



Research Journal of Pharmaceutical, Biological and Chemical Sciences

Histological Changes Of Tissues In Purulent-Necrotic Inflammation Of Soft Tissues In The Hoof Area In Cows.

Evgeniy M Marin*, Valeriy A Ermolaev, Oksana N Marina, Pavel M Lyashenko, and Aleksey V Sapozhnikov.

Ulyanovsk State Agricultural University names after P.A. Stolypin. Ulyanovsk (the Russian Federation)

ABSTRACT

The studied clinical and morphological picture of healing of purulent-necrotic ulcerative lesions in the hoof in cows with their complex treatment with sorption-antiseptic drugs. It was found that the treatment regimen helps to reduce the intensity of acute purulent inflammation, the predominance of recovery processes in the tissues of the pathological focus and the favorable course of the disease.

Keywords: inflammation, ulcer, fibrin capillaries, granulation, tissue, repair

**Corresponding author*



INTRODUCTION

The current state of dairy farming in the Russian Federation is characterized by uneven manifestation of profitability of dairy production. One of the main constraints to the development of highly productive dairy farming, is a significant prevalence of diseases of the distal extremities in cattle. There are new etiological factors that contribute to the development of orthopedic pathology, which is a consequence not only of various injuries, but also of many other causes of industrial, technological, environmental and organizational nature [1, 3, 8, 10].

Diseases of the hooves of cattle in the last twenty years have become widespread around the world. Pathology of the distal extremities in cows and heifers is a serious problem of dairy farming. The seriousness of the problem of hoof diseases of dairy cows is evidenced by the fact that the study of orthopedic pathology of ruminants abroad regularly hosts national and international conferences and symposia [4, 5, 6, 11].

In 1982, an international Commission of experts on hoof diseases in ruminants was established, which proposed the division of hoof diseases on the basis of anatomical and topographic location of the lesion using Latin terminology. As a result, on such a small part of the limb as a hoof, you can describe 18 diseases. The most significant of non-communicable diseases of the limbs are laminitis, ulcer of the hook, ulcer of the sole, pododermatitis, double sole, hemorrhage of the sole, white line diseases. The second group – infectious diseases: interdigital dermatitis (Mortellaro's disease) and necrobacteriosis [14, 15].

In the pathology of the limbs of the animal most of the time is, does not consume the required amount of feed and water, can lose up to 40-50% of body weight. As a result, the milk productivity of the animal drops sharply (800-1000 liters of milk, and with purulent necrotic processes, milk yield can decrease by 80%), infertility occurs, or non-viable calves are born, as a result, the cow is discarded [2, 7, 9, 12, 13, 16].

The aim of this work was to study histomorphological changes in soft tissues of hooves in cows, patients with purulent-necrotic ulcerative inflammation in complex treatment.

RESEARCH TECHNIQUE

Experimental studies were conducted on the basis of LLC "Red Star" Ulyanovsk region Ulyanovsk region. Among the examined animals of black-and-white breed aged 4 to 10 years, with a live weight of 500...550 kg, 30 heads of cattle with diseases of the distal extremities, with a diagnosis of purulent necrotic ulcer were selected. Three experimental groups of ten animals in each were formed, two of them experienced and one control. Conditions, feeding and care were the same.

To study the effect of natural sorbent-diatomite in complex schemes on the healing processes of pyonecrotic lesions in cows, the following groups were formed:

- control group-after surgical treatment, a sterile tissue with Ostrovsky powder was applied in the hydration phase and in the second phase 3% tetracycline ointment was applied to the sterile tissue until the animal recovered;
- in the first experimental group also, after surgical treatment, was applied with a sterile napkin with experienced powder, composed of natural sorbent diatomite, zinc sulfate, soap, and boric acid, further superimposed bintawa bandage, after the phase of hydration applied the ointment Levomekol;
- in the second experimental group, after surgical treatment, a sterile cloth with an experimental powder consisting of a natural sorbent-diatomite, copper sulfate, potassium permanganate and furatsilin was applied, then a bandage was applied, A levomecol ointment was applied in the hydration phase.

Histological studies were carried out after mechanical treatment of the limbs before treatment, on the 7th and 14th days, the blade of the scalpel excised pieces of the affected surfaces with the obligatory presence of intact tissues of 1.5...2 cm in size, which were placed in the fixing liquid (10...12% formalin). Fixation of the material was carried out by neutral formalin, the concentration of which was changed depending on the subsequent method of study.

After fixation, the material was dehydrated in alcohols and poured into paraffin blocks according to conventional methods, then sections 5...8 μm thick were made on a microtome (MS-2), which were stained with hematoxylin-eosin and van gieson.

