CHAPTER-I

INTRODUCTION

Ruminant suffers from many infectious and non-infectious diseases. Ruminal acidosis is one of the most important non-infectious diseases for all ruminants. Many ruminants suffer from ruminal acidosis due to improper practice of feeding resulting from the lack of knowledge about risk factors. Ruminal acidosis occurs when a ruminant animal intake large amount of rapidly fermentable carbohydrates, primarily starches and sugars (Beauchemin and Penner, 2009; Howard, 1981). A large number of farmers involved in cattle fattening program just before 3 or 4 months of Eid-ul-Azha (Sarma and Ahmed, 2011). In that time feeding of easily digestible carbohydrate in large volume leads to found this disorder. Lactic acidosis is a clinical condition due to accumulation of H^+ ions from lactic acid, characterized by blood lactate level > 5 mmole/L and arterial pH < 7.25 (Robert *et al.*, 1982). Lactic acidosis can cause ruminitis, metabolic acidosis, lameness, hepatic abscessation, pneumonia and finally death (Lean *et al*., 2000; Shaver, 2005). In addition, apart from compromises to dairy cow health and economics and the clinical condition lameness and laminitis impact significantly on cow comfort and general well being (Hall and Averhof, 2000; Oetzel, 2003). Sub-acute ruminal acidosis often goes unrecognized and undiagnosed until significant herd involvement and obvious clinical signs are evident. At this stage, large financial losses and long-term health issues, such as a high prevalence of herd lameness, may be inevitable (Nocek, 1997). The study was conducted at Veterinary College and Research Institute (VC &RI), Namakkal, India. In my study a 5 year non-lactating dairy cow (Holstein Friesian) accidentally intake large amount of excess green grasses, cooked rice and rice gruel showing ruminal acidosis, which may severely compromise gastrointestinal function of animal. The owner reported that the cow was off feed and suffering from diarrhoea.

CHAPTER-II

Materials and Method

A 5-year-old 450 kg body weight non-lactating (Holstein Friesian) dairy cow accidentally intake large amount of green grasses, cooked rice and rice gruel that consequently suffered from ruminal acidosis. The owner reported that the cow showed off feed and diarrhea. The cow was brought to Veterinary College and Research Institute (VC&RI), Namakkal, India. Presumptive diagnosis of the cases was performed on the basis of feeding history that was intaking of large amount of grain, cooked rice and rice gruel. The owner also reported that a diet consisting exclusively of hay and with supplemental minerals and vitamins in one week ago where associated with clinical signs and examination of rumen fluid color, consistency and odor. Confirmatory diagnosis was performed by exploring the low pH of rumen fluid. The main clinical sign were anorexia, ruminal atony, sunken face, eyeball, dry mucous membrane, diarrhea, oligouria, dyspnea, increased heart rate, and dehydration (Underwood, 1992) Feeding and grazing history were taken to diagnosis the ruminal acidosis. Physical examinations were performed by palpation firm rumen. The pH level of ruminal fluid less than 6 and microbial motility was almost absent. At first the stomach tube was cleaned and washed by antiseptic solution. Finally dry and use lubricants for use. The ruminal fluid was collected by stomach tube. (Fig.1: A). The stomach tube was penetrated slowly and cautiously. When the cows became coughing then make an interval and tried again. Sample of ruminal fluid was taken by stomach tube. Generally this sample had a higher pH than those obtained through a rumen cannula. There is no chance of salivary contamination in this method of rumen fluid collection. Therefore, ruminal pH samples was collected by stomach tube and interpreted with cautiously. Physical characteristics (color, consistency and odor) of rumen fluid were determined by using organoleptic test. In most of cases the color of rumen fluid was milky grey (Fig.1: B). The consistency of rumen fluid were found thick watery and the odor of the rumen fluid were sour. 1 ml of collected rumen fluid was taken into a watch glass and a piece of pH indicator paper inserted into the fluid for a few seconds. Color change was observed in pH indicator paper. (Fig.1: C) This color

matched with the one of the different color of the color scale. The value of matched color was indicating the pH of the rumen fluid (Duffield *et al.,* 2004). Stomach tube, pH paper, glass slide and microscope were used for detection of acidosis.

Fig: A

Fig: B

Fig: C

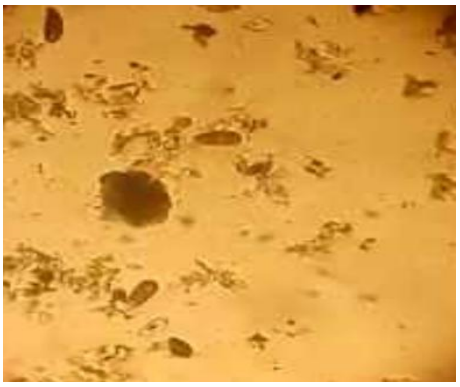

Fig: D

Figures 1: **A**: Penetrating of stomach tube through mouth cavity. **B**: Rumen fluid in kidney Tray **C**: pH Indicator paper for estimation of ruminal Fluid **D**: Rumen microflora movement observed under microscope.

