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CLINICAL MANAGEMENT OF NATURAL RUMINAL ACIDOSIS IN GOATS

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ABSTRACT

Eleven Black Bengal goats aged between 2 and 5 years of either sex, were presented at Animal Production Research Institute (Livestock Unit) of Rajendra Agricultural University, Pusa, Samastipur, Bihar with history of accidental feeding of excessive amount of rice. Anorexia, suspended rumination, distended left flank, dyspoenic respiration, grinding of teeth, pasty to diarrheic faeces, dehydration, generalized weakness, incoordination since last two days were reported. Clinical examination revealed sub-normal body temperature, increased respiration and heart rate. Physical examination of rumen revealed atony and tympany. Auscultation and percussion revealed fluid gurgling sound in left para-lumber fossa. Ruminal pH revealed acidic ranging between 4 and 5 were found. Ruminal fluid's colour was dark brown and protozoal activity was nil on microscopic examination. The aforesaid clinical symptoms, ruminal fluid analysis and co-relating history pointed towards ruminal acidosis. All affected goats were treated with 5% Sodium bicarbonate, NSS, RL, Symbiotics, Antibiotics, Ruminotoric drugs, Vitamin B-complex with liver extract, Rumen buffers and fresh Ruminal cud. Out of eleven (11) goats with acidosis, one (01) goats died during treatment on day 3rd despite all management while,10 acidotic goats (90.90%) recovered completely.

Key words : *Goat, ruminal acidosis, NSS, RL Ruminal microflora.*

Goats contribute significantly to the Indian economy by sustaining livelihood and supplementing the income of small farmers and rural poor through meat, wool / fiber, skin, milk and manure. Goats suffers from many infectious and non-infectious diseases. Ruminal acidosis is one of the non-infectious, major managemental maladies of all ruminant species. Ruminal acidosis occur when ruminants ingest huge amount of rapidly fermentable carbohydrates, principally starches and sugars (Beauchemin and Penner, 2009) or due to the sudden changes in a diet containing high level of finely ground rapidly fermentable feeds such as corn or wheat. This may happen in feedlots where animals are introduced to total concentrate diets rather than being gradually changed from high roughage to high concentrate feeds (Divers and Peek, 2008). A large number of farmers are involved in cattle and goat fattening just 3-4 months before Eid-Ul-Azha (Sarma and Ahmed, 2011) and most cases ruminal acidosis are reported during this time due to feeding of easily digestible carbohydrate. Lactic acid is increased in the rumen from 1-1500 mg/100 ml (Walker, 1968) and in blood from 4.5-90 mg/100 ml (Dunlop and Hammond,1965) after consumption of large quantity of grain. Lactic acidosis can cause ruminitis, metabolic acidosis, lameness, pneumonia and death (Lean and Wade, 2000). Severe dehydration and cardiovascular involvement are common (Shihabudhin *et al.,* 2003) in addition to biochemical changes (Sarma and Nath, 2005). Lal *et al.,* (1989) noted inappetance, anorexia and ruminal stasis in experimentally induced ruminal acidosis in goats, whereas 30-50% goats exhibited the signs of dullness, diarrhea, constipation, abdominal pain, nasal discharge, head pressing and greending of teeth etc. There was significant but gradual fall in body temperature associated with marked increased in pulse and respiration rates and significant decrease in ruminal motility. Ruminal lactic acidosis renders significant economic loss in terms of wasted feed, delayed marketing and condemnation of rumen, liver or entire carcass, lowered nutritional value, reduced water binding capacity of meat and several organoleptic deficiencies (Schukken *et al.,* 1985., Cleon,1988., Blood and Radostits,1989). It is reported that about 18 percent cases of anorexia in sheep and goats in India are due to ruminal acidosis (Prasad *et al.,* 1976a) As matter of fact, 'Ruminal acidosis' is very common ailment in poor man's cow, due to greedy nature.

