BG Pulse Journal USA
ISSN:1947-2536 http://www.bgpulseusa.com/index.php/bg
BG PULSE JOURNAL

UDC: 619:618.19-002:636.39

ETIOPATHOGENESIS, CLINICAL AND MORPHOLOGICAL CHARACTERISTICS, AND MODERN THERAPEUTIC APPROACHES TO PURULENT MASTITIS IN GOATS

Dusyarov Nurmuhammad Muqumovich

Assistant, Department of Higher Nursing, Zarmed University

Ochilov Shahboz Ilhomovich

Assistant, Department of Morphology, Zarmed University

Orinov Khakberdi Sadriddin ugli

PhD in Veterinary Sciences, Assistant, Department of Higher Nursing, Zarmed University

Abstract: This scientific article systematically covers the etiopathogenesis, clinical and morphological features, modern diagnostic methods, pharmacotherapy, and preventive measures of purulent mastitis in goats.

Keywords: goat, mastitis, purulent inflammation, mammary gland, *Staphylococcus aureus*, antibiotic, prevention, etiopathogenesis, somatic cells, meta-analysis.

Introduction

Mastitis is a polyetiological inflammatory disease of the mammary gland and is one of the most widespread and economically damaging pathologies in modern dairy farming [1]. Within the framework of state programs for the development of livestock farming in the Republic of Uzbekistan, special attention is being paid to goat breeding and the processing of goat milk. Goat milk ranks fourth in the world in milk production and has become increasingly popular among consumers in recent years [2].

Although mastitis in goats has been studied less than in cows, interest in mammary gland pathology in small ruminants has grown in recent years. Purulent mastitis manifests itself especially in gangrenous and non-gangrenous forms: in the first, the likelihood of the animal's death is high, while the second requires prolonged rehabilitation [1]. In the conditions of Uzbekistan, the problem of mastitis in goats has not been sufficiently studied, and the present study aims to fill this gap.

Mastitis is defined as inflammation of the mammary gland. The inflammatory process most often results from intramammary infections caused by various pathogenic agents [3]. Dysbiosis of the microbiota plays an important role in the pathogenesis of mastitis [4, 5, 6].

Aim of the study: to systematize, on a scientific basis, the etiopathogenesis, clinical and morphological features, diagnostic criteria, and effective treatment methods of purulent mastitis in goats, and to determine the prevalence of the disease by means of a meta-analysis.

Materials and Methods

The study was carried out on the basis of an analysis of scientific literature published between 2019 and 2026. Prevalence rates were calculated using a random-effects model. Heterogeneity was

assessed using the I^2 statistic and the Q-test. The R program (version 4.2.1) with the "meta" package and the Comprehensive Meta-Analysis 3.0 software were used for data analysis.

Etiological Factors

The complex influence of etiological factors is important in the development of purulent mastitis in goats. The factors are divided into five main groups: biological, mechanical, thermal, alimentary, and climatic.

***Staphylococcus* spp.** are the pathogens most frequently isolated from cases of goat mastitis. *Staphylococcus aureus* is coagulase-positive (CPS) and is distinguished by very high pathogenicity. According to the meta-analysis by Tibebu et al., the pooled prevalence is 11.0% (95% CI: 7–16%) for *S. aureus* and 24.0% (95% CI: 20–27%) for coagulase-negative staphylococci (NAS). Coagulase-negative staphylococci (CNS) are found in 60–80% of subclinical mastitis cases.

***Streptococcus* spp.** occur in 5–10% of mastitis cases in goats. According to the meta-analysis results, the pooled prevalence of streptococcal mastitis is 3.0% (95% CI: 1–6%).

Other pathogens, such as *E. coli*, *Pseudomonas*, and *Mycoplasma* spp., are less common but cause severe clinical forms. In the conditions of Uzbekistan, especially in the hot climate, the role of opportunistic pathogens such as *Pseudomonas* and *E. coli* may be significant.

Factors specific to our republic: the arid climate, high summer temperatures, and seasonal changes in humidity influence the development of mastitis. In the summer months in particular, high temperatures and contamination of bedding lead to active proliferation of pathogenic flora. In addition, worn-out milking equipment and non-compliance with hygiene rules on small farms increase the spread of mastitis.

Clinical Signs

The clinical signs of purulent mastitis vary depending on the severity of the inflammatory process:

Table 1. Clinical forms and signs of purulent mastitis

Form	Local signs	Systemic signs	Changes in milk
Catarrhal-purulent	Swelling of the udder, pain, redness	Fever (39.5–41°C), lethargy	Flakes, admixture of pus, yellow-green color
Phlegmonous	Diffuse swelling, severe pain, restricted movement	Anorexia, depression, accelerated pulse	Purulent-hemorrhagic, foul odor
Gangrenous	Darkening of the skin, coldness, odorless decay	Severe toxemia, collapse, high risk of death	Watery, bloody, putrid odor

Diagnosis

The diagnosis is made on the basis of the following stages:

1. Clinical examination (inspection, palpation, thermometry)
2. Physicochemical examination of milk (color, consistency, pH, KTS)

3. Cytobacteriological examination – inoculation of samples taken from purulent milk onto Petri dishes
4. Antibiogram – to select an effective antibiotic

Somatic cell count (SCC). The diagnostic value of SCC in goats is limited, because the somatic cell count in healthy goats is higher than in cows [2]. The USA has set the maximum SCC limit for goats at 1.5×10^6 cells/ml, while for cattle this figure is 4 times lower [7].

