УДК 636.1.09:616.854

LACTATION TETANY IN HORSES (MILK FEVER, HYPOCALCEMIC TETANY, TRANSPORT TETANY, ECLAMPSIA): DISTRIBUTION, ETIOLOGY

V. I. BORODYNIA, candidate of veterinary sciences (Ph. D.),
assistant professor of obstetrics, gynecology and bio-techniques of animal reproduction department
L. S. LOBODINA, student* of FVM
National University of Life and Environmental Sciences of Ukraine
E-mail:borodynia@gmail.com, lidia.lobodina@gmail.com

Abstract. *The publication covers issues of distribution and etiology of lactation tetany in horses. This disease occurs as a result of a disturbance of calcium metabolism in the mare's body. This pathological condition is associated with a sharp decrease in the level of ionized calcium in the blood serum, and sometimes with changes in the concentration of magnesium and phosphorus in it. Lactation tetany is a rather rare disease of horses. This pathology is diagnosed after a kidling with the onset of lactation, in the mares, when hypocalcaemia develops in organism of animal, after prolonged physical activity or transport (transport tetany), eclampsia. Signs of the disease are variable and associated with neuromuscular hyperresistibility. Lactation tetany is more likely to be affected by shire horse breeds. The mortality rate of animals is high and reaches more than 60%. Hypocalcemic tetany occurs in mare, which feeds the foal - on average 10 days after kidfling or 1-2 days after it is weaned. Mechanisms of hypocalcemia development in the mare's organism, which feeds the foal, consist of reducing the absorption of this element from the intestine, increasing its loss through the kidneys, sweat or milk (in the presence of lactation); or inhibition of osteolysis due to changes in the level of parathyroid hormone (parathormone), calcitonine or vitamin D, in stress states.*

Keywords: horses, mares, lactation tetany, hypocalcemic tetany, distribution, etiology

Introduction. Horses are diagnosed with a large number of diseases that arise as a result of metabolic disorders in the body. It should be borne in mind that the pathology of metabolism can lead to a significant reduction in the natural resistance of the animal organism and thus to the development of a number of diseases that often end lethally. Particularly often, these diseases are recorded in horses when their causes are caused by stress factors such as monotonous feeding with inferior fodders, accumulated retention with violation of animal hygiene requirements, hypokinesia, or on the contrary, excessive physical activity, animal transport, kidling and feeding of the foal, its weaned , etc [1].

* Scientific Supervisor – Ph. D., V. I. Borodynia

Among the wide range of diseases caused by disorders of metabolism in the body of horses, such as myoglobinuria, osteodystrophy, hypomaniaemia, hypocobaltosis, endemic goiter, physical rhabdomyolysis, hypovitaminosis, diabetes insipidus, etc., in the mares during lactation may be development with hypocalcemia of lactation tetany.

Diseases that arise as a result of metabolic disorders in the horses usually begin suddenly and the animals react quickly to the introduction of the shortage ration component (although, in order to avoid recurrence, the affected animals may need dietary supplements). Since metabolic disorders associated with production are serious and develop suddenly, an accurate and rapid diagnosis is important. Ideally, diagnostic tests should be used to predict the probability of the disease. It will make it impossible to develop, or, if necessary, it will be possible to use drugs for prevention or treatment as soon as possible [1].

Analysis of recent research and publications. Lactation tetany of horses is a pathological condition associated with a sharp decrease in the level of ionized calcium in the serum, and sometimes with changes in its concentration of magnesium and phosphorus. This condition for horses is a rather rare phenomenon. This pathology is diagnosed in mares which feed the foals (lactation tetany, milk fever), after prolonged physical activity or transport (transport tetany), eclampsia. Signs of the disease are variable and associated with neuromuscular hyperresistibility. Lactation tetany of horses for clinical manifestation is similar to the disease of cows for postnatal paresis, but it can occur not only immediately after a kidling, but also immediately after the end of feeding the foal and its wean [1, 2, 3].

In some cases, excessive physical loads of horses, maintenance of wild ponies or horses, heavy physical work and prolonged transport of these animals are contributing factors in the development of lactation tetany, resulting in a pathological stress-strain state [4, 5, 9].

Tension or stress leads to a violation of the internal homeostasis of the animal and reduces the level of ionized calcium in the body of the animal [5].

