Abstract. *Thermal stress is a typical summer-time problem in high-yield dairy cows, regardless of the geographical location of milk production enterprises, and differs only in its degree of intensity. Increasing the incidence of thermal stress is likely to be a clear consequence of global climate change, which affects dairy cattle breeding and is due to an increase in the temperature of the environment. Thus, it is projected that Ukraine's dairy industry will operate in a warmer environment in the next decade, with increased demand for high-efficiency industries. Therefore, developing dairy farmers must be prepared for global climate change, and their veterinary support has to be adapted to these changes. It is necessary to evaluate the risks of thermal stress in dairy cows at the level of productivity and profitability of the dairy industry critically. In case of thermal overheating the behavior of cows, physiological processes, energy balance and the state of the antioxidant system in their organism change, what causes decrease of milk quality (decrease in the content of fat and protein), productivity (reduction of dietary intake), deterioration of the general condition, reproductive capacity, increased risk of occurrence scar acidosis, mastitis, endometritis and others. To prevent cow's thermal stress the temperature and humidity index (THI) should be monitored within < 72, with a temperature of not more than 24 ° C and a humidity of ≤ 70%. It is also necessary to change the conditions of retention and feeding timely and qualitatively to reduce the effect of thermal stress on high-yielding cows.*

Keywords: highly productive dairy cows, heat stress, temperature-humidity index, body temperature, thermoregulation, cardiovascular insufficiency

УДК 636.1.09:616.854

LACTATION TETANY IN HORSES (CLINICAL SIGNS, TREATMENT, PREVENTION)

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 the clinical signs and flow of lactation tetany of horses, applied treatment of sick animals and prevention of this pathology. The degree of manifestation of clinical signs in lactation tetany*

* Scientific Supervisor – candidate of veterinary sciences (Ph. D.), assistant professor V. I. Borodynia

corresponds to the concentration of ionized calcium in the blood serum of mare. For the mild form of the course of lactation tetany, the only sign of the disease may be increased excitability of the animal. In severe forms in sick horses there is a complex of typical clinical signs for hypocalcemic tetany. The amount of calcium in the serum in the initial stage of the disease, when the excitation of the animal is observed> 8 mg%; with the appearance of spasm signs - 5-8 mg%; lying position and numbness - <5 mg%. If there is no applying of timely treatment, the disease progresses with a mortal term within 24-48 hours. The preliminary diagnosis is based on data from anamnesis, clinical signs of the disease and response to specific treatment. The final diagnosis requires confirmation of low levels of ionized calcium in serum. For therapeutic purposes, for the mares is given intravenous introduction of calcium solutions, symptomatic treatment. Preventive measures are providing the sufficient amounts of calcium and phosphorus and their correlation in feed during the entire period of pregnancy and feeding the foals.

Keywords: horses, mares, lactation tetany, clinical signs, treatment, prevention

Introduction. Currently, farm animals are diagnosed with pathologies associated with disturbances of calcium metabolism in the body, which, in the long current and the intensity of the changes, cause the transition from biochemical to structural changes. Most often there are dairy cows (especially high-productive ones), sheep and goats. In horses such a pathology is detected much less often [1-3]. One of the diseases that occurs in moths that feed the foals, due to a significant reduction in the level of ionized calcium in serum, and often lowering the concentration of magnesium and phosphorus is lactation tetany inhorses (milk fever, hypocalcemic tetany, transport tetany, eclampsia).

In horses, lactation tetany disease in available domestic sources is insufficient due to a number of reasons. This is primarily due to the fact that in the livestock sector as a whole and in veterinary medicine in particular, insufficient attention is paid to this species of animals, because, for objective reasons, there was a redistribution of the main number of horse-breeders from the state-owned form to private ownership. Due to these circumstances, it is problematic for scientists to carry out integrated, holistic experimental research, and private owners of horses rarely agree to take such measures [4].

Analysis of recent research and publications. According to the literature, the disturbance of calcium metabolism in the body after birth and with the onset of lactation in the form of postpartum paresis (subclinical hypocalcemia, milk fever) has been thoroughly developed by researchers for cattle as a productive animal species [1, 2, 5]. In contrast, hypocalciemia of horses, which develops after birth and manifests itself in the form of lactation tetany, requires a more thorough study. We found separate reports on this pathology of horses published in foreign sources [5-7].

Research purpose. Comprehensive study, analysis and generalization of literature data, clinical signs of horses deseaseof lactation tetany, their treatment and prevention of this pathology.

