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Koreyba L.V., Suslova N.I., Makeyeva N.S., Golub A.A.

BIOCHENICAL BLOOD PROFILE OF PREGNANT COWS WITH OSTEODYSTROPHY

Dnipropetrovsk State Agrarian and Economic University, Dnipropetrovsk, Ukraine

Корейба Л.В., Суслова Н.И., Макеева Н.С., Голуб А.А.

БІОХІМІЧНИЙ ПРОФІЛЬ КРОВІ ХВОРИХ НА ОСТЕОДИСТРОФІЮ ВАГІТНИХ КОРІВ

Abstract: Researched the concentration of total protein, albumin, globulin, urea, creatinine, glucose, carotene, total calcium, inorganic phosphorus, total lipoproteins, the activity of aspartate and alanine aminotransferase, and alkaline phosphatase in blood plasma of the cows in "dry" period.

It was established that during the subclinical osteodystrophy the concentration of total calcium, inorganic phosphorus, carotene and glucose in blood plasma was reduced, evident high content of total lipoprotein and increased activity of aspartate and alanine aminotransferase, and alkaline phosphatase.

Key words: cows, "dry" period, blood plasma, biochemical indicators, osteodystrophy.

Анотація. Досліджено вміст у плазмі крові сухостійних корів загального білку, альбумінів, глобулінів, сечовини, креатиніну, глюкози, каротину, кальцію загального, фосфору неорганічного, загальних ліпопротеїдів, активність аспартат-і аланін амінотрансферази і лужної фосфатази.

Доведено, що за субклінічної остеодистрофії знижується концентрація у плазмі крові кальцію загального, фосфору неорганічного, каротину, глюкози, високий вміст загальних ліпопротеїдів та підвищується активність аспартат-і аланін амінотрансферази й лужної фосфатази.

Ключові слова: корови, сухостійний період, плазма крові, біохімічні показники, остеодистрофія.

Introduction: Osteodystrophy – is a chronic disease characterized by degenerative changes in the bone tissue due to the disturbed calcium, phosphorus and vitamin D-metabolism; damage to the nervous and muscular system, liver and other organs [1, 3–5].

Mass affection of highly productive animals by osteodystrophy causes great economic losses to animal husbandry due to death of animals, forced slaughter; reduce animal fatness and milk production, prolonged estrus cycle, barrenness, the extra cost for treatment of animals and culling non-viable calves [1–4].

Literature review: Metabolism processes are occurring more rapidly in cows with high milk production and that in certain circumstances leads to various diseases. The leading role in internal pathology of farm animals occupies diseases that are proceeding with deviations in metabolism, including mineral.

Subclinical osteodystrophy occurs relatively lightly, unnoticed and not accompanied by specific characteristics. Overall condition can be satisfactory, the average fatness is fatness satisfactory and even good. There may be a loss of appetite. With progression of the disease are reduced animal fatness; productivity; delayed

molting; there may appear licking and digestion problems mainly in the cows during the late pregnancy. Hypoproteinemia is detected in blood plasma, shift of acid-alkaline balance toward acidosis. It has been established that during the development of mineral deficiency in animals all the biochemical parameters are changing [1, 3].

Input data and methods: The aim of this work was to investigate the biochemical parameters of blood of cows suffering from osteodystrophy during the "dry" period.

Material and methods: Research conducted in conditions of Private-Corporation "Agro-Union" in Dnepropetrovsk region on 20 cows Holstein black-motley breed, with body weight 550 - 600 kg, and an annual milk production of 9000-9200 kg.

Development of osteodystrophy was studied on blood biochemical indicators of 20 animals 10 days before calving; blood was taken from the jugular vein in the morning before feeding.

The content in cow's blood plasma of total protein and its fractions, urea, creatinine, glucose, total calcium, inorganic phosphorus, carotene and total lipoprotein and the activity of aspartate- (AST) and alanine aminotransferase (ALT) and alkaline phosphatase was determined by common-accepted methods [2] and on the biochemical analyzer STATFAX 1904 PLUS at the physiology, biochemistry and chemical-toxicological analysis department of Research Centre for Biosafety and environmental control resources of agro industrial complex DSAEU.

Results. Discussion and Analysis: Biochemical parameters of cow's blood plasma were researched during late pregnancy (10 days before the expected calving).

The results of biochemical studies of blood plasma of cows during the "dry" period are presented in Table 1.

Table 1.

The biochemical composition of cows blood plasma, M ± m; n = 20

Indicators	The concentration in the blood 10 days before calving	Norm
Total protein, g / l	76,6±2,22	67 – 75
Albumin, g / l	42,8±1,18	30 – 35,5
Globulin g / l	33,8±1,71	30 – 35
The protein coefficient, units	1,32±0,13	0,5-0,8
Urea, mmol /L	4,9±0,43	2,8 – 5,8
Creatinine umol/L	112,4±7,39	88 – 177
AST, mmol/L	1,4±0,19	0,11 – 0,57
ALT, mmol/L	0,5±0,03	0,12 – 0,45
Alkaline phosphatase, U /L	158,7±16,70	Less than 80
Glucose, mmol/L	1,56±0,13	2,50 – 4,16
Total Calcium, mmol/L	1,54±0,04	2,43 – 3,10
Inorganic phosphorus, mmol/L	1,32±0,06	1,81 – 2,10
Ca: P, Units	1,15±0,07	1,2 – 1,6
Carotene, mcg%	101,4±13,0	375 – 965
General lipoprotein mg%	1377,46±89,8	250 – 550

Analysis of biochemical parameters of blood plasma of cows during the “dry” period showed (Table 1) that the most significant changes in relation to the norm are marked in indicators of total protein and albumin and therefore to the protein coefficient, activity of aspartate- (AST) and alanine aminotransferase (ALT), alkaline phosphatase, glucose, total calcium, inorganic phosphorus, carotene and total lipoproteins.

The rates of total protein and albumin tend to increase (76,6 ± 2,22 g / L and 42,8 ± 1,18 g / L, respectively) in cows 10 days before calving. Due to increase in indicators of total protein and albumin content the protein coefficient is also rises and makes 1,32 ± 0,13 units. Also increased the activity of AST (1,4 ± 0,19 mg, / L) and the number of total lipoprotein (1377,46 ± 89,8 mg%). The trend towards increasing of activity indicator for ALT, the total content of lipoproteins and albumin is typical for osteodystrophy and degenerative changes in the liver of cows [1, 3].

From the obtained results (Table 1) we can see that the glucose level was also low and amounted at 1,56 ± 0,13 mmol / L, which is typical for the osteodystrophy. Increase in concentrations of urea (4,9 ± 0,43 mmol / L), usually passes during the enhanced exchange of proteins due to the albumin fraction. Indicators of total calcium and inorganic phosphorus were also lower than normal and were 1,54 ± 0,04 mmol / L and 1,32 ± 0,06 mmol / L respectively. Calcium-phosphorus correlation herewith amounted to 1,15 ± 0,07 units. The lowest was the content of carotene (101,4 ± 13,0 mcg%).

Decrease in concentration of carotene in blood plasma of pregnant cows is a result of inadequate absorption of it from the intestine during the metabolism disorders, and also of insufficient its receipt in the composition of feed intake.

On the background of increased concentrations in blood plasma of protein and albumin, reduced glucose level can course the development of ketosis [3, 5].

Conclusion: In blood plasma of deeply pregnant cows affected by subclinical osteodystrophy the concentrations of total calcium, inorganic phosphorus, carotene, glucose is decreasing, but evident high content of total lipoprotein and increased activity of aspartate and alanine aminotransferase, and alkaline phosphatase.

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