Sometimes there is no obvious cause for this disease [4].

Purpose. Comprehensive study and analysis of literature data, concerning lactation tetany of horses and their generalization.

Methods and materials of research. In the course of the research, such research methods as search, processing, analysis of literary sources over the lactation tetany of horses and generalization ofdata were used.

The results of own research and discussion. Usually lactation tetany of horses is common in shire horses. The mortality rate of animals is high and reaches more than 60%. Lactation tetany occurs in mares that feed thefoals - on average 10 days after a kidling or 1-2 days after they are weaned. Animals that graze on lush pasturelands with a large number of succulent herbs are more prone to lactation tetany. They have an increased lactation, as a result of which their body loses a significant amount of minerals, including calcium, with milk [4, 5].

Currently, tetanus lactation in horses is observed infrequently although it has been widespread in the times of their use as drag force. Apparently weighty mare were more dairy than today's "light breeds" and therefore were more vulnerable to this disease [5].

A kidling with a sudden onset of a powerful lactation leads to a critical reduction of the ionized calcium organism of the animal. After that, there is a metabolic disorder that has a clinical manifestation. Calcium is an extremely important metabolite, which decreases below the critical level, causes the manifestation of clinical syndrome. This is the result of a dangerous drop in circulating calcium, a mineral important for the normal transmission of nerve impulses and for muscle contraction. Hypocalcemia is a stable presence of blood calcium in the range of 4 to 6 mg%. Hypomagnemia and hypophosphatemia often occur simultaneously [6-10].

Mechanisms of hypocalcemia development consist of reducing the absorption of this element from the intestine; an increase in its loss through the kidneys, sweat or milk (in the presence of lactation); or inhibition of osteolysis due to changes in the level of parathyroid hormone (parathormone), calcitonine or vitamin D [1].

In the presence of mares lactation favorable factors for the development of lactation tetany considered high milk production and grazing pastures with plenty of lush grass. Lactation tetany or milk fever of horses is a disease that usually occurs after kidling, in the early stages of lactation, because in the mammary gland during that period starts to produce large amount of colostrum and then milk, which regularly removed from the breast and take out from the body lactating mares reserves of calcium, causing a state of hypocalcemia [1, 5].

Developing for a long time, hypocalcemia damages the mares, which have a high level of lactation and produce a large amount of milk, but only get herbs in the diet or graze on pasture with a small amount of legumes or their complete absence. The aforementioned pathology can also develop in mares, which have inadequate dietary rations, both in terms of feed amounts and unbalanced for all necessary nutrients, macro-, microelements, vitamins for the period of lactation [3].

The cause of low calcium in the blood serum of a lactation mare may be not only the lack of calcium in its diet. Also, this disease may be the result of a reaction endocrine system to the sudden change in metabolic needs in this macroelement, which occur during lactation. Adjusting the level of calcium in an animal's body is a complex process that involves at least seven organs or tissues, three hormones and several enzymes and minerals [3].

There are periods due to the physiological state of the animal when there is an urgent need to mobilize calcium from the skeleton to meet the growing needs of the organism; parathyroid hormone (PTH) and vitamin D, interacting together, are designed to stimulate this process. In cases of hypocalcemia, the hormonal response to PTH may be too slow to meet the urgent, growing needs of the animal in calcium. The result is a low content of calcium in the blood [3].

Excessive intake (feeding in the form of feed additives) of calcium at the end of the kidling (2-3 months before the expected births) may reduce the normal ability of the animal's body to mobilize calcium from the bones when this will require a start of lactation. In addition, the mares also need an increased amount of calcium in the later stages of pregnancy to mineralize the skeleton of the foals. Both of these factors can lead to hypocalcemia at the initial stage of lactation [3].

Hypocalcemia, after prolonged physical activity (for example, prolonged riding), is caused by loss of calcium due to sweating, increased binding to hypochloric acid and high levels of corticosteroids caused by stress. Corticosteroids inhibit the activity of vitamin D, which leads to a decrease in intake of calcium from the intestine and mobilization from the skeleton. Tension, stress and lack of calcium intake are associated with transport tetany [1].

