

DISTRIBUTION AND CLINICAL AND BIOCHEMICAL STATUS OF D-HYPOVITAMINOSIS IN CALVES OF BLACK-AND-WHITE BREED IN WINTER-STALL PERIOD

I. Ligomina¹, V. Fasola², V. Sokolyuk¹, S. Furman¹, D. Lisogurskaya¹
ligominairina@ukr.net

¹Zhytomyr National Agroecological University, Zhytomyr, Ukraine

²Private Veterinary Clinic “Chance”, Zhytomyr, Ukraine

Many scientific papers, which comprehensively covered violations of D-vitamin and phosphorus-calcium metabolism devoted to pathology of metabolism in young cattle. A characteristic feature of most of these diseases is that they are mostly hidden the stage of flow at which the developing pathobiochemical disorders, back even to the stage of pathognomonic symptoms. Among the latter, D-hypovitaminosis is particularly common. It is characterized by a violation of the formation of bone tissue and its calcification with the following functional changes in the nervous, cardiovascular, digestive and respiratory systems. In addition to the lack of vitamin D, other hypovitaminosis — A, B₁, C, as well as zinc deficiency, manganese, copper and cobalt contribute to the development of this pathology. Also, one of the important reasons is a deficiency or violation of the optimal ratio of Calcium and Phosphorus. It was found that it should be in the diet of ruminants 1.5–2:1. The diagnosis of the disease at this stage can be made only by special, including laboratory methods of investigation.

When performing the work, general clinical and laboratory methods were used. The state of mineral metabolism in calves was determined by the serum content of total calcium (arsenazo-III reagent), inorganic phosphorus (by the method of UV detection of phosphomolibdate complex), and the activity of alkaline phosphatase (by the method of Wagner, Putilin and Kharabuga).

The distribution of D hypovitaminosis among calves 1-3 months of age was examined using clinical and laboratory methods, in OOO “Mojari” (Mogari village, Ovruch district, Zhytomyr region). The course of pathology in calves had two forms: subclinical and clinically expressed, which was much less common. During the clinical study, changes typical for D-hypovitaminosis were noted. Clinical symptoms of the disease were diagnosed in 53 calves (35.6 %), and subclinical course was noted in 97 animals (64.6 %).

The analysis of the content, feeding and the results of blood studies suggest that the main etiological factors of D-hypovitaminosis in calves is insufficient insolation with non-motorized content, low availability of their main nutrients and biologically active substances, namely feeding animals with insufficient intake of vitamin D₂ with feed (hay, haylage, silage, straw), excess Calcium and deficiency or excess Phosphorus. The imbalance of phosphorus-calcium nutrition is complicated by a pronounced deficiency of vitamin D₂ (65.4–89.5 %), deficiency of trace elements — Cobalt, Cuprum, Zinc, the provision of which was, respectively, 65.7, 71.3, and 81.4 % of the need. This imbalance of minerals in the objects of the environment is the cause of specific diseases in animals, including D-hypovitaminosis. Subclinical course of D-hypovitaminosis in calves was not expressed. Under these conditions, the most characteristic symptoms of the clinical course of the disease were characterized by softening and partial resorption of the last rib, pain of the backbone, thickening of the joints, curvature of the limbs (X-shaped formulation of the forelimbs), and resorption of the last tail vertebrae within 10 cm of the distal parts of the tail. The imbalance of minerals in the feed included in the diet of calves had a significant impact on the blood counts of calves. Significant violations of the clinical status in young cattle for subclinical and clinically expressed course of D-hypovitaminosis are confirmed by the results of biochemical blood tests: hypocalcemia, respectively, in 80 % of the diseased young animals — 2.05±0.05 mmol/l, hypophosphatemia — 20 % 1.65±0.04 mmol/l, is likely to increase the activity of alkaline phosphatase (P<0.001). The activity of total alkaline phosphatase for D-hypovitaminosis increases by 1.6 times, indicating a violation of the mineralization of bone tissue.

D-hypovitaminosis was registered in winter-spring period. The main causes of D-hypovitaminosis in calves 1–3 months of age are: low supply of vitamins D₂ and D₃, Cobalt, Copper and Zinc, excessive Calcium, high calcium-phosphorus ratio (2.6–4.3:1 against 1.5–2.0:1). Characteristic symptoms of D-hypovitaminosis in 1–3-month-old calves is softening and partial resorption of the last rib, pain of the backbone, thickening of the joints, curvature of the limbs, resorption of the last tail vertebrae.

Keywords: CALVES, TOTAL CALCIUM, INORGANIC PHOSPHORUS, D-HYPOVITAMINOSIS