

METABOLIC ALTERATIONS IN BUFFALOES SUFFERING FROM DIGESTIVE DISORDERS

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ABSTRACT

The present study was conducted on 40 buffaloes with the history of indigestion, anorexia, less ruminal movements, low milk yield and tympany of unknown origin. The blood samples were collected from these animals and plasma was separated for the estimation of various metabolic parameters. The study revealed a significant decrease in glucose and triglycerides and a significant increase in ketone bodies and blood urea nitrogen, whereas a non-significant decrease was observed in total protein values of affected animals when compared to corresponding values in healthy buffaloes. The results of this study can be used judiciously in diagnosis and to decide the further line of treatment of such cases.

Key words: Buffaloes, indigestion, tympany, blood, biochemical

Indigestion is a common clinical condition in ruminants which generally occurs due to excess intake of carbohydrates and sometimes due to excess amount of nitrogen rich protein diets. Change of feed, use of oral antibiotics, sudden climatic changes etc. are also contributing factors to indigestion (Sharma *et al.*, 2001). Anorexia, tympany or other digestive disorders, commonly encountered in ruminants are characterized by poor appetite, change in rumen pH, decreased rumen motility and reduced microbial fermentation (Radositis *et al.*, 2000). The ultimate result of these clinical conditions is production and economic losses to the farmers. The objective of the study is to characterize the signalment history, physical and metabolic findings to aid in diagnosis and to decide the line of treatment in such clinical cases.

MATERIALS AND METHODS

A total of forty buffaloes suffering from digestive disorders brought at the Teaching Veterinary Clinical Complex were used in the study. The animals had a history of inappetance and indigestion of unknown origin. About 20 ml of blood from each animal was collected in heparinized tubes through venipuncture. Glucose was estimated in fresh blood by Folin and Wu method. Plasma from rest of the blood was separated and stored at -20°C till analysis. Ketone bodies in plasma were estimated by Vanillin method and blood urea nitrogen by diacetyl

monoxime method. Triglycerides, cholesterol, lactic acid, total protein, aspartate transaminase (AST) and lactate dehydrogenase (LDH) were estimated by kits supplied by Bayer Diagnostic India Ltd. using Chemistry analyzer RA-50; Ames (USA). In addition, blood samples were also collected from ten healthy adult buffaloes as control values. These 10 samples were also subjected to haematological and biochemical analysis as described above. The data obtained were analysed statistically by one way analysis of variance and Dunnet's post hoc test using SPSS version 10 to detect significant difference between control and diseased groups (Snedecor and Cochran, 1994).

RESULTS AND DISCUSSION

Mean values of various metabolic parameters are presented in Table 1. Most of the digestive disorders-affected animals had a history of off-feed and poor appetite. On clinical examination, a decrease in rumination and rumen motility was observed in all animals. Mean plasma glucose values were significantly decreased in affected buffaloes as compared to controls (Table 1). Similarly, total triglycerides and total cholesterol were decreased significantly in diseased buffaloes as compared to control group.

A significant increase in ketone bodies and blood urea nitrogen was observed in buffaloes suffering from digestive disorders as compared to healthy animals, which could be correlated with anorexia and decreased

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Table 1
Blood parameters in buffaloes affected with digestive disorders (Mean±S.E.)

Parameters	Healthy buffaloes	Buffaloes with digestive disorders
Glucose (mg/dl)	56.86±0.69 ^a	48.38±0.57 ^b
Triglycerides (mg/dl)	34.55±1.08 ^a	23.75±0.97 ^b
Total cholesterol (mg/dl)	52.67±1.57 ^a	49.41±1.15 ^a
Ketone bodies (mg/dl)	2.07±0.19 ^a	3.08±0.13 ^b
Blood urea nitrogen (mg/dl)	24.07±0.83 ^a	28.35±0.79 ^b
Lactic acid (mg/dl)	14.42±0.78 ^a	12.29±0.25 ^a
AST (U/L)	147.07±7.32 ^a	191.79±10.09 ^b
Lactate dehydrogenase (U/L)	1212.90±59.72 ^a	1397.45±71.54 ^a
Total protein (g/dl)	9.23±0.26 ^a	9.02±0.33 ^a
Calcium (mg/dl)	10.11±0.43 ^a	9.96±0.11 ^a
Phosphorus (mg/dl)	5.15±0.24 ^a	4.76±0.19 ^a

Values with different superscripts in a row for a parameter differ significantly ($P \leq 0.05$)

rumenoreticular activity as catabolism is accelerated under such conditions. Anorexia and ruminal dysfunction might have caused rumen microbial inactivity leading to disturbed rumen metabolism which could have attributed to less volatile fatty acid production (Garry, 2002). The decreased glucose level in blood (protein free filtrate) might have been due to less volatile fatty acid production in the rumen. A non-significant difference in mean values of glucose and calcium was observed in buffaloes suffering from traumatic reticulo-peritonitis (Tabrizi *et al.*, 2007)

The AST enzyme activity increased significantly in anorectic animals as compared to normal buffaloes. The higher levels of AST and LDH activity in diseased buffaloes are indicative of disturbed liver functions and hepatic ischaemia (Kaneko *et al.*, 1997). Similar findings have also been reported by Turkar and Uppal (2007) in buffaloes suffering from omasal impaction. A decrease in plasma protein concentration was observed in anorectic buffaloes, though the difference in comparison to controls

was not significant. The decrease in plasma protein and albumin has also been observed in traumatic reticuloperitonitis and allied syndrome by Ismail *et al.* (2007) and Rose *et al.* (2009). A non-significant difference was observed in plasma calcium and phosphorus concentrations between the diseased and healthy buffaloes. In conclusion, the digestive disorders in ruminants affect the rumen ecosystem, thereby affecting the other metabolic processes in the ruminants. These findings can be helpful for diagnosis and possible remedial measures through supportive therapy in such clinical cases.

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