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Successful management of laminitis-induced lameness caused by hot ash exposure in sheep: Case report

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Abstract
This case report discussed the management of lameness due to hot ash-induced laminitis in sheep at Oracle Wildlife Park in Makurdi, Nigeria. The case involved a flock of 45 sheep who were grazing near a fenced shelter where waste materials and leftover hay were burned. As a result, hot ashes fell onto the ground within the perimeter fence where the animals were housed, and some sheep walked through them, leading to burns on their feet and the development of laminitis. The sheep exhibited lameness, increased digital pulses, heat in their hooves, and a characteristic stance indicating severe pain. The sheep were promptly treated with anti-inflammatory medications, pain management, antibiotics injection, and supportive healing care with honey, but the younger ones healed earlier than the older sheep. The case report emphasizes the importance of client education in preventing hot ash-induced laminitis and creating a safe environment for grazing animals. The authors advised clients to dispose of waste materials appropriately, away from grazing areas, and to monitor their animals closely for signs of laminitis. The publication concludes that by raising awareness of this preventable condition and providing clients with necessary information, the health and well-being of animal patients can be ensured.

Keywords: Hot ash, laminitis, sheep, lameness

Introduction

Laminitis is a prevalent and serious disorder in sheep, marked by inflammation and injury to the sensitive laminae within the hoof. This condition often arises from inflammation of the internal hoof tissues, typically triggered by high-carbohydrate diets or other systemic illnesses, resulting in lameness and possible hoof deformities [1, 2].

Lameness in sheep is a frequent health concern that can greatly affect their welfare and productivity. It describes any discomfort or irregularity in the limbs or hooves that leads a sheep to alter its gait or movement [2].

There are multiple causes of lameness in sheep, including bacterial infections like footrot, which lead to pain and inflammation in the hooves, and foot abscesses, which are pus-filled swellings that form within the hoof. Other contributing factors include hoof cracks, laminitis, and injuries to the legs, hooves, or joints. Infectious diseases such as orf and foot-and-mouth disease can also result in lameness. Moreover, poor management practices-such as improper nutrition, substandard housing conditions, or insufficient hoof care-can increase the risk of lameness [3, 4].

Although several factors like overeating, obesity, or metabolic disorders can cause the condition, laminitis resulting from hot ash exposure is an uncommon but potentially severe form of the disease. This case report on hot ash-induced laminitis in a sheep underscores the need to educate clients on the hazards of burning waste within animal enclosures to avoid future cases [4].

Clinical signs of lameness in sheep may include reluctance to walk or move, favoring one limb, swelling or redness in the affected hoof or leg, altered gait or posture, reduced appetite or productivity, and increased lying down or difficulty standing. Prompt management of lameness is crucial to improve animal welfare, alleviate pain, prevent complications, and minimize economic losses associated with decreased productivity and treatment costs [5, 6].

The significance of addressing lameness cannot be overemphasized. Effective management enhances flock health and welfare. Treatment and control measures involve regular hoof trimming and maintenance, quick identification and management of underlying causes, and ensuring a clean, dry environment. Antibiotic or anti-inflammatory therapy may be necessary, while good husbandry practices-such as balanced nutrition and parasite control-remain essential. Early detection and intervention are key to avoiding long-term complications and ensuring the well-being of affzected sheep [7, 8, 9].

Case Report

A flock of forty-seven (47) sheep of mixed ages and sexes was presented to a team of veterinary consultants during a visit to Oracle Zoo. Twelve of the animals showed severe lameness and reluctance to move. On clinical examination, the affected sheep exhibited increased digital pulses, heat in the hooves, signs of laminitis, and a characteristic stance suggestive of intense pain in the feet. According to the herdsman, the sheep grazed and lived in a fenced enclosure where waste materials and leftover hay were routinely burned within the perimeter weekly. This practice resulted in the accumulation of hot ashes on the ground inside the enclosure. Consequently, several sheep walked over these hot ashes, sustaining burns on their feet, which ultimately led to the onset of laminitis.

Clinical Examination

Physical examination revealed burns on the soles and lateral walls of the hooves (Figure 3). Some animals displayed abnormal gait, while variations in heat at the coronary band were noted-some felt hot, others were not, and a few showed peeling of the coronary band. Severe laminitis cases were observed, including hoof loss and lesions (Figure 3). Additionally, certain sheep were seen grazing while in a sternal position in the pasture field, whereas others moved and fed on their knees within their pens due to their inability to walk to the pasture field (Figures 1 and 2).

