

Occurrence of Ruminal Acidosis in Cattle

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Abstract

Ruminal acidosis was diagnosed in cattle based on necropsy observations. Postmortem examination of the affected cattle revealed hemorrhages and abscess on liver, presence of excessive amounts of carbohydrate diet in the rumen, erosion and ulceration of the ruminal epithelium. Examination of ruminal contents revealed ruminal pH as 3.5. Based on the gross lesions and ruminal pH the present case was confirmed as ruminal acidosis.

Keywords: cattle, ruminal acidosis, high carbohydrate diet, liver abscess

Introduction

Acidosis is a pathological condition associated with the accumulation of acid or depletion of alkaline reserves in the blood and body tissues. To increase the growth rate and milk production in ruminants high grain diets are commonly used. But feeding a high level of rapidly digestible carbohydrates such as barley and other cereals results in ruminal acidosis. Acidosis occurs when the pH of the rumen falls to less than 5.5. The fall in pH results in atonic rumen. Low ruminal pH may also be associated with increased osmolality of the ruminal contents, which inhibits the feed intake leads to depression of production (Carter and Grovum, 1990). The change in rumen acidity leads to proliferation of acid producing bacteria and they produce more acid, making the acidosis worse. The increased acid is then absorbed through the rumen wall, causing metabolic acidosis, which in severe cases can lead to shock and death. This condition is commonly seen in dairy cattle, feedlot cattle and

feedlot sheep. Present paper put on the record about the occurrence of ruminal acidosis in cattle of 2 different farms.

Case history

Cattle was presented for postmortem examination to know the cause of death. History taken from owner revealed that some of the cattle from both the farms were suddenly died without showing any clinical signs. The other cattle were shown depression, reduced feed intake, increased pulse rate and heart rate, elevated temperature, decreased milk production, mild diarrhea, foamy faeces containing gas bubbles, undigested grain in faeces, lethargy, weight loss, abdominal pain, abdominal grunting, grinding of teeth, incoordination, recumbency and death. Similar clinical signs were also observed by previous researchers (Krause and Oetzel, 2006).

Results and Discussion

Necropsy examination of the cattle revealed multifocal hemorrhages ranging from petechiae to ecchymosis on liver (Fig 1) and abscess in liver. Rumen was filled with carbohydrate diet (Fig 2). The ruminal epithelium was eroded and ulcerated. Lungs were slightly congested. Ruminal contents were collected on ice and its pH was determined on a pH meter. The pH found was 3.5 which was very low than the normal ruminal pH.

Ingestion of high amounts of carbohydrates provides the substrate for microbial growth in the rumen leads to increase in total number of bacteria and volatile fatty acid production.



Figure 1: Haemorrhages on liver



Figure 2: Rumen filled with carbohydrate

When the production rate of volatile fatty acids exceeds the capacity of the system to neutralize or absorb these acids that results in decrease in ruminal pH (Allen, 1997). Excess carbohydrates in the rumen can also lead to the production of toxins by some ruminal bacteria (Russell, 1998). Low ruminal pH reduces the absorptive capacity of the ruminal epithelium by causing abnormalities of ruminal papillae and ruminitis (McGavin and Morrill, 1976; McManus *et al.*, 1977; Harmon *et al.*, 1985). Damage to the ruminal epithelium increases the potential for the bacteria and the toxins produced by bacteria to enter into the portal circulation which causes liver abscesses (Nagaraja and Chengappa, 1998; Gozho *et al.*, 2005). Based on the gross lesions and low pH of ruminal contents the present case was confirmed as ruminal acidosis.

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