

Article

Treatment of Hoof Diseases in Large Ruminants

M.O. Sagizbaev¹, G.M. Kurbaniyazova², A.R. Yusupov³, N.P. Dauletbaev⁴

1,2,3,4 Nukus branch of the Samarkand State University of Veterinary Medicine, Animal Husbandry and Biotechnologies assistant

*Correspondence: nursultandauletbaev96@gmail.com

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Abstract: Rustergol ulcer is a significant hoof disorder affecting cattle, causing lameness, reduced productivity, and welfare concerns. This study investigated the prevalence of Rustergolz ulcers and compared the efficacy of two treatment protocols: conventional 10% tetracycline ointment and a combination of Amoxicillin 150 antibiotic with Butofan biostimulator. Clinical observations, wound management, and healing outcomes were recorded over a 27-day period. The results demonstrated faster recovery and improved general condition in cattle treated with Amoxicillin and Butofan, highlighting their effectiveness in managing Rustergol ulcers.

Keywords: Rustergolz ulcer, cattle, hoof disease, Amoxicillin, Butofan, tetracycline, wound healing, lameness, veterinary treatment

Introduction

Hoof disorders in cattle predominantly present as ulcers, sole lesions, phlegmons, and other purulent-necrotic processes. These pathological changes are commonly localized in the hoof wall, sole, and interdigital spaces and are frequently associated with primary trauma. However, in some cases, hoof lesions may occur independently of direct injury. For example, under certain conditions such as structural deficiencies in barn flooring or excessive hoof growth, ulcers may develop at the junction of the soft heel and cloven sole, predominantly affecting the hind limbs; these lesions are occasionally referred to as Rusterholz ulcers[1].

The biomechanical characteristics of the hoof, including its elasticity and hardness, are determined by its structural composition, which is influenced by the degree of horn development and keratinization. In this context, the early identification of the underlying causes of hoof disorders, timely diagnosis, and assessment of the progression of pathological changes in both affected regions and surrounding tissues are essential for effective disease prevention, management, and ensuring overall herd health[2].

Research Objects and Methods

The study was conducted on cattle maintained by households in the Nukus district of Uzunkol region. To rapidly and effectively identify cattle with distal limb disorders, the modified "Lameness Assessment System in Cattle" developed by F.A. Hudoyorova and Kh.A. Khamdamov was applied. This assessment method utilizes a four-point scoring system, with severe lameness rated as 4 points.

Cattle identified with distal limb disorders were evaluated using standard physiological examination methods, including visual inspection, observation, palpation, auscultation, thermometry,

and determination of heart and respiratory rates per minute. A total of 108 animals were included in the study, which were divided into control (3 heads) and experimental (3 heads) groups.

Results and Discussion

Orthopedic examination of 108 cattle revealed that six animals aged 2–4 years, belonging to Holstein-Friesian and Simmental breeds, exhibited Rusterholz ulcers, accounting for 5.55% of the total herd. Clinical evaluation of affected cattle demonstrated elevated body temperature and increased heart and respiratory rates (Table 1)[3].

Affected animals showed signs of compromised general condition, increased tendency to lie down, and pronounced weight-bearing lameness during locomotion. Palpation or hoof clamp examination elicited strong pain responses, with animals attempting to resist handling. Lameness was the primary clinical indicator, initially mild, progressing to moderate by days 3–5, and severe by days 9–10. Examination of the hoof sole revealed characteristic tissue degradation of varying depth and size[4].

Cleaning the hoof sole revealed a discolored, grayish horn that had lost elasticity and strength. Progressive thinning and perforation of the sole horn were observed over time. Localized swelling around the hoof wall and an increase in both local and systemic temperatures were also recorded, indicating inflammatory and pathological processes associated with distal limb disorders[5].

Table 1. Physiological indicators of the control and experimental groups.

Review time	Control group			Experimental group			
	T.H.*	P.**	N.O.***	T.H.*	P.**	N.O.***	
Day 1	On	41,5	83	24	40,5	83	23
days 5-9	On	40,5	82	23	39,5	81	21
days 10-14	On	39,5	80	22	39,0	78	16
days 15-17	On	39,0	78	20	38,5	68	14
days 18-21	On	38,5	70	18	39,0	65	12

*- body temperature, **-pulse rate in 1 minute, ***-respiratory rate 1 minute.

Six cattle diagnosed with Rusterholz ulcers were relocated to a dry and thermally controlled environment prior to the commencement of treatment. Before initiating the experimental procedures, the affected hooves of each animal were subjected to mechanical cleaning[6]. This involved thorough washing of the hooves and digits with warm water using specialized brushes, with particular emphasis on the palmar surfaces. Following cleaning, the hooves were carefully dried and subsequently treated with a 5% iodine solution[7].

Table 2. Treatment of cattle with Rusterholz ulcer.

