

Pathomorphological Changes in the Hoofs Of Pododermatitis Puritius in Productive Cows

B.Z. Mukhtorov

Samarkand State Veterinary Medicine University of Animal Husbandry and Biotechnology.

Abstract:

The pathomorphological changes in the hoof were studied in case of purulent pododermatitis in productive cows. It was revealed that with pododermatitis in the pathological focus of the hoof, the blood vessels in a state of acute hyperemia, the development of emigration of erythrocytes and leukocytes, around the vessels - blood plasma, numerous leukocytes and single erythrocytes in the exudate, destroyed tissues, disordered arrangement of reticular cells and threads atrophied tissues.

Key words: *Purulent pododermatitis, productive cows, pathomorphological, erythrocyte, leukocyte, pathological focus, hyperemia, exudate, reticular cell, connective tissue, necrosis, dystrophic, granulation.*

Introduction

Timely diagnosis of purulent-necrotic pathologies of the distal part of the legs, which are common in productive cows, the pathogenesis of the disease, and the identification of pathomorphological changes in the hooves are of great scientific and practical importance in developing effective methods of treatment.

Surgical diseases of legs in dairy cows have been studied [4, 8, 9, 10], and surgical diseases in high-yielding cows accounted for 84% of total diseases.

In most cases, bursitis, especially tarsal joint bursitis, is noted. During the biochemical examination of blood serum, it was observed that the amount of total protein, globulins, urea, cholesterol and phosphorus increased. Scientific studies have been conducted to determine the effect of movement activity on the quality of horn material of cows' hooves [6], and high movement activity thickens the tubule bark and reduces core erosion, this, in turn, has been noted to improve the morphometric parameters of the horn substance of the hoof. When cows were infected with Rusterholz's ulcer, due to erosion of hoof horn substance, motor activity decreased by an average of 36%, and in pododermatitis, motor activity decreased by an average of 56%.

In the treatment of cows with an ulcerated defect in the distal part of the legs, the inclusion of a natural sorbent of diatomite in the complex treatment led to the recovery of clinical indicators in animals. When this experimental scheme of treatment is used, it is ensured that the duration of treatment is shortened by 2-3 days [1, 7].

Scientific researches were carried out on the diagnosis of diseases of the legs of cattle in farm conditions [2], precarpal bursitis was recorded in 10 cows, serous, serous-fibrinous bursitis of the heel joint in 14 cows.

According to the authors, swelling, pain and fluctuation in acute aseptic subcutaneous bursitis, passive movement, imperceptible limp, elastic swelling in chronic serous-fibrinous bursitis, crepitation, bursolites and presence of fibrin in the bursa wall, yellowish exudate with fibrin fragments, locomotor disorder were clinically observed. Purulent bursitis has been identified as primary or secondary as a result of metastases and infection from surrounding tissues.

The etiological structure of infectious agents in purulent-necrotic lesions of the skin of the distal part of the legs of bighorn cattle was studied [3, 5], and as a result of research, *Pseudomonas aeruginosa* (100%), *Staphylococcus aureus* (67.8%), *Escherichia coli* were found in the purulent-necrotic disease of the distal part of the legs of cows. (49.3%), *Staphylococcus epidermitis* (42.7%), *Proteus vulgaris* (38.4%), *Streptococcus pyogenes* (27.8%) microorganisms were detected.

Research object and methods. Scientific research on the etiology of purulent pododermatitis in productive cows and the study of pathomorphological changes in the hooves was conducted at the Department of "Animal Anatomy, Histology and Pathological Anatomy" of the Samarkand State Veterinary Medicine University of Animal Husbandry and Biotechnology, at the Siyob-Shavkat Orzu farm in Tayloq District, Samarkand Region.

The obtained results and their analysis. As a result of the development of hoof diseases in productive cows, specific pathomorphological changes were manifested in them. Especially, as a result of changing the shape of the hooves, deep pathomorphological changes were observed in the hoof wall, hoof heel, hoof skin, and hoof bone. This is the main factor in the occurrence of hoof diseases. Due to the weakening of its protective layer in the hoof wall, hoof heel, and soft heel due to the influence of external factors, it causes injuries, the appearance of necrosis, purulent pododermatitis and other diseases. As a result of the conducted research, it was found that the skin base of the hoof heel, the tips of the tendons, the tendons, the soft heel and the hoof bone become necrotic as a result of the deepening of the pathological process in productive cows with pododermatitis.

The clinical status of the animals in the groups examined before the start of treatment was typical for purulent pododermatitis, and it was observed that the purulent-fibrinous inflammatory process took place.