Methods and materials of research. In the course of the research, were used methods such as search, processing, analysis of literary sources, clinical signs of lactation tetany in horses, treatment of mares and prevention of this pathology and generalization of data.

The results of own research and discussion. Lactation (hypocalcemic) tetany (milk fever) is a metabolic disorder in the lactating mares, associated with a drop in the concentration of calcium in the blood. Calcium is a mineral that is important for the normal transmission of nerve impulses and muscle contractions. The causes of this disease are different, but all of them are manifested in the background of a sharp drop in the concentration of calcium in the blood of mare. Often, lactating tetany occurs due to stress - after being transported to an exhibition or auction, as a result of abstinence in unusual conditions. This disease in most cases affects mares that feedthe foal [5-7].

Lactation tetany in horses is a pathological condition associated not only with acute exhaustion of ionized calcium in the blood serum, but also with changes in the concentration of magnesium and phosphorus. In some cases, stress complicates the course of the disease. In particular, the placement of wild ponies or horses, heavy physical work and prolonged transport can be a trigger for the disease. Tension or stress leads to a violation of internal homeostasis and reduces the level of ionized calcium in the body of the animal [8].

During a clinical study of a mare with lactation tetany, particular attention should be paid to the history of the disease and the manifestation of the characteristic clinical signs of the disease. Analyzing the data of the anamnesis, clarify the issues relating to the physical activity (load) of the animal, its possible transportation. If this is a mare, when she is shaved, information about the lactation and the amount of milk that she produces, or the time for eating the foal from the mammary gland. Also important is the additional information on the diet of the animal, the quality and composition of the forage, the severity of the symptoms of occurrence of symptoms, etc [8].

Regarding clinical signs and symptoms, attention is drawn to the manifestation of classical symptoms of tetany such as: tremor of the muscles, rigidity or abnormalities of the stroke, high body temperature and any other symptoms inherent in hypocalcemic tetany in horses.

The degree of manifestation of clinical signs in lactation tetany corresponds to the concentration of ionized calcium in the blood serum of mare. For the mild form of the course of lactating tetany, the only sign of the disease may be increased excitability of the animal [9-11].

In severe forms in sick horses there is diaphragmatic tremor, anxiety, signs of anxiety, alarm, tetany, including increased muscle tone. In severe cases, there are also oppression, abundant sweating, salivation, progression of muscle weakness and exhaustion, the animal takes a lying position, possible convulsions or seizures and cardiac arrhythmia, difficulty in movement due to tetany and disturbance of coordination, intense stroke, tinnitus slightly raised, frequent strong, sharp breathing, wide enlargement of the nostrils, pronounced, clear, bright, intense chest breathing (due to spasm of the diaphragm), muscular fibrillation (tremor of the muscles) - insufficiency of chewing, trimester of the masseter - tonic

spasm masticatory muscles (convulsive contraction, eruption), third-eyed prolapse (membrana nictitans - a membrane that can be easily seen in the inner corner of the eye, begins to stand beyond the eye, especially if you click on the nose bone of the mare). The head of the animal may be kept low, the eyelids are partially closed, the lower lip is dying [11].

Hypersensitivity to various stimulus is noted. Any stimulus such as loud sound, bright light or touch can increase the signs of the disease. Body temperature increased. The heart rate is normal at the beginning of the disease, later it becomes more frequent and arrhythmic. The sick animal tries to eat and drink, but can not swallow. Urination and defecation are temporarily absent. Peristalsis weakens. There are colic of convulsive type. In severe cases, horses are traumatized due to spasms and convulsions and die from respiratory failure [8, 11].

If there is no applyingof timely treatment, in the lactating mares, the disease becomes progressive, with a fatal outcome within 24-48 hours. Mare takes a lying position, in 24 hours there are seizures, and after 48 hours of illness - dies.

The content of calcium in serum at the initial stage of the disease, when the animal's excitability is > 8 mg%; with the appearance of spasm signs– 5-8 mg%; Lying position and numbness – < 5 mg%. [11].

The preliminary diagnosis is based on data from anamnesis, clinical signs of the disease and response to specific treatment. The final diagnosis requires confirmation of low levels of ionized calcium in serum. In most laboratories, only the total (protein-bound and free) calcium in serum is detected, which is an acceptable diagnostic test in most cases. However, inaccuracies in the diagnosis may occur in horses for alkalosis and hypoalbuminemia. Alkalos increases the binding of albumin to calcium, which leads to a decrease in the concentration of ionized calcium. Thus, for alkalosis, the horses may have a normal total calcium content in the blood serum when detecting signs of hypocalcemia. Similarly, for hypocalcemia and acidosis in horses, the total serum calcium content may decrease, without the development of signs of hypocalcemia.

