Registered in Germany Europa Revue Journal
ISSN: 1862-6564 Vol. 6 No. 10 (2026) Published October 13, 2026

STUDY OF PATHOMORPHOLOGICAL CHANGES AND PREVENTIVE MEASURES IN BOVINE MASTITIS

Tashkent Branch of Samarkand State University of Veterinary Medicine, Animal Husbandry and Biotechnology PhD in Veterinary Sciences

O. I. Koziboyeva

Trainee Teacher

Sh.I.Elmamatov

Abstract

This study is devoted to investigating the potomorphological changes, causes, and preventive measures of mastitis in dairy cows. The research analyzed the mechanism of disease development, pathological changes in the udder's glandular and connective tissues, immunological reactions, and inflammatory processes. Preventive measures such as compliance with sanitation and hygiene requirements, improvement of milking technology, and correct application of treatment methods were also evaluated. The results contribute to ensuring healthy milk production and improving economic efficiency in livestock farms.

Keywords

mastitis, dairy cows, pathomorphology, udder, mammary glands, inflammation, *Staphylococcus aureus, Streptococcus spp., E. coli*, epithelial necrosis, lymphocytes, neutrophils, fibrosis, zoohygiene, milking technology, prevention, immunoprophylaxis, treatment.

QORAMOLLARDA MASTIT KASALLIGIDA PATOMORFOLOGIK O‘ZGARISHLAR VA PROFILAKTIK CHORA-TADBIRLARNI O‘RGANISH. ИЗУЧЕНИЕ ПАТОМОРФОЛОГИЧЕСКИХ ИЗМЕНЕНИЙ И ПРОФИЛАКТИЧЕСКИХ МЕРОПРИЯТИЙ ПРИ МАСТИТЕ У КРУПНОГО РОГАТОГО СКОТА.

Annotatsiya: Ushbu tadqiqot sog‘in sigirlarda mastit kasalligining patomorfologik o‘zgarishlari, kelib chiqish sabablari va profilaktik chora-tadbirlarini o‘rganishga bag‘ishlangan. Tadqiqotda kasallikning rivojlanish mexanizmi, yelin bezlari va biriktiruvchi to‘qimalaridagi patologik o‘zgarishlar, immunologik reaksiyalar hamda

yallig‘lanish jarayonlari tahlil qilindi. Shuningdek, sanitariya-gigiyena talablariga rioya qilish, sog‘ish texnologiyasini takomillashtirish va davolash usullarini to‘g‘ri qo‘llash kabi profilaktik chora-tadbirlar baholandi. Tadqiqot natijalari sog‘lom sut ishlab chiqarishni ta’minlash hamda chorvachilik xo‘jaliklarining iqtisodiy samaradorligini oshirishga xizmat qiladi.

Аннотация: Данное исследование посвящено изучению потоморфологических изменений, причин и профилактических мер мастита у молочных коров. В работе проанализированы механизмы развития заболевания, патологические изменения железистой и соединительной ткани вымени, иммунологические реакции и воспалительные процессы. Также были оценены профилактические меры, такие как соблюдение санитарно-гигиенических требований, совершенствование технологии доения и правильное применение методов лечения. Результаты исследования способствуют обеспечению здорового производства молока и повышению экономической эффективности на животноводческих фермах.

Kalit so‘zlar: mastit, sog‘in sigirlar, patomorfologiya, yelin, sut bezlari, yallig‘lanish, *Staphylococcus aureus, Streptococcus spp., E. coli*, epiteliy nekrozi, limfotsitlar, neytrofillar, fibroz, zoogigiyena, sut sog‘ish texnologiyasi, profilaktika, immunoprofilaktika, davolash.

Ключевые слова: мастит, дойные коровы, патоморфология, вымя, молочные железы, воспаление, *Staphylococcus aureus, Streptococcus spp., E. coli*, некроз эпителия, лимфоциты, нейтрофилы, фиброз, зоогигиена, технология доения, профилактика, иммунопрофилактика, лечение.

INTRODUCTION: One of the important priorities in ensuring food security and meeting the population’s demand for food products in our country is the intensive development of the livestock sector, increasing the number of highly productive cows, extending their productive lifespan, and producing environmentally safe and high-quality milk and dairy products. The incidence of infectious mastitis among highly productive cows averages 22–60%, resulting in decreased milk productivity and milk quality, an increased incidence of various diseases among calves born from affected

cows, and additional economic costs for livestock farms associated with veterinary and sanitary measures.

Timely diagnosis, effective treatment, and prevention of mastitis and subclinical mastitis caused by conditionally pathogenic microorganisms such as *Staphylococcus*, *Streptococcus*, *Escherichia*, *Pseudomonas*, and *Pasteurella* in cattle remain among the pressing problems requiring further investigation and practical solutions [3; 5].

In most countries of the world, mastitis is widespread in cattle farming. Under farm conditions, approximately 20–25% of mammary gland diseases occur when cows are milked manually, whereas during machine milking, the incidence of mammary gland diseases reaches 35–40% [2; 4].

