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Assessment of Biochemical parameters in Theileriosis infected Cattles and Buffaloes

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ABSTRACT

The aim of this study was to assessed the alteration in biochemical parameters in Theileriosis infected cattle's and buffaloes in Ahilyamata Gaushala (Kesharbag) of Indore District (M.P.). This study has been carried out during rainy season. It has been noticed that blood glucose content was significantly decrease ($P < .01$) in both *T. annulata* infected cattle and buffaloes as compared to normal. Whereas, AST/ SGOT, ALT/ SGPT and serum creatinine was found to be markedly increase ($P < .01$) in both *T. annulata* infected cattle and buffaloes compared to normal in Ahilyamata Gaushala (Kesharbag) of Indore. Results indicates that this alteration in biochemical parameters may creates various kinds of dysfunction in studied animals which causes huge economic loss tolerated by farmer society in studied region of Indore District.

Key words: Theileriosis, Biochemical parameters, Cattles and Buffaloes

INTRODUCTION

Theileriosis is tick-borne diseases in domestic ruminants caused by various species of *Theileria*, causing losses of livestock production in Asia, Africa and Middle East at large scale [1]. There are two common species of *Theileria* was reported in cattle are *Theileria annulata* and *Theileria parva*. The host tick *Rhipicephalus* transmits *T. parva* and *Hyalomma* transmits *T. annulata*. Ticks are obligate haematophagus ectoparasites of humans and livestock population which causes reduced milk production, reduced weight and transmission of pathogens like parasitic protozoa viz; *Babesia*, *Theileria*, *Anaplasma* that impaired to the growth of the livestock population [2, 3, 4]. The prevalence of ticks and tick-borne diseases differ from region to region, host management and environmental factors such as, agro-ecological and geo-climatic conditions [5]. It was reported that, more than 80% of the world cattle population is infected with ticks [6], which is harmful to animals. It causes blood loss, damages to hides and skins, stress and irritation, depression of immune function [7].

Therefore, looking to the importance of good health of livestock and also from economic point of view, the present work has undertaken to studies on bovine theileriosis at Ahilyamata Gaushala (Kesharbag) of Indore with special emphasis on certain biochemical parameters.

MATERIALS AND METHODS

Study area

The proposed experimental work is based upon surveyed on cattle's and buffalos in Ahilyamata Gaushala (Kesharbag), Indore and were carried out in Deptt. of Zoology, Mata Jijabai Govt. Girls PG College (Indore).

Sample collection and Parasite identification

Blood sample (3 ml) was collected from ear vain of cattle's and buffaloes (from approximately same age groups). A blood smears were prepared as per standard methods of Afridi *et al* [8] and fixed with absolute methanol and stained

with diluted Giemsa stain (1:10 ratio) for 30 min approximately and extra stain was removed by washing with tap water. The stained slides were examined under oil immersion lenses at 1000 x magnification. The parasites were identified as per standard method according to OIE publications [9]. However, approximately 3ml blood sample was collected from jugular vein and kept into tubes containing EDTA and stored at -20°C for further biochemical examination.

Experimental work

The biochemical parameters were analysed are blood glucose, Aspartate aminotransferase (AST) or Serum Glutamate Oxaloacetate Transaminase (SGOT), Alanine Aminotransferase (ALT) or serum glutamic pyruvic transaminase (SGPT) and Serum Creatinine and were estimated by using Liquimax Kit (Manufactured by Avecon Healthcare Pvt. Ltd., Parwanoo, H.P.) by Standardised Methods.

Statistical analysis

The data obtained in present investigation were taken as triplicate and expressed as mean $\pm$ SD. Student's *t*-test was also used to compare the mean data between normal and *T. annulata* infected cattle and buffaloes [10]. However, statements of statistical significance were based on $P < 0.05$ level [11].

RESULTS AND DISCUSSION

Table-1: Showing average values of studied biochemical parameters in normal and *T. annulata* infected Cattle and Buffaloes in Ahilyamata Gaushala, Kesharbag, Indore

Biochemical Parameters	Normal Cattle (Mean $\pm$ S.D.)	Infected Cattle (Mean $\pm$ S.D.)	t Values	Normal Buffaloes (Mean $\pm$ S.D.)	Infected Buffaloes (Mean $\pm$ S.D.)	t Values
Glucose (mg/dL)	60.81 $\pm$ 0.0361	46.50 $\pm$ 0.0500	143.10	63.00 $\pm$ 0.4509	48.20 $\pm$ 0.0473	63.41
AST/SGOT (IU/L)	62.41 $\pm$ 0.0500	90.20 $\pm$ 0.0473	3151.84	80.22 $\pm$ 0.0289	120.40 $\pm$ 0.0346	1095.90
ALT/SGPT (IU/L)	26.80 $\pm$ 0.0400	46.40 $\pm$ 0.0557	1960.00	42.40 $\pm$ 0.0600	54.30 $\pm$ 0.0529	1030.57
Serum creatinine (mg/dL)	0.96 $\pm$ 0.0361	1.04 $\pm$ 0.0200	5.23	1.18 $\pm$ 0.0379	1.24 $\pm$ 0.0529	7.18

Each observation was taken in triplicate. All the values are significant at $P < 0.05$.

In present investigation blood glucose, aspartate aminotransferase (AST) or serum glutamate oxaloacetate transaminase (SGOT) (IU/L), alanine aminotransferase (ALT) or serum glutamic pyruvic transaminase (SGPT) and serum creatinine has been estimated. The blood glucose contents was found to be decrease ($P < 0.01$) in both *T. annulata* infected cattle and buffaloes (Table-1). Whereas, AST/SGOT, ALT/SGPT and serum creatinine was found to be increase ($P < 0.01$) in both *T. annulata* infected cattle and buffaloes as compared to normal cattle and buffaloes in Ahilyamata Gaushala, Kesharbag, Indore (Table-1).

Whereas, there was a decrease in serum glucose concentrations in *T. annulata* infected cattle may be due to utilization of glucose by *theileria* in the blood and hepatic dysfunction [12]. The hypoglycaemia noticed in animals infected with *T. annulata* is associated with the utilization of glucose by parasites and damage to the liver occurs due to *T. annulata* infection [13]. However, a significant ($P \leq 0.05$) decrease in glucose and significant ($P \leq 0.05$) increase in serum bilirubin and alanine transaminase has been noticed in *T. annulata* infected cross bred cattle as compared with healthy controls [14]. Serum AST and ALT concentrations are also found to be increased in infected cattle compared with healthy controls [12, 15]. Serum AST and ALT concentrations indicates about hepatic function [16]. In present study, an increase in serum AST and ALT concentration was noticed in infected cattle compared with normal, indicates about hepatic dysfunction [17]. The rise in serum ALT concentration may also be due to muscular trauma because of prolonged recumbency due to bovine theileriosis [12]. An increased in the creatinine levels was reported in cattle naturally infected with *Theileria annulata* [12, 18]. Increased creatinine kinase activity is a highly specific about to indicates muscle damage [12]. Due to significant elevation of urea and creatinine level in infected animals indicates that theileriosis is associated with kidney damage [19]. Their are markedly increased in ALT (alanine amino transferase) and ALP (alkaline phosphatase) activities and the concentrations of bilirubin and urea were recorded in sera from infected animals whereas the concentrations of glucose were significantly decreased as compared to the controls [20]. However, more or less similar patterns of observations were reported in present investigation as suggested by previous authors in terms of studied biochemical parameters in *Theileria annulata* infected domestic ruminants, including cattle's and buffaloes.

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