

RESULTS OF MONITORING OF MINERAL METABOLISM DISORDERS IN BOROUGH COWS

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Abstract

This article describes the causes, clinical, physiological, and hematological indicators of mineral metabolism disorders in 8-9-month-old Simmental cows in cattle farms, as well as an analysis of the condition of calves born from them.

Keywords: Cows, minerals, calcium, phosphorus, magnesium, potassium, hypodynamia, lizukha, bone dystrophy, alopecia, conjunctivitis, xerophthalmia.

Introduction

Relevance of the topic. The Resolution of the President of our Republic No. PQ 120 dated February 8, 2022 “On approval of the Program for the Development of the Livestock Sector and its Branches in the Republic of Uzbekistan for 2022-2026” sets out urgent tasks such as increasing productivity by importing breeds of livestock adapted to the climatic conditions of the republic from foreign countries, increasing their breeding, and improving the quality of their maintenance and care.

Veterinary measures carried out within the framework of these important tasks make a significant contribution to the further development of livestock farming. Various non-communicable diseases, including disorders of mineral metabolism in calves, remain major obstacles to increasing economic efficiency and animal productivity in cattle farms. As a result of this disease, calves fail to grow and are susceptible to diseases, which causes significant damage to the economy of farms. The abundance of such negative consequences makes it difficult to improve the herd structure causes. Therefore, the development and implementation

of effective solutions for early detection and prevention of mineral metabolism disorders in calves is one of the urgent issues of today.

The most frequently identified factor causing the increase in the number of deaths among calves is the lack of vitamins A and E and minerals in their bodies. Therefore, many researchers have emphasized the need to pay great attention to the balance of vitamins and minerals in the body of newborn calves at the normal level [1,3].

One of the most important factors affecting the development of mineral metabolism disorders in calves is the low quality and nutritional value of cow's milk, which does not fully satisfy the need for nutrients and minerals after the lactation period [7].

Newborn calves must obtain most of the vitamin A and minerals necessary for their body from cow's milk, since they have very limited serum levels of β -carotene and retinol are born with a low level of vitamin A and vitamin A [3]. After birth, calves receive vitamins and minerals from their mother's milk for ossification and other biochemical processes. If the diet of cows during lactation is deficient in vitamins A and D and minerals, the risk of hypovitaminosis A, rickets and micronutrient deficiencies increases in calves born from them. The calves are born hypotrophic and have passive immunity [4,5].

According to scientists, a decrease in the quality or quantity of cow's milk can lead to a decrease in the norm of vitamin A in the blood serum, in addition, it has been found that the delayed introduction of milk to calves reduces the amount of β -carotene and retinol in the blood plasma [2].

Most authors attribute the increase in metabolic disorders among calves to a decrease in immunity and increased general susceptibility [3]. To the author's knowledge According to the study, vitamin A deficiency leads to hyperplasia and branching of the skin and epithelium of the lacrimal glands, conjunctiva, respiratory tract, digestive system, and urinary system, as well as a decrease in the protective functions of the mucous membranes, metaplasia and dystrophy of the epithelium of the ovaries and testicles, atrophy of follicles, impaired spermiogenesis, hyperplasia and branching of the skin epithelium, and atrophy of the sweat and sebaceous glands [6].

The purpose and objectives of the study: To study the etiology, clinical signs, and biochemical parameters of mineral metabolism disorders in 8-9-month-old Simmental breed beef cows. To determine the clinical condition and body weight of calves born from them.

Analysis of the results obtained. In order to study the clinical signs and course of mineral metabolism disorders in cows, dispensary examinations were conducted on 175 8-9-month-old weaned cows at the “Khikmatov Bunyod” LLC located in the Bo'ston MFY, Parkent district, Tashkent region. Of these, 15 cows were selected as a reference group and laboratory examinations were conducted. 8-9-month-old cows on this farm are mainly tied up and kept in one place throughout the year. Therefore, the herd syndrome in cows was characterized by a high incidence of non-communicable diseases such as micronutrient deficiencies, chronic ketosis, secondary osteodystrophy, postpartum paralysis, retained placenta, and alimentary anemia.