When the hooves of sick productive cows were visually examined, defects were detected in their palms and the following cases were found: erosion of the horn layer, pathological channels leading to the base of the hoof skin, and a large amount of smelly exudate were released from them. Inflammatory swellings were formed in the tissues around them and spread to the soft heel and round side, local temperature and redness appeared on the skin.

Destructive and dystrophic changes have developed in the base of the skin and surrounding tissues, and in this chronic process, the processes of necrosis and necrobiosis spread to the epidermal, dermal and hypodermal layers. Beneath the fibrin sheaths, necrotic pathological tissue was abundantly formed around the defects in the hoof palm. It was observed that purulent exudate with a lot of leukocytes flowed from the formed fistulas, and inflammatory infiltration had the characteristic of aggressive diffuse penetration of the hoof from the palm side into the deep layers of the dermis. The microhemodynamic network in the dermal and hypodermal layers is similar to venous-capillary vessels filled with blood. Signs of depolymerization were detected in intercellular connective tissue in mature granulation tissue near the base of the wound.

Cows with purulent pododermatitis in the experimental group developed severe lameness, hyperthermia and edema in the tissues of the groin area by the seventh day. Despite the exudative process in the tissues, it was found that the intensity of inflammation decreased.

By the fifteenth day, positive dynamics were observed in the hooves of the cows in the experimental group, which indicates that the condition of the animals has changed in a positive direction. At the time of palpation, it was observed that the pain in the surrounding tissues decreased, although it was limited, mainly in the palm

part of the hoof. When the bandage placed on the hoof was examined, we observed a decrease in the amount of exudate released, which is a characteristic feature of the dehydration stage. It was found that healthy granulation tissue appears in defects in the palm of the hoof.

A visual examination of the hooves of cows infected with purulent pododermatitis in the control group revealed the formation of large granular granulation atypical tissue in the heel defect. This tissue was characterized by the presence of a cloudy fluid and fibrin layer on its surface, it was prone to bleeding, and the surface was ulcerated. Therefore, a slow growth process was noted in them, and no significant changes were observed in the general condition of the animals.

By the twenty-first day, it was found that the morphofunctional changes in the pathological process shifted in a positive direction. The condition of the animals in the experimental group is satisfactory, swelling, local temperature and pain have decreased. When we examined the tissue morphologically, it was found that reparative-regenerative processes and defragmental epithelization were clearly manifested on the surface of the wound in hoof defects.

In the control group, cows infected with purulent pododermatitis had a satisfactory general condition and appetite by the 24th-25th day, no lameness was observed, and the cows moved fully relying on the affected hooves. In the tissues around the hooves, swelling is absorbed, local temperature and pain are not felt during palpation. Defects in the palm of the hoof were completely filled with healthy granulation tissue, due to the end of the epithelization process, it was observed to be closed as a result of the growth of newly formed horn tissue from the edge of the wound.

It was found that the healing process was prolonged for 4-5 days due to partial pathological granulation in the hoof defects of cows infected with purulent pododermatitis in the control group. Therefore, in this cow, by the 24-25th day, due to the partial growth of the horn tissue around the wound, its complete closure was not observed, because the regeneration process was slower than in the experimental group.

One week after the treatment, healing processes of purulent pododermatitis at different stages were determined in all experimental animals. In animals, severe lameness, formation of small granular granulation tissue with a hard consistency was noted in the injured foci.

When the hooves were cleaned, partial bleeding was observed. In some animals, exudate components of a purulent nature were visible on the surface of the wound. Other animals in the experimental group showed improvement in general condition, weak lameness, correct position of legs. The injured area was dry, weakly painful, and a horny substance was detected around the injured tissue.

Two weeks after treatment, in some animals, it was observed that the lesion was filled with granulation tissue, and purulent coverings were formed on its surface. $\frac{1}{4}$ of the wound was filled with horny tissue, hard, partially painful when pressed, lameness was kept weak. In other cows in the experiment, it was observed that the purulent-necrotic focus was filled with dry, complete granulation tissue. In the pathological focus, it was found that there was a partial painful reaction, the general condition of the cows was good, and there was no lameness. On the 21st day of treatment, the same characteristic changes were observed in 4 heads of cows in the first experimental group: the formation of horny tissue in the wound, the growth of granulation tissue in the focus of inflammation, surrounded by a hard-to-move film. This condition was characterized by the shrinking of the injured hearth.

4 cows in the first experimental group showed complete recovery on the 21st day of treatment. In the remaining cow, it was noted that open wound defects were formed, filled with light red granulation tissue, and a horny layer was formed around it.