History : A total of eleven Black Bengal goats aged between 2 and 5 years of age of either sex were presented at Animal Production Research Institute (Livestock Unit) of Rajendra Agricultural University, Pusa, Samastipur, Bihar with history of accidental feeding of excessive amount of wheat and rice, anorexia, suspended rumination, abdominal

Table-1 : Alterations observed in ruminal fluids due to acidosis in goats.

S.N.	Parameters	Pre-treatment	Post-treatment
1.	Consistency of rumen fluid	Watery (in 4 goats) and Thick / Firm and doughy (in 7 goats)	Viscous
2.	Colour of ruminal fluid	Dark brown	Greenish
3.	Odour	Sour	Aromatic
4.	Ruminal pH(Range)	4.0-5.5	6.0-6.8
5.	Ruminal motility (Per 5 minutes) (Range)	Nil	7.0-8.0
6.	Gram's staining	Dominancy of Gram Positive bacteria	Dominancy of Gram Negative bacteria
7.	CDT(Hours) Mean ± SE	Nil	44.42±0.274
8.	SAT (Minutes) Mean ± SE	Nil	24.70±0.985

distention, grinding of teeth. Out of 11 goats, three goats exhibited severe constipation and eight goats showed pasty to diarrheic faeces, dehydration, generalized weakness, in coordination since last two days.

Clinical Observations : Clinical examination revealed sub-normal body temperature, increased respiration rate, heart rate. Examination of rumen and ruminal fluid was performed and depicted in table-1. Physical examination of rumen revealed atony and bloat. Auscultation and percussion revealed fluid splashing sound in left para-lumber fossa. About 2-3 ml of ruminal fluid was collected from left paralumber fossa with the help of 18 gauge needle. In pre-treatment, the consistency of rumen fluid was watery in four goats and thick /firm and doughy in seven goats. Ruminal fluid analysis revealed dark brown colour. The odour of ruminal fluid was sour. The ruminal pH was measured with the help of pH indicator paper which showed acidic, ranging between 4-5 and activity of rumen microflora was was made by two simple laboratory test i.e. CDT in hours & SAT in minutes which revealed nil activity of microflora on microscopic examination in goats with acidosis.

Diagnosis and Treatment : In the present study, the goats were diagnosed with ruminal acidosis on the basis of co-relating history, clinical findings as well as ruminal fluid examination. All the goats were treated with antihistaminic i.e., chlorpheniramine maleate (Cadistin) @ 2ml i/m o.d. for five days; Injection Sodium bicarbonate 5% @ 5ml/kg b. wt. i/v for three days; Injection B-complex with liver extract, Belamyl @ 2ml i/m on alternate day for five days; Injection Normal Saline Solution (NSS) @ 250 ml /goat/day i/v for three days depending upon the degree of dehydration; Injection Ringers Lactate @ 250 ml/goat/day i/v; Rumenotoric viz. Biobloom bolous @ 1/2 boli orally bid for five days, Yea-sac bolus@1/2 boli orally bid for five days, Rumen-FS powder @ 25gram orally bid for three days and antibiotic viz. Steclin bolus@ 1/2 boli orally given bid for five days as well as ruminal cud of healthy goats @ 150-200 ml/day for 3-4 days orally administered.

RESULTS AND DISCUSSION

In present study, out of eleven goats with ruminal acidosis, a remarkable improvement (90.90%)) was noticed in ten goats i.e., completely recovered after 5 days of treatment while one goat (9.09%) died due to cardiovascular arrest as a result of severe dehydration on 3rd day of therapy in spite of all clinical management. It might be due to the fact that the severely affected goat did not respond to systemic alkalizer and died indicating the already set up toxaemia as a result of chemical rumenitis as reported by Blood and Radostits (1989). Following ingestion of large quantity of highly fermentable carbohydrate rich diet, the lactate producing rumen bacteria (*Streptococcus spp*) proliferate and ferment the readily available carbohydrate resulting in excess accumulation of lactic acid in the rumen and its subsequent absorption into blood circulation causes systemic acidosis. This increase lactic acid production adversely affected rumen movement, rumen protozoa and production of toxic amines (Radostits *et al.,* 2000). Gram's staining of ruminal acidosis fluid resulted in predominance of Gram positive flora which is reverse of normal Gram negative population in rumen (Dirkson,1970). The sub-normal body temperature may be due to lactic acidosis (Tanwar and Mathur., 1983a., Nour *et al.,*1998). The increased heart rate might be due to toxic effect of lactic acid, fall in plasma volume and circulatory failure (Radostits *et al.,* 2000). Significantly pulse rate have been shown to increase due to energy rich diet (Thomas and Moore, 1951). In the present investigation, increased respiration rates per minute might be due to stimulation of respiratory centre by

