

**Laminitis in a crossbred buck due to high grain
diet feeding: A case study**



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diet feeding: A case study**



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Abbreviations

S/C	Subcutaneous
I/M	Intra-muscular
NSAIDs	Non-steroidal anti-inflammatory drug
SAIDs	Steroidal anti-inflammatory drug
b.wt	Body weight
LPS	Lipopolysaccharides

Abstract

Laminitis is an extremely painful condition resulting in damage to the sensitive laminae of the hoof and if not treated initially it may cause severe lameness and great economic losses. It occurs in acute, subclinical, and chronic forms. The severity of laminitis is associated with the frequency, intensity, and duration of systemic acidotic insults on the mechanisms responsible for the release of vasoactive substances. It is manifested by shifting of weight, abnormal gait, painful hooves with mild fever, anorexia etc. A two-year old crossbred goats (buck) weighing 18 kg was brought to the Upazilla livestock office and veterinary hospital, Fatickchari, Chattogram with history of inward staggering of limbs, reluctant to walk and anorexia for 15 days. Based on history and clinical examination it was diagnosed as laminitis and treated carefully. The goat was treated with NSAIDs (Tolfenamic acid) and anti-histaminic, SAIDs (Dexamithasone) along with multivitamins, Zinc and probiotic preparation as a supportive therapy. The owner was advised properly to maintain the hoof hygiene to avoid the chance of further infection. It was also advised to supply good quality forages with a balanced diet to improve the health status of the animal and avoid further complications. As a result, the goat recovered successfully after seven days.

Keywords: Laminitis, goat, acidotic, laminae.

Chapter – I: Introduction

Laminitis in its most simple definition is inflammation of the sensitive laminae of the hoof wall. The cause however can vary from trauma, to grain overload, to toxins, and beyond. It can also develop as a complication of acute infections such as mastitis, metritis, or pneumonia, especially after kidding. The condition is usually characterized by sudden onset of lameness of variable severity related to one or more feet. Laminitis in goats occurs worldwide; however, the incidence is lower than that in dairy cattle and horses.

Overfeeding a high-energy diet or feeding a concentrated grain regimen with low-to-zero roughage sets the stage for this illness. As an essential organ for ruminants to adapt to high grain diet feeding, rumen has acquired a great deal of concern from researchers, and results have showed that excessive grain diets alter the state of rumen fermentation and cause rumen metabolic disorders in dairy cows and goats (Saleem et al., 2012; Hua et al., 2017). A high-fiber diet and a stable microbiota community are essential for maintaining ruminant health status. Although, in the current feeding strategy, particularly in the intensive management systems, it is a common strategy to feed enormous amounts of grains diet to ruminants due to the lack of quality forage and pursuing high milk yield (Soriano et al., 2000; Boerman et al., 2015).

Previous research has proven that excessive grain feeding causes the aggregation of volatile fatty acids (VFAs) and alters the composition and function of the rumen bacterial community (Fernando et al., 2010). During the high grain diet feeding, rumen lipopolysaccharides (LPS) contents increased and this may be linked with the dramatic fluctuations of gram negative bacteria, such as Bacteroidetes (Khafipour et al., 2009). Once the rumen epithelium has been harmed, the rumen LPS can translocate across the epithelial tissue into the peripheral circulation, and consequently causes a systemic inflammatory response (Khafipour et al., 2009; Steele et al., 2011). The pro-inflammatory substance, LPS, has the capability to damage the capillaries of the lamellae in the foot and induce haemorrhage, inflammation and lameness (Nocek, 1997). Therefore, the LPS in peripheral circulation may be a triggering factor of laminitis in ruminants.

In Bangladesh, prevalence of laminitis in goat has not been studied enough yet. So, it requires more study to know about laminitis in goats due to high grain diet feeding along with its management. Therefore, the present study was designed to achieve the following objectives:

- To know more about the high grain diet feeding along with its complications and management in goats.
- To know more about the laminitis with its associated risk factors and management in goats.

Chapter – II: Case presentation

2.1. Case history

A two-year old crossbred goats (buck) weighing 18 kg was brought to the Upazilla livestock office and veterinary hospital, Fatickchari, Chattogram with a history of inward staggering of limbs, reluctant to walk and anorexia for 15 days. The owner noted that anthelmintics were administered one year ago and no vaccine was given. He also informed that the goat had suffered from acidosis six months ago.

After further investigation, the owner informed us that he supplied wheat brans mostly, sometimes rice bran. The concentrates were offered in open troughs. Very few or no grass was supplied due to lack of availability.