The general condition of the cows examined during the dispensary examinations on the farm was satisfactory, their fatness was below average, and their appetite was reduced. In the winter and early spring months, 45-55% of the cows on the farm showed changes in appetite (lizukha), dryness of the skin and mucous membranes, decreased skin elasticity, increased skin roughness, decreased gloss and fragility, alopecia, conjunctivitis, xerophthalmia (dry eyes). These clinical signs are characteristic of micronutrient deficiencies and are associated with a lack of carotene in the diet. Signs of impaired mineral metabolism were observed in cows during the 8-9-month gestation period. Signs of calcium and phosphorus metabolism deficiency included movement of the incisors, resorption of the last caudal vertebrae, lordosis, rickets, and bone deformation in 40-45% of the cows during the gestation period. Signs of magnesium, cobalt, iodine, and zinc deficiency were observed in 50-60% of cows, including pale mucous membranes, wrinkling, dryness, and loss of elasticity of the skin, crusting and rashes on the skin, decreased gloss, roughness, and tearing of the skin. Signs of manganese deficiency were characterized by enlargement and deformation of the joints, as well as tongue protrusion and spiral twisting.

Table 1.**Characteristic clinical signs detected in cows (in %) (n=10)**

Indicators	Inspection time	
	8- month	9- month
Movement of incisors	40	45
Demineralization of the last caudal vertebrae	40	45
Pale mucous membranes (anemia)	50	60
Appetite changes	50	60
Enlargement of joints	40	45
Loss of skin luster	50	60
Decreased skin elasticity, dryness	50	60

Clinical examination of 8-9-month-old cows with bloat was characterized by signs of mineral metabolism disorders such as low-to-moderate obesity, changes in appetite (lizukha), hypotonia of the foregut, paleness of the mucous membranes, decreased skin elasticity and dryness, the appearance of folds, the formation of scabs and rashes on the skin, decreased gloss of the skin, roughness and tearing of the eyes, changes in the shape of the spine, enlargement and deformation of the joints, and tongue protrusion and spiral twisting, lameness, changes in the shape and incorrect growth of the hooves, movement of the incisors, demineralization of the last caudal vertebrae, deformation and softening of the bones.

During the scientific research, the body temperature of 8-9-month-old cows in the farms was within the physiological norms, and the number of heartbeats per minute in cows was on average 68.4 ± 4.4 times at 8 months of gestation, and 69.8 ± 4.8 times at 9 months. The number of breaths per minute in animals was on average 16.3 ± 0.4 times at 8 months of gestation. At 9 months of gestation, it was on average 19.4 ± 0.5 times (the norm is 12-25 times per minute).

The number of contractions of the anterior stomach sections in cows in 2 minutes at the beginning of the studies was on average 4.2 ± 0.2 and 3.8 ± 0.2 times at 8 and 9 months of gestation (the norm is 3-5 times per 2 minutes).

Table 2.

Clinical indicators of cows with mineral metabolism disorders (n=15)

Place and time of inspections		Body temperature, °C	Pulse rate, per minute	Number of breaths, per minute	Rumination, in 2 minutes
“Xikmatov Bunyod” MCHJ	8-month	37,0±0,06	68,4±4,4	16,3±0,4	4,2±0,2
	9-month	38,5±0,07	69,8±4,8	19,4±0,2	3,8±0,2

Hypotonia of the foreparts of the stomach in cows can be explained by their year-round confinement, contraction of the rumen wall due to the rapid development of the fetus, one-sided silage-concentrate feeding, low quality and nutritional value of feed, and unbalanced diet. Scientific sources report a decrease in the activity of rumen microflora and a decrease in the contractions of the foreparts of the stomach in cows with hypomicroelementosis due to a lack of such microelements as copper, cobalt, manganese, zinc, and iodine. (n=15). By the end of the forepart, the acceleration of the heart rate, the strengthening and splitting of the first tone indicate the development of myocardial dystrophy in the heart muscle. In connection with the end of the forepart, an acceleration of the respiratory rate was observed.