CHAPTER-III

RESULTS

The result of rumen fluid pH was 5, the temperature was 101.5°F. To identify the motility of the rumen microflora, two drops of rumen fluid were taken into two clean glass slides, make slide smear and then observed under microscope at low power objective (10x). The ruminal microflora movement was dramatically reduced in one slide and another slide was absent but some protozoa's were found due to acidic environment in the rumen (Fig.1: D). After diagnosis of ruminal acidosis case then decision was taken for Treatment. Firstly the cow was restrained. Therapy includes oral antacids such as magnesium hydroxide, alkalizer such as sodium bicarbonate at the rate of 1 gm/kg body weight mixed with double volume of water administered orally initially to neutralize the rumen pH, and oral electrolyte solutions to minimize the dehydration, preferably those containing additional sodium bicarbonate to treat metabolic acidosis (Solorzano, 1989; Stone, 2004). Then use systemic ruminal alkalizer: Sodium bicarbonate (Inj. Sodib®, M. R. Chemicals, India) which was 5% sodium bicarbonate and administered at the rate of 450 ml for 450 kg body. This cases should be treated by withholding concentrates, giving intravenous fluids, e.g. hypertonic saline (0.9% sodium chloride solution) at the rate of 50-100 ml/kg body weight (Depending upon severity of dehydration), I/V, once daily for 3 days and access to water or balanced electrolyte solutions not containing lactic acid. There can be a considerable level of dehydration of affected cow because fluid is sequestered in the rumen as a consequence of increased ruminal osmolarity. Antibiotics including potentiated Sulphonamides (333mg/kg) and Tetracycline (20mg/kg) should be given to reduce the risk of liver abscessation. Administered oral Meronidazole bolus (Menid @16mg/kg) to kill the protozoa. Other supportive treatments include flunixin meglumine (1mg/kg) for endotoxaemia, antihistamines to control histamine production, and calcium/magnesium solutions either intravenously or subcutaneously to counteract secondary hypocalcaemia and hypomagnesaemia. As already discussed in the document, cow that are successfully treated in the acute stage of acidosis and became cure. Finally after three days of sickness, the cow became cure without complications.

CHAPTER-IV
DISCUSSION

The objective of this case report was to describe how the structure and function of the rumen adapts during the initial stage of ruminal acidosis just after correction of rumen pH. It was revealed in the present study that sudden intake of large amount of easily digestible non-fiber carbohydrates eg. feeding of cooked rice, rice gruel predisposes the ruminal acidosis in most of the cases. In the case a remarkable changes the physical characteristics of ruminal fluid observed during the period of rumen acidosis, such as becoming milky color, watery consistency and souring odor. These findings were in agreement with those reported by some authors that relate changes with decreasing pH in the rumen caused by excessive rice in the concentration of VFA and lactic acid, which increases the osmolarity of the medium, making it hypertonic in relation to plasma, causing a greater flow of water from the intracellular and extracellular compartments into the digestive tract, especially the rumen (Kolver and De Veth, 2002). CHO engorgements increased amount of lactic acid with VFA that decreased rumen flora (Dunlop, 1972). In present study, there was found abdominal distension in the case as a clinical sign, it is due to high osmotic pressure inhibit bacterial digestion of fiber and starch causing ruminal content to become stagnant and also due to pulls up water from systemic circulation by high osmotic pressure of rumen reported that abdominal distension is a clinical sign of acute ruminal acidosis. Diarrhoea found as a clinical sign of ruminal acidosis. Changes in microbial fauna of the rumen fluid of animal studied with respect to decreased motility or absence of motility. Protozoa lose their activity when the pH drops to values between 5.0, disintegrating or suffering rumen mucosa layer lysis occurs when an increase in acidity of the medium and pH reaches values below 5.0; In present study it was revealed that use of ruminal and systemic alkalizer is more effective treatment in ruminal acidosis. These findings have similarity with (Hart and polan, 2009), they use ruminal alkalizer (Sodium bicarbonate) and intravenous hypertonic sodium bicarbonate (5%) in severe cases in an induced acidosis and observed all the animal recovered. (Stone, 2006) suggested to use ruminal antacids orally to neutralize the ruminal acids and intravenous hypertonic sodium

bicarbonate to neutralize systemic acidosis and correction of dehydration. The recovery of the animals is due to full utilization of the acids and the gradual modification of the microbial population of the rumen fluid.

CHAPTER-V

CONCLUSION

Ruminal acidosis is an important nutritional problem in ruminants in terms of economic point of view and as a substantial health problem. The cause of ruminal acidosis is not a pathogen, but self created complication by owner and the major predisposing factors are in feeding practices. This study indicates feeding of large amount of grain, cooked rice, rice gruel that predisposes the ruminal acidosis. In present study, the rumen fluid color, consistency, odor, absent of ruminal flora movement, lower rumen fluid pH gives clues for diagnosis. This study shows the use of ruminal and systemic alkalizer along with fluid in treatment of ruminal acidosis is more effective and has a quicker resolution. This study also shows correct feeding practice can reduce change of ruminal acidosis. Feeding habit should be gradually changed.

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