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PATHOGENESIS AND RISK FACTORS OF LAMENESS AND NECROBACTERIOSIS IN HIGH-YIELDING CATTLE

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ABSTRACT

This study investigates the pathogenetic basis of lameness and necrobacteriosis in high-yielding cattle. The interrelationship between feeding systems, ruminal acidosis, and laminitis under intensive dairy farming conditions was analyzed. The results demonstrated that the majority of lameness cases were associated with hoof pathologies. Furthermore, disturbances in microcirculation and secondary infections were identified as key factors contributing to the development of necrobacteriosis.

Keywords: cattle, lameness, necrobacteriosis, ruminal acidosis, laminitis, hoof disorders

INTRODUCTION

In recent years, lameness and necrobacteriosis in high-yielding cattle have become major challenges in veterinary practice. The widespread use of high-concentrate diets, reduction in fiber content, and implementation of total mixed ration (TMR) feeding systems in intensive dairy farming have significantly contributed to the increasing prevalence of these conditions.

Lameness is not a specific disease but rather a clinical sign reflecting various pathological processes. Necrobacteriosis is a chronic infectious disease characterized by purulent-necrotic lesions of hoof tissues, primarily affecting the distal limbs.

According to modern concepts, these pathologies develop through a chain of interconnected processes: **imbalanced feeding → ruminal acidosis → laminitis → necrobacteriosis.**

MATERIALS AND METHODS

The study was conducted between 2022 and 2025 in three dairy farms located in the Tashkent region. High-yielding Holstein-Friesian and Simmental cows were selected as the study population.

A total of 480 cattle were subjected to clinical and laboratory examination. The following methods were applied:

- clinical examination and lameness scoring;
- functional and morphological assessment of hooves;
- evaluation of rumen environment using oral rumen fluid sampling and portable pH-metry;
- analysis of veterinary sanitary inspection data;
- statistical analysis.

RESULTS

The prevalence of lameness ranged from 12% to 58%. When the proportion of lame animals exceeded 15%, it was considered a herd-level problem.

It was determined that 72–84% of lameness cases were associated with hoof pathologies. The most common lesions included sole hemorrhages, white line separation, hoof ulcers, interdigital abscesses, and heel erosions.

Laminitis prevalence ranged from 11% to 57%, indicating its major role in the development of lameness.

Evaluation of the rumen environment revealed decreased pH values in 48–53% of animals, indicating widespread occurrence of ruminal acidosis.

Clinical cases of necrobacteriosis ranged from 12% to 42% and were primarily localized in the distal parts of the limbs.

DISCUSSION

The findings confirm that lameness and necrobacteriosis in high-yielding cattle are multifactorial conditions. Feeding management was identified as the primary trigger factor.

High-concentrate diets contribute to ruminal acidosis, which promotes rumen wall damage and facilitates the translocation of microorganisms into the bloodstream, leading to liver abscess formation and systemic intoxication.

Under acidic conditions, the breakdown of Gram-negative bacteria results in the release of vasoactive substances, which impair microcirculation in the hoof dermis. This leads to disruption of horn formation, tissue damage, and increased susceptibility to infection.

Laminitis initially develops as an aseptic inflammation of the hoof dermis and subsequently progresses to necrobacteriosis. Therefore, different hoof diseases observed within a herd should be considered as stages of a single pathological process.

CONCLUSION

Lameness and necrobacteriosis in high-yielding cattle represent interconnected multifactorial conditions. Feeding-related factors play a key role by initiating ruminal acidosis and laminitis, which subsequently lead to necrobacteriosis.

Effective prevention and control strategies should be based on a comprehensive approach, including optimization of feeding practices, improvement of housing conditions, regular hoof care, and ensuring adequate animal movement.

Practical Recommendations

- increase the proportion of fiber in the diet and regulate concentrate levels;
- monitor feeding strategies to prevent ruminal acidosis;
- implement regular hoof trimming and preventive treatments;
- improve hygienic conditions by reducing moisture and injury risk;
- ensure adequate animal exercise;
- apply timely veterinary interventions upon early detection of lameness.

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