In order to diagnose mineral metabolism disorders in cows, blood samples are taken from cows, and morphobiochemical blood parameters indicate the level of metabolism in the body. In the case of mineral metabolism disorders in cows at the age of 8-9 months of gestation, biochemical changes in the blood are manifested much earlier than clinical symptoms. Therefore, morphobiochemical blood tests are important for the early diagnosis of these pathologies.

In order to study morphobiochemical changes in the blood in cows, blood samples were taken from 15 heads of cattle at “Khikmatov Bunyod” LLC on the basis of the principle of similar pairs. For hematological tests, blood samples were taken from cows at the age of 8-9 months of gestation and the parameters were analyzed.

The number of erythrocytes in the blood of cows during the 8th month of gestation was on average 5.02 ± 0.1 million/ μ l, the hemoglobin content was on average (normal 99-129 g/l) 98.2 ± 3.2 g/l, the glucose content was on average (normal 2.22-3.33 mmol/l) 2.18 ± 0.21 mmol/l, the total protein content was within the physiological norms (normal - 72-86 g/l), on average 87.3 ± 2.06 g/l, the alkaline reserve in the blood serum was on average 46.8 ± 2.1 vol% CO₂, and the activity of the alkaline phosphatase enzyme in the blood serum was on average 1.56 ± 0.32 μ mol.s/l.

The results of the tests showed that the number of erythrocytes in the blood of cows during the 9th month of gestation was on average 4.96 ± 0.2 million/ μ l, the hemoglobin content was on average (normal 99-129 g/l) 99.6 ± 1.2 g/l, the glucose content was on average (normal 2.22-3.33 mmol/l) 2.21 ± 0.18 mmol/l, the total protein content was within the physiological limits (normal 72-86 g/l), on average 88.2 ± 1.78 g/l, the alkaline reserve in the blood serum was on average 47.1 ± 2.4 vol% CO₂, and the alkaline phosphatase enzyme activity in the blood serum was on average 1.58 ± 0.24 μ mol.s/l. The increase in serum alkaline phosphatase activity during the last months of the disease can be explained by the increased absorption of calcium from the

bones into the blood (demineralization of bones). The literature also notes an increase in alkaline phosphatase activity in liver and bone diseases, namely osteomalacia.

Table 3**Morphobiochemical parameters of blood in cows. (n=15).**

Inspection time (month)	Erythrocytes, million/ μ l	Hemoglobin, g/l	Glucose, mmol/l	Total protein, g/l	Alkaline reserve, volume% CO ₂	Alkaline phosphatase activity, μ mol/l
8	5,02 \pm 0,1	98,2 \pm 3,2	2,18 \pm 0,21	87,3 \pm 2,06	46,8 \pm 2,1	1,56 \pm 0,32
9	4,96 \pm 0,2	99,6 \pm 1,2	2,21 \pm 0,18	88,2 \pm 2,10	47,1 \pm 2,4	1,58 \pm 0,24
P<	0,05	0,001	0,001	0,01	0,01	0,001

The decrease in hemoglobin levels in the blood compared to the norm (hypohemoglobinemia) in cows in farms where dispensary examinations were conducted after the end of the disease can be explained by the lack of microelements such as iron, copper, cobalt, which are involved in blood formation in cows, in the composition of the diet.

During the examinations, it was found that there were signs of microelementosis in the diseased cows. It is also known from the literature that calves born from sick cows characterized by such clinical signs were hypotrophic and developed dyspepsia and rickets B.M. Eshburiyev (2016). Conclusion: During the dispensary examinations, hematological examinations of cows at “Khikmatov Bunyod” LLC led to the conclusion that 175 8-9-month-old cows in the farm had mineral metabolism disorders, that is, 40% of 8-month-old cows, and 45% of 9-month-old cows had various degrees of mineral metabolism disorders. In the last months of lactation, the levels of hemoglobin, glucose, total protein, alkaline reserve, total calcium, inorganic phosphorus in the blood were reduced, and the activity of the alkaline phosphatase enzyme increased. As a result of this condition, hypotrophic calves are born from cows.

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