After a physical examination of a sick mare, it is necessary to conduct tests that are specific for lactating tetany to exclude any other diagnosis from which to be differentiated.

A differential diagnosis excludes pathological conditions that have symptoms similar to those in lactation tetany. It is tetanus, endotoxemia, colic, stiffness syndrome or physical rhabdomyolysis after prolonged muscle tension or other muscular disorders, stomach ups, laminitis, botulism. In addition, in the clinical differential diagnosis are considered viral encephalomyelitis horses, parasitic aneurysms and eclampsia, convulsive seizures. [9].

In the case of tetanus, a third-eyelid prolapse occurs when lifting the head. In addition, the diseased animal has nothing to do with the recent whipping, hanging out, transporting a vehicle or physical activity. According to the laminitis in the diseased animal, anxiety, tremor of the muscles, pain in the extremity are manifested.

Conduct a hematological study of blood samples to determine the content of electrolytes in serum [12].

Symptoms for lactation tetany in horses can vary from moderate to severe. They can acquire a life-threatening manifestation within 48 hours, so it requires immediate medical attention.

If the mare reveals any signs or symptoms of lactation (hypocalcemic) tetany, it is necessary to apply immediately after qualified veterinary care. The importance of emergency care for mare is justified by the possibility of a sufficiently rapid increase in the symptoms of this disease and aggravating the general condition of the animal until death [13].

For therapeutic purposes, the mare is given intravenous introduction of calcium solutions, such as 20 % calcium borogluconate or solutions recommended for treatment of bovine, patients with postpartum paresis. Usually such treatment leads to a complete recovery of mares with lactation tetany. These solutions should be introduced slowly (over 20 minutes), at a rate of 250-500 ml per 500 kg of body weight of the animal, diluting at least 1: 4 in physiological solution or dextrose. The reaction of the cardiovascular system to the introduction of infusion solutions should be carefully monitored. The intensity of heart tones is expected to increase. In the event of arrhythmia or bradycardia, treatment should be stopped immediately. After the heart rate returns to normal, infusion can be restored, but slower. If the condition of the mare does not improve within 1-2 hours after the firstintroduction, a re-dose of these drugs is prescribed, but it is necessary to carry out a laboratory examination of the level of calcium in the blood of the diseased animal to confirm hypocalcemia. For a complete recovery from lactating tetany, some mammals require continued treatment for several days. Due to the mild form of this disease (mild degree of hypocalcemia), the horses may recover without specific treatment. If tetany is associated with physical activity, it is advisable to include magnesium in the infusion solution. The main symptom of recovery of the animal will be the allocation of large volumes of urine [8].

To improve the quality of the diet, they are prescribed feeds enriched with calcium (alfalfa or legume hay).

For symptomatic treatment, analgesics are prescribed that help the animal relieve discomfort from muscle pain. It is advisable to prescribe a broad spectrum antibiotic to overcome any bacterial infection that an animal has.

The condition of the mite should be observed for several days, and if necessary longer, to make sure that it reacts positively to the treatment.

There is a possibility of recurrence in lactation tetany, therefore, the animal will need to continue to be closely monitored after stabilizing the general condition and restoring hematological parameters [13].

In order to ensure sufficient amounts of calcium and phosphorus and their ratios in feed during the entire period of pregnancy, the mare should be provided with a balanced diet in accordance with their physiological state. During periods of increased need, calcium animals, such as feeding the horses, feed the diet to correct, ensuring the availability of high-quality feed. These are components such as alfalfa (other legumes), or special mixtures

containing calcium. It is necessary to prevent starvation of the animal. When transporting horses with any type of transport, stress, fasting should be minimized. To increase the endurance of horses during physical activity, associated with prolonged stress and excessive sweating and to ensure increased need of the body in water and electrolytes, it is necessary to provide them in advance with sufficient water and electrolyte nutrition.

In order to prevent the milk fever in horses, it is important that the calcium intake in the body of the marigold mare during the last two to three months of pregnancy is consistent, but does not exceed the needs of the animal's organism in this physiological period. Disturbances in the content of other blood electrolytes, such as low levels of magnesium, may also affect calcium content [10].