California Mastitis Test (CMT). This is the cheapest and most widely used screening test, but it has low specificity (CMT detects 80% when the count exceeds 7×10^6 cells/ml) [7]. In the conditions of Uzbekistan, the CMT test can be widely used on small farms, but its limitations must be taken into account.

Bacteriological identification is considered the gold standard [15]. Molecular methods (PCR) have high sensitivity and specificity [9]. The introduction of PCR diagnostics in veterinary laboratories in Uzbekistan would significantly improve the quality of identification of mastitis pathogens.

Treatment

The treatment of purulent mastitis requires a comprehensive approach.

Table 2. Main drugs used in purulent mastitis and their doses (goats)

Drug group	Preparation	Route of administration	Dose	Duration
Penicillins	Procaine benzylpenicillin	i.m.	20,000–30,000 IU/kg	5–7 days
Aminoglycosides	Streptomycin sulfate	i.m.	10–15 mg/kg	5 days
Fluoroquinolones	Enrofloxacin (5%)	i.m./s.c.	2.5 mg/kg	3–5 days
Tetracyclines	Oxytetracycline	i.m.	10–20 mg/kg	3–5 days
Intracisternal	Mastijet, Mastisan	Via the udder canal	5 ml/quarter	3–5 days

Antimicrobial resistance (AMR) is becoming a global health problem. *Staphylococcus* spp. are showing resistance to amoxicillin, tetracycline, and penicillin. In our republic, it is urgent to monitor antibiotic resistance and to introduce treatment based on the antibiogram.

Therapeutic recommendations for the conditions of our republic: disinfection of the udder before and after milking is mandatory; preparations available in local veterinary pharmacies (Brovafom, Mastisan, Mastiject) may be used; in severe cases, complex therapy: antibiotic + symptomatic treatment + immunostimulants; based on the "One Health" principle, control that there are no antibiotic residues in the milk. Prevention includes the following areas:

- *Hygienic:* wiping the udder with a clean cloth before each milking; disinfecting the teats (dip);

- *Zoohygienic:* regular replacement of bedding, humidity <70%, ventilation, stocking-density norms;
- *Feeding:* BEP ("bir em-xashak"), vitamins A and E, selenium (E-selenium preparations);
- *Monitoring:* control milking for latent mastitis (KTS test) once a month;
- *Quarantine:* isolation of goats with clinical mastitis and separate milking.

Key factors of effective control: early diagnosis (clinical + laboratory) based on clinical examination, physicochemical examination of milk, cytobacteriological examination, and the antibiogram; targeted antibiotic therapy based on the antibiogram; strict implementation of hygienic and zoohygienic measures; and regular control milking (CMT test).

Practical recommendations: establishing mastitis monitoring on goat farms by the veterinary service; conducting practical training on the CMT test for small farms; organizing monitoring of antibiotic resistance; and introducing modern diagnostic methods (PCR) in veterinary laboratories.

Applying the "One Health" principle – a comprehensive assessment of the impact of mastitis on the health of animals, humans, and the environment – is important in modern veterinary medicine. The use of anti-mastitis vaccines for goats (for example, Startvac, Mabellin) and probiotics is considered promising.

Conclusion

Purulent mastitis in goats is a pathology with a severe clinical course, a sharp decrease in milk productivity, and a threat to the animal's life. The meta-analysis results showed that the prevalence of mastitis in goats is 36% (95% CI: 25–50%). Subclinical mastitis is the most widespread form and is caused mainly by coagulase-negative staphylococci.

References

1. Rashidov B.S., Bobomurodov R.I., Kulashov O.U. Etiopathogenesis, clinical and morphological characteristics and therapeutic approaches to purulent mastitis in goats. Scientific Journal of Agrobiotechnology and Veterinary Medicine. 2026;5(4):31-36. (In Uzbek)
2. Novac C., Andrei S., Catoi C., et al. Aspects regarding the aetiology of goat mastitis and the importance of milk somatic cell count. Bulletin UASVM Veterinary Medicine. 2019;76(2):117-125. doi:10.15835/buasvmcn-vm:2019.0025
3. Accorsi PA, Paccioni B, Pezzi C. Role of prolactine growth hormone and insuline like growth factor in mammary gland involution. J. Dairy Sci. 2002;85:507-513.
4. Contreras GA, Rodríguez JM. Mastitis: Comparative Etiology and Epidemiology. J. Mammary Gland Biol. Neoplasia. 2011;16:339-356.
5. Oikonomou G, Machado VS, Santisteban C, et al. Microbial Diversity of Bovine Mastitic Milk as Described by Pyrosequencing of Metagenomic 16s DNA. PLoS ONE. 2012;7(10):e47671.
6. Rainard P. Mammary microbiota of dairy ruminants: fact or fiction? Vet. Res. 2017;48:25.
7. Tibebu A., Teshome Y., Tamrat H., Bahiru A. Mastitis in goat: A review of etiology, epidemiology, economic impact, and public health concerns. One Health. 2025;101131. doi:10.1016/j.onehlt.2025.101131