Histological studies were performed using an ocular screw microscope "MOV-1-15x" (GOST-151-50-69) and ocular mesh for cytohistostereometric studies with 100 and 25 points, using dry lenses with a resolution (8x and 40x), 7x and 20x eyepieces. For microphotography we used a microscope MBI-6 complete with a camera"SONY".

RESULTS AND THEIR DISCUSSION

Before treatment the ulcer surface in animals in the control groups is covered with stratified squamous epithelium neorogovevayuschy with on-existence of a deep ulcer, represented purulent - necrotic skim the detritus in the form of severe inflammatory neutrophilic infiltration with admixture of fibrin films and single full-blooded vessels of the capillary type in the papillary layer of the dermis. Bundles of collagen fibers with fragmentation in the form of focal homogeneous structures surrounded by loose fibrous connective tissue with moderate inflammatory leukocyte infiltration were found in the deep mesh layer of the dermis.

In the first experimental group, the ulcer surface is covered with a multi-layer flat non-keratinizing epithelium with a plurality of full-blood vessels of capillary type and the presence of diffuse inflammatory, mainly lymphocytic infiltration with an admixture of single leukocytes in the upper layers of the dermis. In the deep layers of the dermis, perivascular inflammatory infiltrates were found, mainly lymphocytic cells with small focal hemorrhages with the presence of some thickened vessels due to fibrosis of their wall. Surrounding collagen fibers in the deep layer of the dermis in the stage of their disorganization in the form of fragmented homogenized areas. A purulent-necrotic ulcer defect was found, a deep layer of the dermis is represented by fibromuscular tissue with the presence of large areas of necrosis of collagen fibers in the form of homogenization and swelling in certain fields of vision. Among the fibro-muscular fibers tangles of small blood vessels with mild fibrosis of their walls and paretic advanced, most of which is empty. Slight perivascular inflammatory infiltration with predominance of lymphocytes and histiocytes.

In animals of the second experimental group, the ulcer surface is covered with a thickened layer of multilayer flat non-keratinizing sites with keratinization of the epithelium, with the presence of a deep ulcerative defect of the epithelium, represented by diffuse inflammatory infiltration of neutrophil cells to the upper layers of the dermis, with areas of fibrin on the surface.

In the deep layers of the dermis collagen fibers with isolated areas of their disorganization in the stage of mucoïd swelling, in one of the fields of view found a group of thickened vessels of arterial type due to severe fibrosis with significant mixed cell lymphocytic infiltration in their wall and perivascular in the surrounding loose fibrous tissue.

A week after the start of treatment in the control group, the inflammatory process in the soft tissues of the hooves was accompanied by severe hyperkeratosis and acanthosis of the epithelium with the presence of focal purulent inflammation in its surface areas and an admixture of a large number of fibrinous overlays on its surface. In the deep layers of the dermis, capillary vessels are thickened due to fibrosis with predominantly perivascular chronic lymphoid cell infiltration.

In the first experimental group of ulcerous defect is covered with a thick layer of stratified squamous epithelium with presence in parts of the surface of a small focal area of the ulcer in the form of a fibrinous-purulent inflammation with a mixture of a large number of red blood cells, at the periphery of the well defined, Mature granulation tissue. On the periphery of the site of the purulent-necrotic defect, the growth of fibrous granulation tissue was noted.

On the seventh day, in the second experimental group, dense fibrous tissue with the presence of a small area of purulent-necrotic inflammation on the surface was noted, along the periphery of which Mature granulated tissue with the presence of many small tangles of capillary vessels, a large number of histiocytes, a small number of lymphocytes and single basophils.

Selected material is presented epithelial layer nekrotizirovanne with a thickened Horny layer with a single fibrotsementnymi and sklerozirovanie empty vessels.

On the 14th day in the control group of ulcer defect-rivalsa a thick layer of stratified squamous epithelium with phen-tions of hyperkeratosis in superficial departments expanded-tion of thin-walled vessels, the lumen of which is noted by red blood cells, fibrin, mixed with a moderate number of granular white blood cells, sometimes beyond the vascular wall.

In the superficial parts of the dermis in the interepithelial spaces maturing granulation, directly under the epithelial layer of a small chronic lymphocytic infiltration.

In the first experimental group, a thickened layer of multi-layer flat epithelium with hyperkeratosis phenomena in the form of horn masses on the surface, acanthosis and the presence of small full-blood vessels were found.

In the second experimental group in the area of ulcerative defect the thickened layer of multilayer flat epithelium with corneal dystrophy in the form of strongly expressed hyperkeratosis with adjacent dermis, represented by compacted collagen fibers and fibrous vessels of capillary type was noted.

Thus, prior to the beginning of treatment in histomorphological examination morphofunctional disorders were established: damage to cell elements, structural changes in the vascular system. After a week of the start of treatment in the experimental groups were detected formed of fibrous-and granulation tissue. Localized (focal) purulent inflammation was noted in the control group. At the time of clinical recovery in all groups in the selected biopsies, the formation of scar tissue in the form of thick layers of multilayer flat epithelium with hyperkeratosis phenomena, the growth of dense fibrous tissue with focal chronic inflammatory process was noted at the site of the existing ulcerative defects.

