



ISSN: 2456-2912

VET 2024; 9(1): 487-489

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www.veterinarypaper.com

Received: 08-10-2023

Accepted: 20-12-2023

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Therapeutic management of lactic acid acidosis in cattle

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Abstract

A 10 cattle's were presented for treatment in the CVAs, Bikaner with history accidental feeding of grain, chapattis and rice. During clinical examination rectal temperature, ruminal motility, respiratory rate, Heart rate were taken. Ruminal fluid collected for Macroscopic, Microscopic and Biochemical examination for diagnosis of disease. There was a significant decrease in mean PH of rumen fluid in all the cattle and falls to 4.7+0.29 in severe acidosis. Smell of ruminal fluid was sour due to rise in concentration of lactic acid. Colour of Rumen liquor in the study was light grey to grayish in colour. acidosis Consistency of rumen liquor was slight viscous. Motility of rumen protozoa was slow. It might be due to low intracellular and environmental PH and high toxicity of rumen encountered in lactic acidic animal. All cattle treated with Magnesium hydroxide, 400gm dissolved in 10 liter water was pumped into rumen by stomach tube to neutralize the acidity. Magnesium hydroxide is a potent alkalizing agent to be used in ruminants as an antacids (Smith and Correa, 2004). This was followed by fluid therapy in the form of Nacl solution 1000ml as I/V drip to counter dehydration and electrolyte imbalance. An injection of thiamin was also given. Sodium bicarbonate, 400gm was advised to be orally drenched twice daily for two days (Suzuki *et al.* 1999). Alkalizing drugs such as calcium carbonate, magnesium carbonate, and sodium bicarbonate were administered orally. In addition to antibiotics, benzyl penicillin and oxytetracyclin were employed to eradicate gram-positive germs. B-complex with anti-histaminic preparation and liver extract cud transplantations, diets, and supportive care were utilized to restore the ruminal microflora. After two days of treatment, the cow began to normal feed intake and was clinically sound.

Keywords: Acidosis, Sodium bicarbonate, Carbohydrate indigestion

Introduction

Acidosis is a condition of the rumen's carbohydrate fermentation that can affect ruminants. It is sometimes referred to as lactic acidosis, rumen acidosis, or grain overload. Acidosis causes the rumen to have an acidic pH, as the term suggests (normal being 6.2-6.8). Acidosis is caused by the consumption of highly fermentable carbohydrates, a low fiber diet, inadequate management methods, or a combination of the above. The severity of acidosis ranges from a minor decline in feed intake (moderate) to mortality. Acute form of the disease in ruminants is characterized by indigestion, rumen stasis, dehydration, acidosis, toxemia, incoordination, collapse and frequently death. It is one of the most serious clinical crises in ruminants resulting in significant mortality (Radostits *et al.*, 2000) [1]. After consuming a substantial amount of grain, lactic acid has been shown to rise in the blood from 4.5 to 90 mg/100 mL (Heuter *et al.* 1956; Dunlop and Hammond, 1965) [4, 5] and in the rumen from 1 to 1500 mg/100 mL (Uhart and Carrol, 1967; Walker, 1968) [6, 7]. Further, a significant amount of lactic acid might not be systemically digested (Dunlop and Hammond, 1965) [5]. To lower the risk of grain engorgement in ruminants, a better knowledge of the systemic changes that occur during lactic acidosis is necessary for appropriate treatment and prevention strategies.

Materials and Methods

A 10 cattles were presented for treatment in the CVAs, Bikaner with history accidental feeding of grain, chapattis and rice. During clinical examination rectal temperature, ruminal motility, respiratory rate, Heart rate were taken. Ruminal fluid collected for Macroscopic, Microscopic and Biochemical examination for diagnosis of disease.

Collection of Ruminal Fluid: Ruminal fluid collected through rumenocentesis. 3 ml of ruminal fluid was aspirated from left paralumbar fossa.