Mastitis occurs in approximately 17.5% of cows during the dry-off period and in 20–23.7% of cows during the dry period. As a result of these diseases, the total amount of milk obtained decreases by 15–20%, while milk fat content decreases by approximately 0.8–1%. The productive lifespan of highly productive animals in farms may be reduced to 6–8 years. The sanitary quality of milk also deteriorates, resulting in poor-quality dairy products being produced from such milk. Affected cows may develop reproductive disorders and remain infertile. In young animals, consumption of contaminated milk may contribute to digestive disorders such as dyspepsia (diarrhea), while in young children, consumption of contaminated dairy products may potentially contribute to diseases such as scarlet fever. Economic losses in cattle farming are associated with reduced productivity, premature compulsory slaughter or death of animals, and increased veterinary costs.

In many cases, unfavorable environmental factors not only adversely affect the resistance and overall physiological condition of livestock but also create favorable conditions for the spread of mastitis pathogens. Therefore, determining the prevalence of infectious mastitis, improving effective methods and means of its diagnosis, treatment, and prevention, establishing early diagnosis, and implementing modern systematic control measures while taking into account the environmental conditions of specific regions and zoohygienic requirements for animal housing are among the important current tasks [1, 6, 7].

Infectious mastitis is widely distributed among livestock farms throughout the Republic. According to the scientific literature, although the course of this disease, diagnostic methods, treatment approaches, and the efficacy of medicinal products were studied by some researchers in different regions of the Republic during the 1980s and 1990s, changes in livestock management systems and the development of new approaches to cattle farming make it necessary to reassess the current epidemiological and epizootological situation of infectious mastitis in cattle based on reliable evidence and indicators. Therefore, the development of effective measures for the treatment and prevention of the disease and their implementation in veterinary practice remain relevant tasks. The incidence of infectious mastitis in cows worldwide has been reported to be approximately 40% among a population of 211 million cattle, while in livestock farms of our country it ranges from 8% to 32%. This disease leads to a reduction in milk productivity, adversely affects the technological quality of milk, and often causes the mammary gland quarters of dairy cows to become unsuitable for further production due to tissue atrophy.

Various antibiotics, sulfonamides, and other medicinal preparations are used in the treatment of infectious diseases. However, before applying these drugs, it is necessary to determine the susceptibility of the causative agents to antibiotics and other antibacterial preparations. Treatment without determining the antimicrobial susceptibility of infectious disease pathogens is often ineffective. Therefore, in our studies, before treating cows affected by infectious mastitis, we investigated the susceptibility of the causative agents—including *Staphylococcus*, *Streptococcus*, *Enterococcus*, *Escherichia*, *Proteus*, *Citrobacter*, and *Pseudomonas*—to antibacterial preparations.

The susceptibility of *Staphylococcus*, *Streptococcus*, *Enterococcus*, *Escherichia*, *Proteus*, and *Pseudomonas* to penicillin, streptomycin, sulfadiazine, chloramphenicol, tetracycline, enrofloxacin, kanamycin, monomycin, polymyxin, erythromycin, oleandomycin, tylosin, as well as anti-mastitis preparations such as Mastisan and Masticid, was studied using the disk diffusion method. If the zone of growth inhibition around the test culture ranged from 15 to 25 mm, the microorganism was considered moderately susceptible; a zone greater than 25 mm indicated susceptibility. The absence

of a growth inhibition zone indicated resistance of the microorganism to the respective antibiotic.

The results of testing the susceptibility of the above-mentioned *Staphylococcus*, *Streptococcus*, *Enterococcus*, *Escherichia*, *Proteus*, and *Pseudomonas* species to antibacterial preparations demonstrated differences in their sensitivity to the tested drugs.

Materials and Methods: The scientific research was conducted in 2025–2026 using milk samples collected from lactating cows for the investigation of infectious mastitis, including clinical and subclinical forms. The study was carried out at the "Jamol Chorva Nasil" farm in Yangiyul District, Tashkent Region; the "Ergash Ota" farm in Tashkent Region; and among households in Tashkent Region where dairy cows were kept.

Experimental studies were conducted on a total **of** 280 cattle, 12 rabbits, and 5 cats**.** Clinical examination of lactating cows was performed through general clinical assessment and organoleptic evaluation of the udder and its quarters. Particular attention was paid to the color and shape of the udder skin, condition of the teats, pain response, consistency of the udder tissue, local temperature, and the condition of the supramammary lymph nodes. The tone and patency of the teat canal, as well as the type and consistency of the secretion and the presence of abnormal masses or foreign material in the secretion, were also assessed.

Before collecting milk samples from cows suspected of having clinical or subclinical mastitis, the teats were disinfected with 70% ethyl alcohol**.** Approximately 2 mL of pathological material or 4–5 mL of milk was collected from the affected quarter of the udder into sterile Eppendorf tubes. The samples were placed in a thermos containing ice and transported for bacterioscopic and bacteriological examination**,** including isolation of pure cultures.