To prevent hypocalcemia, which appears in lactating mares as lactation tetany (lactic fever) or re-occurrence of this disease, it is necessary to comply with the following rules: provide diets of lactating mares sufficient calcium (early lactation daily requirement mares in calcium more than twice as compared with the functional state of the mammary gland); not fed in the last trimester of kidling by excessive amounts of feed high in calcium supplements or appropriate diet to endocrine mechanism to mobilize calcium stores (bones) to function properly after the start of lactation; adding calcium-rich foods such as alfalfa or calcium-weakly mineralized salt, etc., should begin at early stages of lactation (grassy pasture and clover are ideally suited for mares at the beginning of lactation); in order to ensure that the required amount of calcium to meet the needs of the body enters the animal, it is necessary to control the eating of the mare of the forage after kidling. If the mare has reduced appetite, this is the reason for a comprehensive clinical examination and laboratory examination of samples of blood and blood samples for calcium and other microelements [10].

Conclusions and perspectives. Lactation tetany in horses is a pathological condition associated not only with acute exhaustion of ionized calcium in serum but also with changes in the concentration of magnesium and phosphorus. During a clinical study of a mare with lactation tetany, special attention should be paid to the data of anamnesis and manifestation of the characteristic clinical signs of the disease. The degree of manifestation of clinical signs in lactation tetany corresponds to the concentration of ionized calcium in the blood serum of mare. If there is no applying of timely treatment, in the lactating mares, the disease becomes progressive, with a fatal outcome within 24-48 hours.

For therapeutic purposes, the mare is given intravenous introduction of calcium solutions, such as 20 % calcium borogluconate or solutions recommended for the treatment of bovine, postpartum paresis, and also symptomatic treatment. For preventing the lactation tetany, it is necessary to provide for mares a balanced diet in accordance with their physiological state. In periods of increased need, animals in calcium, such as feeding the foals, feed diet are corrected.

Список використаних джерел

1. Yablonskyi, V. A. Veterynarne akusherstvo, hinekolohiia ta biotekhnolohiia vidtvorennia tvaryn / V. A. Yablonskyi, S. P. Khomyn, H. M. Kalynovskyi, H. H. Kharuta ta in. − Vinnytsia: Nova knyha, 2006. – 592 s.

2. 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.

3. Meier, D. Veterynarnaia laboratornaia medytsyna: ynterpretatsyia y dyahnostyka / D. Meier, Dzh. Kharvy; per. s anhl. L. A. Levytskoho. – M. : Sofyon, 2007. – 456 s.

4. Bodiako, O. I. Makroelementnyi status loshat / O. I. Bodiako, V. I. Holovakha, S. V. Sliusarenko // Nauk. visnyk vet. medytsyny. – 2015. – № 1 (118). – S. 14–18.

5. Salgado-Hernández, E. G. Effect of the first and second postpartum partial milking on blood serum calcium concentration in dairy cows / E. G. Salgado-Hernández, A. Aparicio-Cecilio, F. H. Velásquez-Forero, D. A. Castillo-Mata, J. Bouda // Czech J. Anim. Sci. – 2014. – Vol. 59 (3). – P. 128–133.

6. Holovakha, V. I. Makroelementnyi status kobyl ukrainskoi verkhovoi porody / V. I. Holovakha, O. I. Bodiako // Naukovyi visnyk LNUVMBT imeni S. Z. Gzhytskoho. – 2015. – T. 17, № 2 (62). – S. 23–28.

7. Edes, S. C. Laboratory profiles of equine discales / S. C. Edes, D. I. Bounous. – Mosby, 1999. – P. 223–225.

8. 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.

9. 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.

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

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

12. Differential diagnosis and treatment of lactation tetany [Електронний ресурс] / Режим доступу : https://ecoursesonline.icar.gov.in/mod/page/view.php?id=136842.

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

References

1. Yablonskyi, V. A., Khomyn, S. P., Kalynovskyi, H. M., Kharuta H. H. et al. (2006). Veterynarne akusherstvo, hinekolohiia ta biotekhnolohiia vidtvorennia tvaryn [Veterinary obstetrics, gynecology and biotechnology of reproduction of animals]. Vinnytsia : Nova knyha, 592.

2. 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.

3. Meier, D., Kharvy, Dzh. (2007). Veterinary Laboratory Medicine: Interpretation and Diagnosis. Moscow : Sofyon, 456.

4. Bodiako, O. I., Holovakha, V. I., Sliusarenko, S. V. (2015). Makroelementnyi status loshat [Macroelement status of the horses]. Nauk. visnyk vet. medytsyny, 1 (118), 14–18.