increased carbon dioxide tension of blood and decrease blood pH (Huber,1976). Similar observation was reported by Gnanaprakasam (1970), Lal *et al.,* (1989) and Nour *et al.,* (1998) in acidotic goats. Involvement of hydrogen ion receptors in gastrointestinal tract, central inhibition of absorbed acids, inhibition by absorbed amines and thus possibly leading to reduced ruminal motility (Huber, 1976). Thick, firm and doughy like rumen consistency might be due to increased viscosity with heavy concentration of undigested feed grains particles. The watery rumen consistency observed might be due to passage of fluid from vascular bed to rumen as a result of increased osmality of the rumen content (Lal *et al.,* 1989 and Das, 1990). In the present investigation, the time factor for CDT and SAT was found absent. It might be due to destruction of normal microflora and shift in their pattern from Gram negative to Gram positive nature (Randhawa *et al.,* 1989). Neutralization of acidic pH of rumen is the primary consideration in clinical management of ruminal acidosis. Use of alkali or buffer as Sodium or Potassium bicarbonate is recommended (Erdman *et al.,* 1988) and oral and parental use of alkalizers like Sodium bicarbonate has been useful in correction of rumen acidosis (Prasad and Rekib, 1975). In the present study, intravenous administration of 5% Sodium bicarbonate and oral administration of Rumen-FS Powder helped to correct acidosis, prevent chemical ruminitis and restore normal rumen pH (6.0-6.8). Rumen-FS powder is a unique combination of vitamins, minerals, probiotic, rumen stable multi-enzymes fortified with live yeast culture. It contains metabolic boosters, along with alkalizers that quickly restore not only the pH of rumen but also normal microflora, protozoa population and ruminal motility as well as enhances fiber digestibility. The parentral administration of Normal saline solution and Ringer Lactate restore hydration and renal function. Synbiotic combination (Yea-sac bolus) containing yeast helps in stimulation of ruminal flora and for optimizing biological and metabolic function of rumen. Addition of yeast culture to the basal diet may alleviate the effect of acidosis that normally resulted in the depression in feed intake as live yeast and other bacterial cell species adhere to feed particles to support ruminal fermentation (Kawas et al., 2007*).* The main modes of action of yeast include supplementation of growth factors to rumen microorganisms; oxygen scavenging that creates more favourable conditions for the anaerobic communities and nutritional competition with autochtonous ruminal species for energy (James, 2011). Administration of Chlorphenramine maleat prevented the release of histamine due to chemical ruminitis. In the present study vitamin- B complex with liver extract (Belamyl) was used which corrects the deficiency of thiamine hydrochloride and helped in the absorption of lactic acid (Broberg, 1960). Oral antibiotic steclin bolus which contain tetracycline hydrochloride was administered in affected growth to check the growth of Gram positive bacteria, to stop the further production of lactic acid in the rumen and for sterilization of rumen content. Dirksen (1970) advocated oral antibiotic for treatment of ruminal acidosis. In the present study, Ruminal cud was administered orally in two goats which were severely affected with acidosis after improvement of ruminal fluid pH. The establishment of normal rumen microbial population is essential and can be best achieved by the cud transplantation (Hoflund, 1967 and Dunlop, 1972).

CONCLUSIONS

In the present study, it is concluded that i/v administration of 5% Sodium bicarbonate, Fluid therapies, and oral administration of Rumen Buffer along with supportive therapy, Anti-histaminic, B-complex with liver extrct, Antibiotic, Ruminotoric is highly effective for therapeutic management of natural ruminal acidosis in goats.

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