During examination of the hooves of the cows in the second experimental group, the following changes were detected in the hoof wall and the heel of the hoof: animals infected with purulent pododermatitis had necrotic

foci in the horn layer of the heel, and purulent fistulas were formed in some of them, from which it was found that white-yellow pus was flowing.

As a result of pathohistological studies, it was found that the blood vessels in the pathological focus are in a state of acute hyperemia, the emigration of erythrocytes and leukocytes is advanced, blood plasma and shaped elements and foci of purulent exudate are reflected in various forms around the vessel, in addition, there are a large number of leukocytes, few erythrocytes and eroded tissues in the exudate, it was found that connective tissue fibers and reticular cells are irregularly arranged and atrophied.

Connective tissue cells were eroded, and in the case of necrosis, fibers were divided into fragments, fibrinoid and mucoid staining was observed in collagen and elastic fibers, mucoid and fibrinoid substances were absorbed in the walls of fibers, and fibers were broken into fragments.

The foci of necrosis are stained in light red in eosin, and the nuclei are visible in the state of rhexis and pyknosis. Dystrophic changes in the cells, the walls of connective fibers are not differentiated and have undergone necrosis.

Collagen fibers are swollen, fibrinoid necrosis is observed in most of them, hyperplasia of elastic fibers and accumulation of fibrin between collagen fibers, hyalinosis, fibrinous changes in connective tissue, hyaline, the main substance of connective tissue, is formed instead of degraded collagen fibers, dystrophy of elastic fibers, damage to the structure of smooth muscle cells, it was noted that most of the elastic fibers were eroded.

It was found that the emigration of serum fluid and a large amount of polymorphous leukocytes developed from the vascular walls.

Dystrophic and atrophic changes were observed in the papillary layer of the dermis and the epidermal layer. Dystrophic changes in vascular endothelial cells, foci of necrosis and microabscesses, acute inflammation characterized by infiltration of polymorphous cells and neutrophilic granulocytes in some areas of the section were revealed.

On the third day of the experiment, fibrin was soaked in the inflammatory site, purulent necrotic tissue was limited, tissue hypoxia led to the development of tumors. Hygropic dystrophy was observed in cells with desquamous epithelium, hyperemia of colloidal vessels under the eroded tissues, blood deposits between the tissues.

On the seventh day of the experiment, not only quantitative changes in cell composition, but also qualitative changes were detected. As a result of the increase in blood circulation, swelling of the tissues occurred. Hyperemia of sinusoidal capillaries developed, as a result of cessation of exudative inflammation, some collagen fibers were not formed by uninjured tissues. In the control group, under the foci of necrosis, leukocyte infiltration and advanced hemorrhages were observed.

On the fourteenth day of the experiment, the qualitative development of granulation tissue, fibrin coatings were not visible on the surface of the wounds, leukocyte infiltration was observed in the center of the nuclei. In the control group, necrosis and fibrosis were noted in the center of the ulcer, and inflammatory infiltrates rich in plasmocytes, lymphocytes, and neutrophils were noted in the granulation tissue.

At the end of the experiment, complete epithelization developed on the surface of the wounds, granulation tissue between the epithelial components, connective tissue formed in the wounds, it was found that lymphoid infiltrates and fiber structure were developed on the edges, and blood vessels were densely located in the control group, and epithelial cells that formed scars were restored.

Conclusions:- as a result of the development of a complex necrotic process in the palm part of the hooves of productive cows infected with purulent pododermatitis, the development of disintegration in the tissues, the violation of blood circulation causes the spread of the pathological process, and the addition of microorganisms to it causes purulent pododermatitis;

- blood vessels are in a state of acute hyperemia in the pathological focus of purulent pododermatitis on the hoof, the development of emigration of erythrocytes and leukocytes, blood plasma and shaped elements around the vessel, and foci of purulent exudate are reflected in various forms, in addition, it is characterized by the presence of a large number of leukocytes, few erythrocytes and eroded tissue in the exudate, irregular arrangement of connective tissue fibers and reticular cells, atrophy.