5. Salgado-Hernández, E. G., Aparicio-Cecilio, A., Velásquez-Forero, F. H., Castillo-Mata, D. A., Bouda, J. (2014). Effect of the first and second postpartum partial milking on blood serum calcium concentration in dairy cows. Czech J. Anim. Sci., 59, (3), 128–133.

6. Holovakha, V. I., Bodiako, O. I. (2015). Makroelementnyi status kobyl ukrainskoi verkhovoi porody [Macroelemental status of Ukrainian equestrian mare]. Naukovyi visnyk LNUVMBT imeni S. Z. Gzhytskoho, 17, № 2 (62), 23–28.

7. Edes, S. C., Bounous, D. I. (1999). Laboratory profiles of equine discales, Mosby, 223–225.

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

9. 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.

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

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

12. Differential diagnosis and treatment of lactation tetany. Available at: https://ecoursesonline.icar.gov.in/mod/page/view.php?id=136842.

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

ЛАКТАЦІЙНА ТЕТАНІЯ КОНЕЙ (КЛІНІЧНІ ОЗНАКИ, ЛІКУВАННЯ, ПРОФІЛАКТИКА)

В. І. Бородиня, Л. С. Лободіна

Анотація. *У статті висвітлені особливості клінічного прояву та перебігу лактаційної тетанії коней, застосовуваного лікування хворих тварин і профілактики даної патології. Ступінь проявлення клінічних ознак за лактаційної тетанії відповідає концентрації іонізованого кальцію у сироватці крові кобили. За легкої форми перебігу лактаційної тетанії єдиною ознакою захворювання може бути підвищена збудливість тварини. За важкої форми у хворих коней з'являється комплекс характерних для гіпокальціємічної тетанії клінічних ознак. Вміст кальцію в сироватці крові на початковій стадії захворювання, коли відмічається збудження тварини, становить > 8 мг%; з появою ознак спазмування – 5-8 мг%; лежачого положення і заціпеніння – < 5 мг%. Якщо не застосувати своєчасного лікування, захворювання набуває прогресуючого перебігу зі смертельним завершенням протягом 24-48 годин.*

Попередній діагноз ґрунтується на даних анамнезу, клінічних ознаках захворювання та реакції на специфічне лікування. Остаточний діагноз потребує підтвердження низьких рівнів іонізованого кальцію в сироватці крові. З лікувальною метою кобилам застосовують внутрішньовенне введення розчинів кальцію, симптоматичне лікування. Заходи профілактики полягають у забезпеченні достатніх кількостей

кальцію й фосфору та їх співвідношення в кормах протягом усієї вагітності й вигодовування лошати.

Ключові слова: коні, кобили, лактаційна тетанія, клінічні ознаки, лікування, профілактика

ЛАКТАЦИОННАЯ ТЕТАНИЯ ЛОШАДЕЙ (КЛИНИЧЕСКИЕ ПРИЗНАКИ, ЛЕЧЕНИЕ, ПРОФИЛАКТИКА)

В. И. Бородыня, Л. С. Лободина

***Аннотация**. В статье освещены особенности клинического проявления и течения лактационной тетании лошадей, применяемого лечения больных животных и профилактики данной патологии. Степень проявления клинических признаков при лактационной тетании соответствует концентрации ионизированного кальция в сыворотке крови кобылы. При легкой форме течения лактационной тетании единственным признаком заболевания может быть повышенная возбудимость животного. При тяжелой форме у больных лошадей появляется комплекс характерных для гипокальциемической тетании клинических признаков. Содержание кальция в сыворотке крови на начальной стадии заболевания, когда отмечается возбуждение животного, составляет > 8 мг%; при появлении признаков спазмирования – 5-8 мг%; лежачего положения и оцепенения – < 5 мг%. Если не применить своевременного лечения, заболевание приобретает прогрессирующее течение со смертельным завершением в течение 24-48 часов.*

Предварительный диагноз основывается на данных анамнеза, клинических признаках заболевания и реакции на специфическое лечение. Окончательный диагноз требует подтверждения низких уровней ионизированного кальция в сыворотке крови. С лечебной целью кобылам применяют внутривенное введение растворов кальция, симптоматическое лечение. Меры профилактики заключаются в обеспечении достаточных количеств кальция и фосфора и их соотношение в кормах в течение всей беременности и вскармливания жеребенка.

Ключевые слова: лошади, кобылы, лактационная тетания, клинические признаки, лечение, профилактика