Sometimes hypocalcemic tetany can be manifested as a consequence of hypocalcemia after eating with the grass or hay bugs from the familiaEpicauta. The hemolymph of these insects contains a toxic substance cantaridine, which can cause poisoning of horses and the death of pasture animals. These insects are most often associated with toxicosis in horses [1].

Conclusions and perspectives. Calcium is an extremely important metabolite to maintain homeostasis in the body of horses. In the mares, which feed the foal, the critically low content of this element in the blood serum causes the manifestation of the clinical syndrome of lactation tetany. This disease is more likely to be affected by mounds of shire breeds on average by 10 days after kidling or 1-2 days after weaning the foals. The mortality rate of animals is high and reaches more than 60%.

Lactation tetany occurs in mares, which feed the foal and graze on pasturelands with a large number of succulent herbs. They have an increased lactation, as a result of which their body loses a significant amount of minerals, including calcium, with milk.

Mechanisms of hypocalcemia development consist of reducing the absorption of this element from the intestine; an increase in its loss through the kidneys, sweat or milk (in the presence of lactation); or inhibition of osteolysis due to changes in the parathyroid hormone (parathormone), calcitonin or vitamin D.

Perspectives for further research response in finding out the relationship of concentration of ionized calcium in serum with a degree of clinical manifestation of lactation tetany of horses, their treatment and prevention of this pathology.

Список використаних джерел

1. Tsvilikhovskyi, M. I. Vnutrishni nezarazni khvoroby tvaryn / M. I. Tsvilikhovskyi, V. I. Bereza, V. S. Sichkar, S. I. Holopura, N. H. Hrushanska, O. O. Skyba, P. V. Lazarenko, A. A. Rudenko, O. M. Yakymchuk. – K. : Ahrarnaosvita, 2014. – 614 s.

2. Hypocalcemic Tetany in Horses (Transport tetany, Lactation tetany, Eclampsia) [Електронний ресурс] / Режим доступу :

http://www.msdvetmanual.com/metabolic-disorders/disorders-of-calcium-metabolism/hypocalcemic-tetany-in-horses.

3. Milk Fever in Mares [Електронний ресурс] / Режим доступу : http://broadfordvets.com.au/PetCareArticles/VetArticleDetails/tabid/3258/ArticleID/2201/MilkFeverinMares.aspx.

4. Lactation tetany in mares [Електронний ресурс] / Режим доступу : http://ecoursesonline.iasri.res.in/mod/page/view.php?id=136840.

5. Rach, D. J. Equine Eclampsia / D. J. Rach, D. W. Moore, R. T. Sturm // The Canadian Veterinary Journal. − 1972. – Vol. 13 (3). – P. 78–79.

6. Blood, D. C. Veterinary Medicine / D. C. Blood, J. A. Henderson. – London : Bailliere, Tindall and Cassell, 1968.

7. Bone, J. F. Equine Medicine and Surgery / J. F. Bone, E. J. Catcott, A. A. Gabel, L. E. Johnson, W. F. Riley. − Santa Barbara, California : American Veterinary Publications, 1963.

8. Joes, L. M. Veterinary Pharmacology and Therapeutics / L. M. Joes. − Ames, Iowa: Iowa State University Press, 1966.

9. Baird, J. D. Lactation tetany (eclampsia) in a Shetland pony mare / J. D. Baird // Aust Vet J. − 1971. – Vol. 47 (8). – P. 402–404.

10. Hypocalcemic tetany in horses [Електронний ресурс] / Режим доступу : https://wagwalking.com/horse/condition/hypocalcemic-tetany.

References

1. Tsvilikhovskyi, M. I., Bereza, V. I., Sichkar, V. S., Holopura, S. I., Hrushanska, N. H., Skyba, O. O., Lazarenko, P. V., Rudenko, A. A., Yakymchuk, O. M. (2014). Vnutrishni nezarazni khvoroby tvaryn [Internal non-contagious animal diseases]. Kyiv : Ahrarnaosvita, 614.

2. Hypocalcemic Tetany in Horses (Transport tetany, Lactation tetany, Eclampsia). Available at : http://www.msdvetmanual.com/metabolic-disorders/disorders-of-calcium-metabolism/hypocalcemic-tetany-in-horses.