2.2. Clinical examination

On clinical examination, the goat revealed that -

- Temperature – 103°F
- Dehydration – moderate
- Dull and depressed
- Shifting of weight on hindlimbs
- The goat was able to stand for short periods of time.
- On palpation and percussion pain at the hoof was observed, particularly on the left hindlimbs.
- The affected hoof was touch to warm and slightly reddish.
- No discharge or secretion was found.

Actually, radiography is essential and more appropriate for confirmatory diagnosis of the laminitis and to evaluate the changes between the alignment of the distal phalanx and the hoof wall in order to choose the appropriate treatment protocol and ascertain the prognosis. But unfortunately, such facilities were not available in the Upazilla veterinary hospital. So, based on the above clinical findings it was tentatively diagnosed as laminitis and treatment were given accordingly.



Figure: Laminitis in goat.

2.3. Treatment and management

After confirmation, treatment was started with non-steroidal anti-inflammatory drug (NSAIDs) Tolfenamic acid @ 2mg/kg b.wt, S/C for 5 days. Although, Phenylbutazone was found effective along with other supportive therapy and hence, was used as a drug of choice in laminitis (Schvartz et al., 2012; Akil et al., 2020). Along with this pheniramine maleate @ 0.5mg/kg b.wt, I/M, Dexamithasone @ 0.02mg/kg b.wt, I/M for five consecutive days once a day.

For supportive treatment multivitamins (vit- B1, B6, B12) @ 4ml twice daily orally, preparation of probiotic and prebiotic (10gm sachet) ½ packet once daily orally and preparation of zinc 4ml once daily orally for seven consecutive days.

Hoof care at all stages of laminitis is extremely important for quick and successful recovery. The overgrown hoof wall was trimmed from the quarters to the heels, bringing the heels to the level of the frog. However, in the case of horses' shoes were preferred. The owner was advised to keep the hooves clean and make a daily short walk to the goat. He was strongly advised not to use only high grain diet feeding. Although, the farmer was not able to use high roughage diet hence to use as much as possible and encourage the goats to eat roughage or any palatable pasture, hand feed if necessary. It was also recommended to provide soft bedding, as harder such as

concrete floor may accelerate the hoof lesion. The goat showed good sign of recovery day by day and recovered successfully after seven days.

Chapter – III: Discussion

Laminitis is a complicated disease and it is rapidly turning into the most prevalent disease in the dairy industry and feedlots for beef cattle and goats (Nocek, 1997). It was considered that an early diagnosis always has a good prognosis. The case report presented here describes the treatment and clinical progression of acute laminitis in a two-year-old crossbred buck.

The study of Liu et al., (2013) demonstrated that excessive grain feeding caused disruption of ruminal epithelial tight junctions, and this may be responsible for the translocation of rumen LPS into peripheral circulation. A concentrated diet fed without sufficient functional fiber from the forage results in less chewing, and, consequently less buffering saliva. Not only the diet composition, but also the way it is formulated and fed, and the feeding strategy of the animals are vital risk factors for laminitis. It may bring about a drop in the rumen pH and a more rapid passage of the ingesta through the rumen.

During the introductory phase to grain feeding, animals should be closely observed. Diarrhoea is often the first sign of mild grain poisoning, and if this is noticed in a number of animals, the percentage of hay in the diet should be further increased (Walker, 2006). It had been reported that there is variation within goats to cope with ruminal acidosis depending on chewing behavior to buffer rumen pH (Groenevelt et al., 2018). To try and avoid the suspected alterations in rumen pH in the goats, it was advised that the roughages always be of usually good quality and readily available.

Chapter- IV: Conclusion

Usually, acute laminitis having good prognosis but if not treated early, the condition worsens and becomes chronic consequently chances of recovery decrease. The two most important preventive measures to reduce laminitis-related lesions are closely related to feeding and housing. To enhance an optimal rumination and minimize the risk for acidosis all necessary measures should be taken. Precautions regarding feeding include: a gradual adjustment to a diet or feed, use feeding routines that accelerate a natural digestion, and maintaining well balanced diets with enough functional fiber to improve rumination. Farmers training in rural areas can be arranged to raise awareness about laminitis due to high-grain diet feeding.

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Biography

I am Humyra Begum, daughter of Md. Mafizur Rahman and Fatema Begum. I have completed my Secondary School Certificate examination from Maizbhandar Girl's High School, Fatickchari, Chattogram in 2013 (G.P.A-5.00) and Higher Secondary School Certificate examination from Shaheed Bir Uttam Lt. Anwar Girls' College, Dhaka cantonment in 2015 (G.P.A-4.75). I am an intern veterinarian at Chattogram Veterinary and Animal Sciences University, Bangladesh under the Faculty of Veterinary Medicine. I am very interested in veterinary medical research and want to serve the nation through my knowledge and creativity so that we can conquer the current challenges in this field.