



## Comparative Evaluation of Hemato Biochemical Profile in Healthy and Parasitic Infected Buffalo Calves

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### ABSTRACT

Studied on clinico-haematological and blood biochemical profiles in parasitic infected and treated buffalo calves (n=60) were carried out. The clinical symptoms observed during worm infestation were weakness, anorexia, emaciation, foetid diarrhoea, pale mucus membrane and reduced body weight. Haematological studied revealed lower haemoglobin, packed cell volume (PCV) and total erythrocyte count (TEC) while total leukocyte count (TLC) values were found to be increased. In differential leucocyte count, the lymphocyte percentage was decreased while eosinophil and neutrophils percentage were increased. In erythrocyte indices, the mean corpuscular volume (MCV) and mean corpuscular haemoglobin (MCH) value were increased whereas mean corpuscular haemoglobin concentration (MCHC) was decreased. The biochemical parameters of worm infested calves showed decreased level of serum glucose, serum protein and albumin. The mean alanine amino transaminase (ALT) and aspartate amino transferase (AST) values were increased in worm infection. Thus, it may be concluded that worm infestation in buffalo calves leads to anemia, eosinophilia, hypoglycemia and hypo proteinimia while increased activities of serum enzymes.

**Key words:** Worm Infestation, Hematology, Biochemical Profile, Buffalo Calves.

### INTRODUCTION

Water buffaloes (*Bubalus bubalis*) are originally from Asia and they are mainly distributed in tropical and subtropical Asia. Calf is the back bone of the dairy industry. Many parasites are common in cattle and buffalo. Buffalo suffer less from adverse effects of parasite as compared to cattle. Owing to their habit of wallowing in rivers, water channels and even dirty water,

there is a high risk of snail-borne helminths. Young buffalo calves also suffer from *Neoscaris vitulorum* infestations<sup>4</sup>.

The blood metabolites and biochemical parameters provide useful information on nutritional status and clinical investigation of an individual hence WHO recommended the use of blood parameters for medical and nutritional assessments<sup>8</sup>.

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Haematological studies establish the diagnostic baselines of blood characteristics for routine management practices of farm animals. They reflect the physiological responsiveness of the animal to its external and internal environments serving as a veritable tool for monitoring animal health. Since then determination of haematological parameters is considered as an essential tool in the diagnosis of various pathological and metabolic disorders<sup>3</sup>.

Hematological and biochemical variables are very important diagnostic aids in diseases diagnosis. Interpretation of the haemato biochemical variables requires comparison with the reference values in healthy population. Calves need all the nutrients they can get for growing. If they are fed normal rations but heavily infected by internal parasites, they cannot utilize the food given to them. Their growth may be reduced dramatically, and they easily become victims of a pneumonia or diarrhoea that may cause their death<sup>2</sup>. Diarrhea in farm animals due to parasitic infection, especially in neonatal calves is one of the most challenging clinical syndromes encountered by practicing large animal's veterinary practitioners<sup>1</sup>.

#### MATERIAL AND METHODS

The study was conducted on organized buffalo unit of ABIS dairy farm Rajnandgaon, Chhattisgarh where all calves were kept in well-organized system. Calve up to one month age were kept in individual calf pan and one month to two month of age were kept in small group of *i.e.* 6 calves per group, after two month of age all calves were kept in group consisting 25 calves. All calves were weaned at the age of two month.

The infected group consisted of 30 calves which were naturally infected with helminthes selected on the basis of clinical symptoms whereas the healthy control group comprised of 30 calves which were free from parasitic infection. Hence, this study comprised of a total 60 calves.

Blood sample from all the calves were collected on day 0 of start of treatment and

analyzed for different haematological and biochemical parameters.

Parasitological analyses of faecal samples were done on the day of collection using sedimentation and floatation standard techniques. The parasitological findings were reported to the farms to enable them to treat the animals and take recommended control measures.

Study was conducted by the screening of suspected animals, showing clinical sign and their faecal sample examination. The studies of clinical findings haematological and blood biochemical parameters were carried out in all positive cases suffering from worm infestation along with healthy control group.

Blood sample of 10 ml of blood was collected aseptically from jugular vein of each animal which were positive for worm infestation. From the sample 3 ml blood was collected in one glass vial containing ethylene diamine tetra acetate (EDTA) anticoagulant as required for the haematological findings and 7 ml in a test tube of wide bore without anticoagulant for harvesting serum to investigate for biochemical parameter. The haematological parameters *i.e.* haemoglobin concentration (Hb), packed cell volume (PCV), total erythrocyte count (TEC), total leukocyte count (TLC), differential leukocyte count (DLC), erythrocyte indices (MCV, MCHC) were recorded according to the standard techniques.

About 7 ml of blood was collected without anticoagulant in a sterilized test tube and allowed to clot at room temperature. After two hours, serum was collected with the help of a pasteur pipette in a centrifuge tube. Blood cells were removed by centrifugation for 15 minutes at 2000 rpm and the top of clean serum was collected with the help of a pasteur pipette. To avoid bacterial and fungal growth a drop of 1:1000 thiomersol was added as preservative and the sample were stored in deep freeze for further estimation of various biochemical parameters such as blood glucose, total serum protein (TSP), serum albumin, serum globulin, serum alanine amino transferase (ALT), serum asparatate amino transferase (AST) and

calcium using standard procedure by commercial kits.