Macrscopic examination-The colour, consistency and Odour of ruminal fluid were noted immediately after collection.

Microscopic examination- Motility of rumen protozoa was determined microscopically as per 20-30, 10-20, 1-10 and no protozoa was graded and represented as 4 (Vigorous), 3 (Moderate), 2 (slow) and 1 (absent) respectively.

Biochemical examination

- 1. Rumen PH examination:** The pH of rumen liquor was recorded with the help of PH paper before adding any preservative. The filtration or aspiration of rumen fluid had no effect on PH.
- 2. Ruminal motility/5 min:** Decrease ruminal motility was recorded. The decrease ruminal final tract, central inhibition of absorbed acid, to reduced ruminal motility.

Treatment

All cattle treated with Magnesium hydroxide, 400gm dissolved in 10 liter water was pumped into rumen by stomach tube to neutralize the acidity. Magnesium hydroxide is a potent alkalizing agent to be used in ruminants as an antacids (Smith and Correa, 2004) [2]. This was followed by fluid therapy in the form of NaCl solution 1000ml as I/V drip to counter dehydration and electrolyte imbalance. An injection of thiamin was also given. Sodium bicarbonate, 400gm was advised to be orally drenched twice daily for two days (Suzuki *et al.* 1999) [3].

Result

On the basis of history it was observed that 20% cattle had eaten grain, 46.6% chappati and 33.3% had eaten rice. There was a significant decrease in mean PH of rumen fluid in all the cattle and falls to 4.7 ± 0.29 in severe acidosis.

Macrscopic examination

Smell of ruminal fluid was sour due to rise in concentration of lactic acid. Colour of Rumen liquor in the study was light grey to grayish in colour. Acidosis Consistency of rumen liquor was slight viscous.

This is due to passage of fluid from vascular bed to rumen as a result of increased osmolality of rumen content.

Microscopic of rumen protozoa

Motility of rumen protozoa was slow. It might be due to low intracellular and environmental PH and high toxicity of rumen encountered in lactic acidic animal.

On the basis of history, clinical finding and Macoscopic, Microscopic, Biochemical examination cattle were diagnosed as rumen acidosis. They were treated according to the severity of disease. After two days of treatment, the cow began to normal feed intake and was clinically sound.

Discussion

Acidosis /Grain engorgement acid indigestion is a disorder of microbial fermentation process in rumen. This condition arises due to the sudden and excess ingestion of carbohydrate rich feed such as grains or their flour. (Radostitis *et al.*, 2000) [1]. In lactic acid acidosis, the acidic rumen PH result in decrease in the population of rumen microbes, this leads to decline in biosynthesis of thiamine.



Fig 1: Ruminal fluid collection



Fig 2: Test tube collection

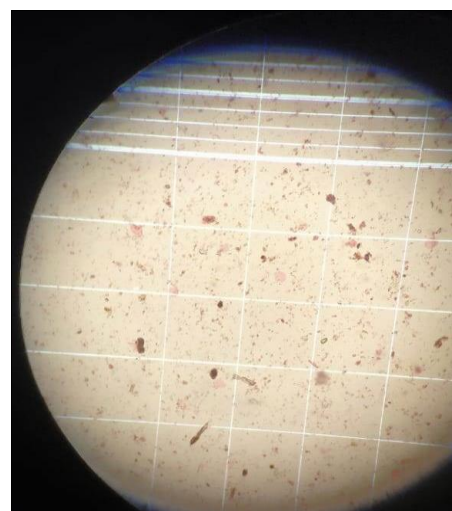


Fig 3: Final Ruminal

Conclusion

The present study “Therapeutic Management of Lactic Acid Acidosis” was conducted for study clinical Manifestations, Systemic effect and Management of Acidosis. The present study conducted on 10 Cattle. On the basis of history, Laboratory diagnosis Acidosis was diagnosed and treated

with Sodium bi carbonate, Magnesium hydroxide, fluid therapy. After treatment Cattle began to normal and started to take feed.

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