3. Milk Fever in Mares. Available at : http://broadfordvets.com.au/PetCareArticles/VetArticleDetails/tabid/3258/ArticleID/2201/MilkFeverinMares.aspx.

4. Lactation tetany in mares. Available at : http://ecoursesonline.iasri.res.in/mod/page/view.php?id=136840.

5. Rach, D. J., Moore, D. W., Sturm, R. T. (1972). Equine Eclampsia. The Canadian Veterinary Journal, 13 (3), 78–79.

6. Blood, D. C., Henderson, J. A. (1968). Veterinary Medicine. London : Bailliere, Tindall and Cassell.

7. Bone, J. F., Catcott, E. J., Gabel, A. A., Johnson, L. E, Riley, W. F. (1963). Equine Medicine and Surgery. Santa Barbara, California : American Veterinary Publications.

8. Joes, L. M. (1966). Veterinary Pharmacology and Therapeutics. Ames, Iowa : Iowa State University Press.

9. Baird, J. D. (1971). Lactation tetany (eclampsia) in a Shetland pony mare. Aust Vet J., 47 (8), 402–404.

10. Hypocalcemic tetany in horses. Available at : https://wagwalking.com/horse/condition/hypocalcemic-tetany.

ЛАКТАЦІЙНА ТЕТАНІЯ КОНЕЙ (МОЛОЧНА ЛИХОМАНКА, ГІПОКАЛЬЦЕМІЧНА ТЕТАНІЯ, ТРАНСПОРТНА ТЕТАНІЯ, ЕКЛАМПСІЯ): ПОШИРЕННЯ, ЕТІОЛОГІЯ

В. І. Бородиня, Л. С. Лободіна

Анотація. *У публікації висвітлені питання поширення і етіології лактаційної тетанії коней. Дане захворювання виникає внаслідок порушення кальцієвого обміну в організмі кобили. Цей патологічний стан пов'язаний з гострим зниженням рівня іонізованого кальцію в сироватці крові, а іноді, зі змінами концентрації магнію та фосфору в ній. Лактаційна тетанія є досить рідкісним захворюванням коней. Дану патологію діагностують після жеребіння з настанням лактації у кобил, коли в організмі тварини розвивається гіпокальціємія, після тривалого фізичного навантаження або транспортування (транспортна тетанія), еклампсія.*

Ознаки захворювання мінливі й пов'язані з нервово-м'язовою гіперрезистентністю. Лактаційною тетанією частіше хворіють коні ваговозних порід. Рівень смертності тварин високий і сягає більше 60 %. Гіпокальцемічна тетанія виникає у кобил, які вигодовують лоша – у середньому на 10 день після жеребіння або через 1–2 дні після його відлучення. Механізми розвитку гіпокальціємії в організмі кобили, яка вигодовує лоша, складаються зі зменшення абсорбції цього елементу з кишечнику, збільшення втрати його через нирки, піт чи молоко (за наявності лактації) або гальмування остеолізу внаслідок зміни рівня гормону паращитовидної залози (паратгормону), кальцитоніну або вітаміну D, за стресових станів.

Ключові слова: коні, кобили, лактаційна тетанія коней, гіпокальціємічна тетанія, поширення, етіологія

ЛАКТАЦИОННАЯ ТЕТАНИЯ ЛОШАДЕЙ (МОЛОЧНАЯ ЛИХОРАДКА, ГИПОКАЛЬЦИЕМИЧЕСКАЯ ТЕТАНИЯ, ТРАНСПОРТНАЯ ТЕТАНИЯ, ЭКЛАМПСИЯ): РАСПРОСТРАНЕНИЕ, ЭТИОЛОГИЯ

В. И. Бородыня, Л. С. Лободина

Аннотация. *В публикации освещены вопросы распространения и этиологии лактационной тетании лошадей. Данное заболевание возникает вследствие нарушения кальциевого обмена в организме кобылы. Это патологическое состояние связанное с острым снижением уровня ионизированного кальция в сыворотке крови, а иногда с изменениями концентрации магния и фосфора в ней. Лактационная тетания является довольно редким заболеванием лошадей. Данную патологию у кобыл диагностируют после выжеребки с наступлением лактации, когда в организме животного развивается гипокальциемия, после длительной физической нагрузки или транспортировки (транспортная тетания), эклампсия.*