For the isolation of pure cultures from pathological (abnormal) milk samples, *Staphylococcus* spp. were cultured on mannitol salt agar supplemented with phenol red, egg-yolk salt agar, milk salt agar, sucrose agar, Agar D, and blood agar**.**

Streptococcus spp. were cultured on broth supplemented with trypan blue or crystal violet according to the method of N. G. Shatokhin**,** lactose broth, blood serum medium, and broth supplemented with neomycin and bromocresol purple according to the method

of V. M. Kartashova, as well as Chesbro–Evans alkaline nutrient broth**.**

Escherichia, *Pseudomonas*, *Proteus*, *Citrobacter*, and *Enterobacter* spp. were cultured on GPB (general-purpose broth), GPA (general-purpose agar), Endo agar, and Ploskirev agar**.**

After inoculation of the pathological materials onto the respective culture media, the inoculated media were incubated in a thermostat at 37°C for 1–3 days. Following incubation, the cultures were examined for bacterial growth, and their growth characteristics and other cultural properties were evaluated.

Clinical and laboratory examinations: Cows underwent a general clinical assessment, including body temperature, milk color and consistency, udder swelling and pain, and signs of inflammation. Laboratory studies included bacteriological analysis of milk samples and hematological and biochemical blood tests.

Potomorphological analysis: Biopsy and necropsy samples of affected mammary glands were prepared for histological sections. Microscopic examination of glandular epithelium, alveoli, and ducts determined the degree of inflammation, type of infiltration, necrosis, and fibrosis.

Preventive measures: To prevent mastitis, the following measures were implemented: use of individual and sterile milking equipment**,** regular disinfection of mammary glands, balanced feeding, reduction of stress factors, and application of immunoprophylaxis**.** Results were statistically processed using arithmetic mean (M), standard error (m), and confidence level (P).

Results and Discussion: Incidence: Mastitis most commonly occurred in dairy cows during the first 2–3 years of lactation.

Clinical signs: Changes in milk color and consistency, swelling and pain in mammary glands, and general weakness.

Laboratory findings: Milk samples revealed *Staphylococcus aureus*, *Streptococcus spp.*, and *E. coli*. Hematological and biochemical indicators reflected inflammation and immune response: leukocytosis, increased total protein and globulin levels, and slight disruption of electrolyte balance.

Potomorphological findings: Lymphocyte and neutrophil infiltration in alveoli

and ducts, epithelial necrosis, and, in some cases, fibrosis were observed. These pathological changes explain the clinical course of mastitis and treatment outcomes.

Preventive effectiveness: In groups where preventive measures were applied, the incidence and severity of mastitis were significantly reduced.

Conclusion

1. Mastitis is widespread in dairy cows, with bacterial infections, improper milking techniques, and violations of zoohygienic standards as the main etiological factors.

2. Potomorphological analysis revealed inflammatory processes, epithelial necrosis, and fibrotic changes in the mammary glands.

3. Preventive measures-sterile milking, individual equipment, balanced feeding, and immunoprophylaxis-were scientifically proven to reduce disease incidence.

4. The study's results contribute to maintaining healthy milk production and improving economic efficiency in livestock farms.

REFERENCES

1. Шатохин Н.Г. Инфекционные маститы коров, овец икоз в Узбекистане и меры боръбы с ними\ автореферат, докт.вет.наук.1971 г. Масква, 3-40.с.

2. Карташова О.Л. Диагностика скрытых форм мастита у коров / О.Л. Карташова, С.Б. Киргизова, Е.Ю. Исайкина // Ветеринария. - 2004. - № 10. - С. 32-35.

3. Семиволос А.М. Сравнительная эффективность лечения различных форм маститов у коров/А.М. Семиволос, И. Идельбаев, В.А. Агольцов//Вавиловские чтения -2006: Материалы конференции, посвященной 119-й годовщине со дня рождения академика Н.И. Вавилова, 4-8 декабря 2006. Секция ветеринарии и биотехнологии. - Саратов, 2006. -С.89-92.

4. Бочкарев В.Н. Лечение маститов коров / В.Н. Бочкарев, М. Славецкая, О. Панферова // Ветеринария сельскохозяйственных животных. - 2010. - № 10. -С. 31-32.

5. Барышев В.А. Сравнительная оценка лечебной эффективности препаратов «Мастисан А» и «Мастифит» при субклиническом мастите коров / В.А. Барышев // Международный вестник ветеринарии. - 2016. - № 2. - С. -34-38.

6. Bradley A.J. Aetiology of clinical mastitis in six Somerset dairy herds / A.J. Bradley, M.J. Green // Veterinary Record. - 2001. - V. 148. - P. 683-686.

7. Fox L.K. Teat skin normal flora and colonization with mastitis patogen inhibitor // Veter. Microbiol., 2002. - V. 17. - N. 4.-P. 357-365.