Treatment

The affected sheep received prompt treatment with anti-inflammatory agents and antibiotics, specifically Penicillin-Streptomycin (P-STREP NOR) by Jubaili Animal Health Ltd, Nigeria, administered at 1 ml/20 kg body weight daily for 5 days. Dexamethasone (Dexanor 0.2®) by Jubaili Animal Health Ltd, Nigeria, was given at 1 ml/25 kg body weight daily for 5 days, along with Multivitamin injection (VMultinor®) by the same company at a dose rate of 1 ml/10 kg body weight intramuscularly for 5 days. Supportive care included the topical application of honey on the burnt lesions for 20 days to promote healing.

Despite intensive therapy, recovery occurred gradually, with younger sheep showing improvement earlier than the older ones. The farm management expressed deep regret over the incident, acknowledging their unawareness of the health risks associated with burning waste within the fenced area and the subsequent adverse effects on their animals.

Fig 1: Sheep on sternal position in the pasture field

Fig 2: Sheep walking on kneel around the pen to graze

Fig 3: Severe Laminitis and deformed hooves in Sheep showing lost hooves lesions

Discussion

Lameness in sheep is a major health concern that significantly affects their welfare and productivity. It is defined as any abnormality or discomfort in the limbs or hooves that results in altered gait or movement [10, 11, 12]. Multiple factors can contribute to lameness, including bacterial infections such as footrot, foot abscesses, hoof cracks, laminitis, injuries, infectious diseases like orf (contagious ecthyma) and foot-and-mouth disease, as well as poor husbandry practices. Laminitis, a specific condition involving inflammation and damage to the sensitive laminae of the hoof, may be caused by high-carbohydrate diets, systemic illnesses, or exposure to hot ash [1, 2, 3, 13].

Timely intervention is essential to improve animal welfare, alleviate pain, and prevent secondary complications and economic losses. Common signs of lameness include reluctance to walk, favoring one leg, swelling, altered gait, and reduced appetite. Proper management and treatment strategies include routine hoof care, prompt diagnosis and treatment of underlying causes, maintaining a clean, dry, and well-bedded environment, and practicing sound husbandry through adequate nutrition and parasite control. Early detection and intervention are critical to minimizing long-term effects and enhancing animal well-being, underscoring the need for education and proper farm management to prevent recurrence [11, 12, 13].

Hot ash-induced laminitis is a preventable yet severe condition that can lead to devastating outcomes in sheep. Burning waste materials within enclosures creates a hazardous environment, as falling hot ashes can cause thermal burns on the animals' feet when they step on them. Such burns can progress to laminitis-a painful and debilitating inflammatory condition that severely diminishes the quality of life in affected sheep [13, 14, 15, 18, 19, 20].

Laminitis resulting from thermal or burn injuries poses a notable health challenge in domestic animals. Although data on its prevalence are limited, studies show that laminitis commonly affects equines, with about 2% of horses impacted annually. In cattle, lameness affects up to 40% of dairy cows, with laminitis serving as a primary factor. While limited research exists regarding laminitis prevalence in goats and sheep, these species are similarly vulnerable to the disease [21-30].

In sheep, laminitis is a recognized condition typically linked to metabolic imbalances, trauma, or underlying illnesses. However, specific data on hot ash-induced or thermal laminitis in sheep remain scarce [8].

This report represents the first documented case of hot ash-induced laminitis leading to lameness in sheep, successfully managed through the application of honey. The case demonstrates the therapeutic value of combining honey with antibiotics and anti-inflammatory agents in treating hot ash burns within a flock of 47 sheep (Figures 1-3). Rapid recovery was recorded in 90% of cases, predominantly among younger animals, while 10% of cases involving hoof deformities were mainly observed in older sheep.

Despite intensive treatment, improvement occurred gradually, with younger sheep responding more quickly than older ones. The farm management expressed deep remorse over the incident, acknowledging their lack of awareness regarding the health risks of burning waste within animal enclosures and the resulting harm to their flock.

Advice to the Client

As veterinarians, it is crucial that we educate our clients on the dangers of burning waste in the fence and the potential risks it poses to their animals. Clients should be advised to dispose of waste materials appropriately, away from grazing areas, to prevent accidental exposure to hot ashes. Additionally, clients should be encouraged to monitor their animals closely for signs of laminitis, such as lameness, increased digital pulses, and heat in the hooves, and seek veterinary attention promptly if any concerns arise.

Conclusion

Hot ash-induced laminitis is a rare but serious condition that can have devastating consequences for sheep. This case report highlights the importance of client education in preventing the occurrence of hot ash-induced laminitis and emphasizes the need to create a safe and healthy environment for grazing animals. By raising awareness of this preventable condition and providing clients with the necessary information to make informed decisions, we can work together to ensure the health and well-being of our animal patients.

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Conflict of Interest

The authors declare that they have no conflict of interest.

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