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OSTEODYSTROPHY DURING: SPECIFICS OF IT AND SYMPTOMS IN COW

ОСТЕОДИСТРОФІЯ ВАГІТНИХ: ОСОБЛИВОСТІ ПЕРЕБІГУ ТА ПРОЯВУ У КОРІВ

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Annotation: *Established that the clinical signs of puerperal osteodystrophy were not typical and manifested in cows as restriction of mobility; appetite loss and distortion; licking; hypotension of proventriculus and weakening peristalsis, cautious in movements, painfulness of skeleton and joints, especially in the ribs area and tubular bones.*

Noted a change in acidy-alkaline balance towards acidosis; reducing level of total calcium and inorganic phosphorus and also calcium-phosphorus balance shift; reduce in the concentration of glucose; increased activity of alkaline phosphatase and urea nitrogen.

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

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, 5].

Osteodystrophy is recorded in almost all regions of the country. Most frequently affected highly productive cows aged 3 to 7 years through pregnancy or

during 1–1.5 months after calving and has nutritional, puerperal or enzootic etiology. Puerperal osteodystrophy develops during pregnancy because calcium and phosphorus spent on fetal growth and development [3].

Literature review: Mass osteodystrophy in high performance cows causing significant losses to the farmer's economy. During illness the milk productivity is sharply reduced. Decrease in milk yield during prolonged disease in a highly productive cows reaches 80-90% of the milk yield before the disease; in cows with an average capacity 27–86,7% and in low productive cows decrease is 55,6–78,6% [5, 7].

According to many researchers subclinical course of osteodystrophy recorded more often than published in the official statistics. Such differences in data related to the imperfection of the clinical diagnosis of the disease and understanding of the molecular mechanisms of pathogenesis [1, 2, 4, 6].

Therefore very important is the study of the pathogenesis and development of diagnostic tests aimed at the preclinical diagnosis of osteodystrophy, which will provide more effective therapeutic and preventive work.

Input data and methods: The aim of our study was to explore the specifics of manifestation and course of the disease of puerperal osteodystrophy at highly productive cows.

The diagnosis was based on anamnesis, clinical signs and biochemical studies of blood plasma.

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 BUN, Index de Ritisa (AST / ALT), Units, 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 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: Clinical signs of disease in calf cows were not typical and manifested in cows as restriction of mobility; appetite loss and distortion; licking; hypotension of proventriculus and weakening peristalsis. At the end of pregnancy noticed weakness of animal, caution in movements, painfulness of skeleton and joints, especially in the ribs area and tubular bones, during these time animals are more lying down and rise up with difficulties for them.

From biochemical parameters we have observed changes in acid-base balance towards acidosis; reduce of total calcium and inorganic phosphorus and calcium-phosphorus balance shift; reduced concentration of glucose; increased activity of alkaline phosphatase and urea nitrogen.

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.

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.

Table 1.

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

Indicators	The concentration in the blood 10 days before calving	Norm
BUN, mg%	9,32±0,5	8 – 14
Glucose, mmol. / L	1,64±0,11	2,50 – 4,16
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
Index de Ritisa (AST / ALT), Units	3,8±0,02	1,0–3,4
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

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.

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.

Conclusion:

1. Puerperal osteodystrophy in cows is manifested by restriction of mobility; appetite loss and distortion; licking; hypotension of proventriculus and weakening peristalsis, cautious in movements, painfulness of skeleton and joints, especially in the ribs area and tubular bones.

2. During puerperal osteodystrophy acid-base balance was changed towards acidosis; reduced levels of total calcium, phosphorus and inorganic glucose; increased activity of alkaline phosphatase and urea nitrogen.

Анотація: *Встановлено, що клінічні ознаки пуерперальної остеодистрофії були не характерними і проявлялися у корів обмеженням рухливості, збоченням та погіршенням апетиту, лизухою, гіпотонією передшлунків та послабленням перистальтики кишечника, обережністю в рухах, хворобливість кістяка і суглобів, особливо в області ребер і трубчастих кісток.*

Відзначали зміни кислотно-лужної рівноваги в бік ацидозу; зниження рівня кальцію загального та фосфору неорганічного, а також зрушення фосфорно-кальцієвого рівноваги; зниження концентрації глюкози; підвищення активності лужної фосфатази та азоту сечовини.

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

Literature:

1. Borisevich B.V. Etiology, pathogenesis and pathomorphism of osteodystrophy in cattle: Abstract of Dissertation . ... Doctor. vet. Sciences specials. 16.00.02 "Pathology, oncology and morphology of animals /B.V. Borisevich; K., 1999. – 35 p.

2. Veterinary Clinical Biochemistry // V.I. Levchenko, V.V. Vlizlo, I.P. Kondrahin etc .; edited by V.I. Levchenko and V.S. Halyasa. – White Church, 2002. – 400 p.

3. Demydyuk S.K. State of metabolism in cows suffering from nutritional osteodystrophy in western biogeochemical zone of Ukraine/ S.K. Demydyuk // Scientific Herald LNAVM named after S.Z. Gzhytsky. - 2005. - Vol 7, № 3 (26). Part 1 - P. 33-39.

4. Levchenko V.I. The clinical diagnosis of animal diseases / V.I. Levchenko, M.O. Sudakov, Y.YA. Melnyk – K .: Harvest, 1995. – 384 p.

5. Levchenko V.I. State of phosphorus-calcium metabolism in highly productive cows / V.I. Levchenko, A.S. Petrenko, A.U. Melnyk // Scientific Herald LNUVMBT named after S.Z .Gzhytsky. – 2009 – Vol 11, № 2 (41). Part 1. – S. 166 – 170.

6. Fedorovich V.L. Current areas of molecular diagnostics of osteodystrophy in cows /V.L. Fedorovich, S.K. Demydyuk, A. Drachuk // Farmer. - 2010. - № 5-6. - P.28-31.

7. Sharabryn I.G. Metabolism pathology and its prevention in animal at the specialized industrial-type farms / I.G. Sharabryn, V.M. Danylevskyy, I.I. Belyakov, P.G. Zamaryn. – M .: Kolos, 1983. – 144 p.