S/n	Groups	Number of cattle in a group	Treatment Scheme
1	Control group	4 heads	After mechanical preparation, the hooves were rinsed with a 3% hydrogen peroxide solution and subsequently treated with a 5% alcoholic iodine solution. The affected areas were then dusted with a powder mixture containing iodoform, boric acid, and tricillin. Finally, a dressing impregnated

2	Experimental group	4 heads	<p>with 10% tetracycline ointment was applied over the treated surface. The dressing was replaced every 2–3 days.</p> <p>On the first day of treatment, the cattle of the experimental group were treated by the same complex method, only 10% tetracycline ointment was not applied to the process, the drug "Amoxicillin 150" was administered intramuscularly in 20 ml from both sides, and after 48 hours, the same course was repeated.</p> <p>Butafan biostimulator was administered intramuscularly once a day at a dose of 10 ml for 5 days.</p>
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To alleviate pain, the dorsal and palmar nerves supplying the digits and hooves were locally anesthetized using a 3% novocaine solution via conduction anesthesia. The limb affected by Rustergol ulcers was immobilized in a stationary position using a hoof stand. Subsequently, overgrown portions of the hoof wall on the anterior, lateral, and medial aspects were excised and shaped using a hoof knife[8]. Necrotic and detached tissues in the palmar region were carefully removed, and drainage pathways were widened to facilitate blood flow. Areas of coagulated blood were opened in a funnel-shaped manner to ensure free bleeding. Pathologically necrotic tissues within the lesions were surgically excised[9].

Animals in the control group were treated according to the protocol outlined in Table 2. After three days, the dressing was removed, and the wound surface was rinsed with Shemi-spray.

Cattle in the experimental group underwent a similar comprehensive treatment, with the exception that instead of applying 10% tetracycline ointment over the dressing, 20 ml of Amoxicillin 150 antibiotic was administered intramuscularly, 10 ml on each side. This course was repeated 48 hours later. Once the purulent exudate from the lesion decreased, 10 ml of Butofan biostimulator was administered intramuscularly once daily for five days to accelerate tissue regeneration[10].

Upon initial examination after the commencement of treatment, the following observations were made in both groups. The affected cattle spent most of their time lying down and were reluctant to stand. All animals exhibited weight-bearing lameness in the affected limb. Palpation elicited pain, and a grayish exudate with a foul odor was observed from the pathological lesions. The cattle partially flexed the affected limb, maintaining a relaxed stance while slightly supporting weight on the hoof tip[11].

By days 5–9 of treatment, the general condition of the experimental group showed noticeable improvement. Purulent exudation from the lesions had nearly ceased. Lesions were covered with dense brownish, scab-like tissue, and in some animals, pinkish granulation tissue was visible[12].

In contrast, clinical signs in the control group were more severe. Animals exhibited poor general condition and reduced appetite. Soft tissues in the palmar region were swollen and painful on palpation, with continued purulent exudation. Moderate lameness was observed when animals were forced to move[13].

By days 10–14, the general condition of the experimental group was satisfactory. Heart and respiratory rates were within normal limits, and appetite was good. The lesion surfaces were dry and covered with fresh granulation tissue. Meanwhile, the control group continued to show unsatisfactory general condition and reduced appetite. Palmar tissues remained swollen and painful, with a small amount of purulent exudate still present[14].

By the 15th-17th days of treatment, the general condition of the animals in the experimental group was satisfactory. Pulse and respiratory rate are within normal limits, and the animals have good appetite. The surface of the pathological focus was dry and reduced due to the growth of horny tissue.

In cattle of the control group, at this time, the cavity of the defect began to fill with young granulation tissue. Swelling of the tissues in the area of the hoof sole has decreased, and purulent exudate has not been released[15].

On the 18-21st day of treatment, the cattle of the experimental group fully recovered, and it was noted that the limping of the supporting leg was practically eliminated during movement. In the control group of cattle, during this period, a slight lag was observed when the cattle were forced to walk. Their lameness disappeared on the 22nd-27th day of treatment.

Conclusion

The results of the study demonstrated that Rustergol ulcers were detected in 5.55% of the total cattle population examined, indicating that this pathology remains a relevant problem in modern cattle breeding systems. The occurrence of the disease was closely associated with management and environmental conditions, highlighting the importance of preventive measures in maintaining hoof health.

The comparative analysis of treatment efficacy revealed significant differences between the experimental and control groups. In the experimental group, where animals were treated with the antibiotic Amoxicillin 150 in combination with Butofan, complete clinical recovery was observed within a relatively short period, specifically between days 18 and 20 of treatment. In contrast, cattle in the control group, which received conventional therapy using 10% tetracycline ointment, achieved full recovery considerably later, between days 22 and 27. These findings indicate that the combined use of Amoxicillin 150 and Butofan contributes to a faster resolution of inflammatory processes, improved tissue regeneration, and overall acceleration of the healing process.

An analysis of etiological and predisposing factors showed that the development of Rustergol ulcers was primarily influenced by unfavorable housing and management conditions. The most significant risk factors included inadequate or uneven flooring in resting areas, the use of low-quality concrete surfaces causing mechanical trauma to the hooves, and constant exposure to moisture, which weakened the horn tissue and increased susceptibility to infection. Additionally, the presence of sharp or abrasive objects in grazing areas contributed to hoof injuries, while insufficient physical activity negatively affected blood circulation in the distal limbs. Irregular hoof trimming practices, as well as improper trimming techniques, further exacerbated the risk of ulcer formation. Collectively, these factors emphasize the necessity of improving housing conditions, ensuring regular and properly performed hoof care, and implementing comprehensive preventive strategies to reduce the incidence of Rustergol ulcers in cattle.

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