и физические нагрузки могут служить факторами стресса, что впоследствии кардинально меняет гематологические показатели крови лошадей. Стресс-фактор легко можно определить при помощи лейкограммы лошадей.