REFERENCES

- [1] Gimranov, V. V. Clinical features of purulent-necrotic lesions on the fingers in cattle / V. V. Gimranov // Bulletin Bashkir state agrarian University. - 2006. - № 7. - P. 19-22.
- [2] Features of pathology in the field of fingers in cattle Holstein-Friesian breed / V. Gimranov // Materials of the all-Russian scientific and practical conference with international participation in the framework of the XVIII International specialized exhibition "Agrokompleks-2008". In the collection: Integration of agricultural science and production: state, problems and solutions. Ministry of agriculture of the Russian Federation, Ufa. - 2008. - P. 39.
- [3] Ermolaev, V. A. The pathology of hooves of dairy cows / V. A. Ermolaev, E. M. Marin, O. N. Marina, P. M. Lyashenko, A. V. Sapozhnikov // In the book: Modern problems of veterinary, zootechny and biotechnology. - 2015. - P. 157-163.
- [4] Zhurba, V. A. the use of the drug "Dexamet" in the complex treatment of cows with purulent pododermatitis / V. A. Zhurba, E. I. Veremey, A. I., Matusevich, I. A. Kovalev // Questions of normative-legal regulation in veterinary medicine. - 2017. - № 1. - P. 77-79.
- [5] Lopatin, S. V. diseases of the fingers of the cows: causes and treatment of / S. V. Lopatin, A.A. Samolov // Animal Husbandry of Russia. - 2014. - №54. - Pp. 27-28.
- [6] Pisarenko, V. F. Comparative effectiveness of drugs for treatment of cows with syndrome of infectious digital dermatitis / V. F. Pisarenko, and A. M. Kovalenko, Y. A. Bahturin // Vestnik of Kursk state agricultural Academy. - 2014. - № 5. - P.70-71.
- [7] Rukol, V. M. Influence of ecologically pure preparation "Bioheat gel" on milk quality indicators in the treatment of cows with diseases of the limbs / V. M. Rukol // Scientific notes of the educational institution Vitebsk order of the badge of honour state Academy of veterinary medicine. - 2013. - Vol. 49. - № 2-1. - P. 342-345.
- [8] Rukol, V. M. Histomorphological changes in tissues in the complex treatment of cattle with finger diseases / V. M. Rukol // Scientific notes of the educational institution Vitebsk order Badge of honor state Academy of veterinary medicine. - 2015. - Vol. 51. - №1-1. - P. 132-136.
- [9] Rukol, V. M. Pathomorphogenesis ulcers of the finger pulp in cows / Rukol V. M., A. L. Lyakh, E. V. Khovaylo // Questions of normative-legal regulation in veterinary medicine. - 2017. - № 3. - P. 86-89.



- [10] Semenov, B. S. Disease of the limbs vysokoprochnykh cows / B. S. Semenov, O. K. blukhovolsky, E.V. Rybin, // Materials of International scientific-practical conference dedicated to the 80th anniversary of the faculty of veterinary medicine, "Current problems in diagnostics, therapy and prevention of diseases of domestic animals." - Voronezh: Voronezh state agrarian University im. Emperor Peter I, 2006. – Pp. 267-269.
- [11] Stekolnikov, A.A. The disease of the extremities of cattle in the intensive management of livestock, the prevention and treatment of the disease in the collection / A.A. Stekolnikov // Actual problems of veterinary surgery, the Materials of the International scientific conference. Ulyanovsk state agricultural Academy. - 2011. - P. 3-9.
- [12] Khovailo, E. V. Morphological assessment of crumb ulcer healing in cattle using the drug ASD-3 / E. V. Khovailo // In the collection: Agriculture - problems and prospects collection of scientific papers. Educational institution "Grodno state agrarian University". Grodno, 2015. - Pp. 243-250.
- [13] Cook, N.B. New Developments in Digital Dermatitis Control / N.B. Cook // AABP Proceedings. – 2015. - № 48. – P. 88 -93.
- [14] Döpfer, D. Dermatitis digitalis: Klauen-krankheit mit vielen Gesichtern / D. Döpfer // Milchpur das Magazin des Milchprüfungsring Bayern E.V. – 2012. – V. 3. – S. 12-17.
- [15] Khomyn, N.M. Prevalance and causes of diseases occurrence of cows hooves / N.M. Khomyn, A.R. Mysak, I.I. Iglitskej, V.V. Pritsak // Scientific Herald Lviv National University Veterinary Medicine And Biotechnology Name C.3. Gzhytsky. - 2017. - T. 19. - № 77. - C. 22-26.