## RESULTS AND DISCUSSION

Haematological and serum biochemical reference intervals are essential for diagnosing diseases. Changes in the haematological parameter during parasitic infection in buffalo calves are illustrated in (Table 1). In recent study, the mean Hb concentration (g/dl) was recorded  $8.91 \pm 2.24$  in infected and  $13.23 \pm 0.24$  in healthy calves, while the mean PCV (%) of parasitic infected animal was  $27.75 \pm 3.45$  and in healthy animals was  $40 \pm 0.20$ . The TEC( $10^6/\mu\text{l}$ ) in infected calves was  $3.49 \pm 0.88$  and in healthy calves was  $6.50 \pm 0.05$ . The mean total lymphocyte, neutrophils, eosinophil and monocyte values (%) were  $48.5 \pm 2.2$ ,  $40.20 \pm 2.02$ ,  $8.0 \pm 0.21$  and  $3 \pm 0.21$  respectively in infected animals and  $53.3 \pm 1.0$ ,  $37.5 \pm 0.10$ ,  $2.83 \pm 0.15$  and  $3.66 \pm 0.19$  in healthy animals respectively. The mean values for MCV(fl), MCH (pg) and MCHC (g/dl) in diseased buffalo calves were found  $28 \pm 2.0$ ,  $23.66 \pm 0.66$  and  $28.5 \pm 1.47$  respectively, and in healthy calves the values were  $67 \pm 0.20$ ,  $24 \pm 0.46$  and  $33.01 \pm 0.20$  respectively.

Changes in the biochemical parameter during parasitic infection are exemplified in

Table 2. In the current investigation, the mean blood glucose level (mg/dl) was  $42 \pm 0.20$  in healthy buffalo calves while  $31.75 \pm 2.22$  in parasitic infected calves. Total serum protein (TSP) (g/dl) was  $6.27 \pm 0.24$  in healthy calves while it was reported  $5.70 \pm 0.20$  in parasitic calves. The mean value of serum albumin (g/dl)  $2.20 \pm 0.20$  and serum globulin (g/dl)  $3.0 \pm 0.10$  were found in parasite infected calves while diverging from normal level  $2.49 \pm 0.41$  serum albumin and  $2.80 \pm 0.12$  globulin were reported in this study. The mean serum enzyme ALT (U/L) was  $30.23 \pm 0.47$  while AST was  $88 \pm 0.26$  in healthy calves. The mean serum enzyme ALT was  $42.5 \pm 0.92$  while AST (U/L) was  $118.21 \pm 0.57$  in infected calves. Serum calcium (mg/dl) value was  $10.01 \pm 0.24$  in healthy calves while  $8.48 \pm 0.24$  mg/dl in parasitic infected animals. The mean blood glucose level were  $42 \pm 0.21$  while  $31.75 \pm 2.22$  in parasitic calves.

Our results are in agreement with Pandey and Mishra<sup>6</sup>, Waghmare *et al.*<sup>7</sup>, and Jyoti *et al.*<sup>5</sup>. To keep the number of parasites as low as possible the farmer has to manage his animals in good hygiene, satisfactory nutrition, pasture rotation and treat animals against parasites at fixed intervals.

**Table 1: Haematological parameter of healthy and parasitic infected calves**

Parameters	Healthy buffalo calves (n=30)	Infected buffalo calves (n=30)
Haemoglobin (g/dl)	$13.23 \pm 0.24$	$8.91 \pm 2.24$
Packed cell volume (%)	$40 \pm 0.20$	$27.75 \pm 3.45$
Total erythrocyte count ( $10^6/\mu\text{l}$ )	$6.50 \pm 0.05$	$3.49 \pm 0.88$
Total leucocyte count ( $10^3/\mu\text{l}$ )	$53.3 \pm 1.0$	$48.5 \pm 2.2$
Neutrophil (%)	$37.5 \pm 0.10$	$40.20 \pm 2.02$
Eosinophil (%)	$2.83 \pm 0.15$	$8.0 \pm 0.21$
Monocyte (%)	$3.66 \pm 0.15$	$3.0 \pm 0.21$
Mean Corpuscular volume (fl)	$67 \pm 0.20$	$28.0 \pm 0.20$
Mean corpuscular haemoglobin (pg)	$24 \pm 0.46$	$23.60 \pm 0.66$
Mean corpuscular haemoglobin concentration (g/dl)	$33.01 \pm 0.20$	$28.5 \pm 1.47$

**Table 2: Serological parameter of healthy and parasitic infected calves**

Parameters	Healthy buffalo calves (n=30)	Infected buffalo calves (n=30)
Blood glucose (mg/dl)	42 ±0.20	31.75±2.22
Total serum protein (g/dl)	6.27±0.24	5.70±0.20
Albumin(g/dl)	2.49±0.41	2.20±0.20
Globulin(g/dl)	2.80±0.12	3±0.10
ALT (U/L)	30.23±0.47	42.5±0.92
AST(U/L)	88±0.26	118.21±0.57
Calcium (mg/dl)	10.50±23	8.48±0.24

### CONCLUSION

Haematological studied revealed lower Haemoglobin, Packed Cell Volume (PCV) and total erythrocyte count (TEC) whereas mean total leukocyte count (TLC) values were found to be increased. In differential leucocyte count, the lymphocyte percentage was decreased while eosinophil and neutrophil percentage were increased. In erythrocyte indices, the Mean Corpuscular Volume (MCV) and Mean Corpuscular Haemoglobin (MCH) value was increased whereas Mean Corpuscular Haemoglobin Concentration (MCHC) was decreased. The biochemical parameters of worm infested calves showed decreased level of serum glucose, serum protein and albumin. The mean Alanine amino transaminase (ALT) and Aspartate amino transferase (AST) values were increased in worm infection. Thus, it may be concluded that worm infestation in buffalo calves leads to anemia, eosinophilia, hypoglycemia and hypo proteinimia while increased activities of serum enzymes.

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