References

1. Гугкаева М.С. Комплексная терапия гнойного пододерматита у крупного рогатого скота в хозяйствах РСО-Алания // Автореф. дисс. канд. вет. наук. Казань, 2011. 24 с.
2. Ладанова М.А., Суховальский О.К., Дашаев И.В. Диагностика болезней конечностей у крупного рогатого скота в ЗАО "Калининское". Вопросы нормативно-правового регулирования в ветеринарии. Ежеквартальный информационно-аналитический журнал. № 3. Санкт-Петербург, 2013. –С. 65-66.
3. Марьин Е.М., Лященко П.М., Сапожников А.В. Клиническая и патоморфологическая характеристика гнойных пододерматитов у крупного рогатого скота // Вестник Ульяновской ГСХА. -2015. -№4. -С.123-132.
4. Семенов Б.С., Виденин В.Н., Пилаева Н.В., Савина Г.Ю. Хирургические болезни конечностей у молочных коров. Вопросы нормативно-правового регулирования в ветеринарии. Ежеквартальный информационно-аналитический журнал. № 3. Санкт-Петербург, 2013. –С. 107-109.
5. Сольянчук П.В., Кочетков А.В., Руколь В.М. Ассоциация микроорганизмов при болезнях копыт у крупного рогатого скота. Актуальные вопросы и пути их решения в ветеринарной хирургии. Материалы Международной научно-практической конференции, посвященной 80-летию со дня рождения профессора Э.И.Веремея. Витебск, ВГАВМ, 2019. –С. 105-108.
6. Ховайло Е.В. Влияние двигательной активности на качество копытцевого рога коров. Вопросы нормативно-правового регулирования в ветеринарии. Ежеквартальный информационно-аналитический журнал. № 3. Санкт-Петербург, 2013. –С. 129-130.
7. Якоб В.К., Ермолаев В.А., Марьин Е.М. Клиническая характеристика заживления язвенных процессов в области копыт у крупного рогатого скота. Вопросы нормативно-правового регулирования в ветеринарии. Ежеквартальный информационно-аналитический журнал. № 3. Санкт-Петербург, 2013. –С. 138-140.
8. Kostlin R.G., Nuss K. Behandlung der eitrigen Klauengelenkentzündung beim Rind durch Gelenkresektion – Ergebnisse. // Tierarztl. Praxis. 1988.Т.16. N2.- S. 123-131.
9. Botle S., Igna C., Blaga L. Observatii asupra eficientei finadynului. In terapie unor procese algicesi inflamatorii la animale. // (Lucr./Inst. Agron. (Cluj-Napoca). Fac. Agr. Catedra Med. veter. 1989. Т. 15. – p. 369-374.
10. Parker D.W.H., Hinton M. Disease conditions diagnosed in culled adult cattle sent to an abattoir either with or without a veterinary certificate. // Veter. Rec. 1990. Т. 126. N. 8. – p. 189-190.
11. Muxtarov, B. (2021). The importance of " Al-Fiqh An-Nofoe" in solving modern social problems. *ACADEMICIA: An International Multidisciplinary Research Journal*, 11(4), 1161-1166.
12. Мухторов, Б. З. (2022). Махсулдорлиги юкори бўлган сигирларда йирингли пододерматит касаллигини айрим хўжаликларда учраш даражаси. *AGROBIOTEKNOLOGIYA VA VETERINARIYA TIBBIYOTI ILMIY JURNALI*, 411-414.

13. Dilmurodov, N. B., Muxtorov, B. Z., Muxtarov, E. A., & Yakubov, M. A. (2023). Change of biochemical indicators of blood in putural pododermatitis of productive cows. *ЎОЖ 619+ 636 КБЖ 48+ 45 Қ18, 5(7)*, 268.
14. Muxtorov, B. Z., & OO, U. (2023). Xorijdan keltirilgan mahsuldorligi yuqori bo'lgan sigirlarda yiringli pododermatitning keltirib chiqaruvchi sabablar. *Journal of new century innovations, 28(5)*, 30-34.
15. Mukhtorov, B. Z. (2023). Pathomorphological changes in hoofs in pododermatitis puturus in cows. *Ethiopian International Journal of Multidisciplinary Research, 10(12)*, 351-357.
16. Mukhtorov, B. Z. (2021, July). Treatment of purulent pododermatitis in productive cows. In *E-Conference Globe* (pp. 246-251).
17. Yakubov, M. A., Dilmurodov, N. B., Muxtorov, B. Z., & Muxtarov, E. A. (2023). Change of biochemical indicators of blood in putural pododermatitis of productive cows. *Scientific Impulse, 1(9)*, 555-562.
18. MUKHTAROV, B. Z., & DILMURODOV, N. B. Some Biochemical Indicators of Blood in Prosperous Cows in Pure Pododermatitis. *JournalNX, 6(06)*, 58-62.
19. Mukhtorov, B. Z., & Dilmurodov, N. B. (2021). Pathomorphological changes in poultry pododermatitis in cows. *Academicia: An International Multidisciplinary Research Journal, 11(4)*, 1679-1683.
20. Muzafar, Y., & Elmurod, M. (2022). Some Hematological Indications in Fertile Cows. *Central Asian Journal of Theoretical and Applied Science, 3(4)*, 107-110.