



RESEARCH ARTICLE

Haematological and Clinical Alterations with Traumatic Reticuloperitonitis in Cattle

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ABSTRACT

The aim of the present study was to investigate the haematological alterations in cattle suffering from traumatic reticuloperitonitis. A series of case studies were conducted from December 2012 to February 2014 in cattle referred to the Teaching Veterinary Clinical Complex, College of Veterinary Science, Proddatur. A total of 11 cattle were diagnosed with traumatic reticuloperitonitis and most of them were referred with a history of fever, anorexia, sudden milk drop, stiff gait etc., upon examination, the cattle revealed fever, tachycardia, tachypnoea, with ruminal atony associated with mild bloat and dehydration. Condition was diagnosed with metal detector. Haematology revealed significant ($P<0.05$) erythrocytopenia, higher packed cell volume, lower haemoglobin concentration, lower mean corpuscular haemoglobin concentration, higher mean corpuscular volume, significant ($P<0.05$) leucocytosis with neutrophilia, presence of more number of immature neutrophils and decreased lymphocyte count.

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INTRODUCTION

Traumatic reticuloperitonitis (TRP) in cattle is mainly caused due to the ingestion of sharp foreign bodies like nails, wires etc., Among the numerous foreign body syndromes in ruminant species, TRP and traumatic pericarditis (TP) are the most common. TRP is a sporadic disease in ruminants caused by perforation of the reticulum due to ingestion of foreign materials, which is a common cause of abdominal surgery in cattle (Braun, 2003). The honeycomb like structure of the reticulum provides many sites for fixation of a foreign body, and contractions of the reticulum and pressure of the calf during late pregnancy may be sufficient to push a sharp foreign body through the wall, inducing the disease (Ghanem, 2010).

Cattle are more susceptible to foreign body syndrome than small ruminants because the bovine species does not have highly sensitive prehensile organs such as lips and tongues that discriminate sense of taste (Braun, 2003). As a consequence, cattle kept in farm yards stables or at other sites close to human mechanical activities are prone to swallow metallic objects such as nails and pieces of wires that have been carelessly left in their feeding areas (Desiye and Mersha, 2012). However, the development of

severe sequelae to the penetration of the reticular wall depends on the characteristics of the foreign body as well as the direction and the extents of the penetration (Gokce *et al.*, 2007). Affections of the bovine for stomach due to ingested foreign bodies are the subject of attention almost all over the world and of major economic importance due to severe loss of production and production ability and sometimes death of the animal were reported (Ramprabhu *et al.*, 2003). In turn, TRP may also lead to serious complications such as peritonitis, pericarditis, pleuritis, peri-reticular abscesses and pneumonia. The aim of this study was to investigate haematological alterations in cattle suffering from TRP.

MATERIALS AND METHODS

Present study was carried out on the cattle presented and referred to the Teaching Veterinary Clinical Complex, College of Veterinary Science, Proddatur and Veterinary Hospital, Proddatur and Veterinary Dispensary, Bollavaram from December 2012 to February 2014. TRP was confirmed in eleven cattle by their feeding history, clinical and physical examination of animals, laboratory findings. Metal detector was used for confirmatory diagnosis. Routine clinical examinations were carried out

and body temperature, pulse, and respiratory rate were recorded for each animal. Whole blood was collected from jugular vein in Ethylenediaminetetraacetic acid (EDTA) containing vial for estimation of haemoglobin (Hb), packed cell volume (PCV), total red blood corpuscle (RBC) count, total white blood corpuscle (WBC) count and erythrocyte indices such as mean corpuscular volume (MCV), mean corpuscular haemoglobin (MCH) and mean corpuscular haemoglobin concentration (MCHC) were estimated by standard methods as described by Weiss and Wardrop (2010). The blood smears were stained by Leishman's stain to study the differential count (DLC) following which, the absolute counts were derived. The data were analyzed by using student t-test and all the statistical analyses were conducted using SPSS software (Version 11.5).

RESULTS AND DISCUSSION

In the present study, the cattle affected with TRP had pyrexia, tachycardia, tachypnoea (Table 1). Haematological abnormalities were incorporated in Table-2. There was significant ($P<0.05$) decrease in total erythrocyte count with lower haemoglobin concentrations and higher PCV, significant ($P<0.05$) leucocytosis, neutrophilia, presence of more number of immature neutrophils (band cells) than mature neutrophils and decreased lymphocyte count. Based on the metal detector the condition was diagnosed as TRP.

In this study the observed decrease in total erythrocyte count and hemoglobin concentration indicates anemia, which could be attributed to the loss of blood during penetration of the reticulum or the chronic inflammatory process which was in accordance with Ocal *et al.* (2008), they reported that a significant decrease in mean erythrocytes count in TRP affected cattle when compared with healthy cattle. Ghanem (2010) observed significant erythrocytopenia (reduced RBC) and lower Hb concentrations in the cows with TRP. Reddy *et al.* (2014) also observed concurrent findings in their studies. Omidi (2008) observed anemia in TRP cattle.

In the present study, PCV% in TRP cattle was found to be increased compared to healthy cattle (35.40 ± 0.37). This increase in hematocrit values could be attributed to dehydration associated with fluid loss due to the reduction of food and water intake (Rosenberger, 1979). Increased hematocrit values of our study are in accordance with the earlier reports of Ghanem (2010), who observed increase in PCV% in traumatic reticuloperitonitis cattle. Whereas as a contradiction, Ocal *et al.*, (2008) observed that a significant decrease in PCV% in TRP affected cattle when compared with healthy cattle. Reddy *et al.* (2014) observed that a significant increase in hematocrit values in TRP cattle.

Increase in total leukocytic count with neutrophilia and lymphopenia was noted in the present study, which was in agreement with Ghanem (2010), Aref and Abdel-Hakien (2013), which is mainly because of inflammatory responses due to infection associated with the penetration of the reticulum and diaphragm (Latimer *et al.*, 2003 ; Braun *et al.*, 1993). Ocal *et al.*, (2008) observed significant increase in mean total leukocyte count and neutrophilia with lymphopenia in TRP affected cattle.



Fig. 1: Cattle with Traumatic reticuloperitonitis showing increased accumulation of fluid in the peritoneum

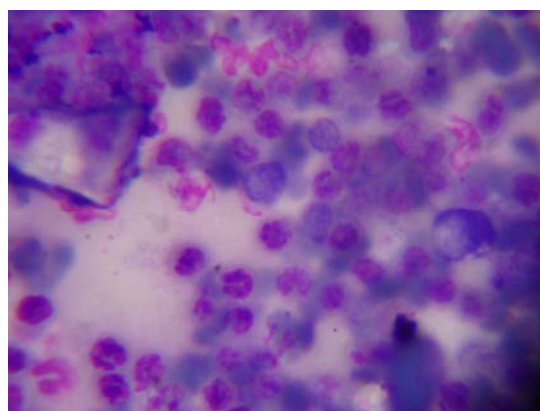


Fig. 2: Presence of more number of band cells

Table 1: Clinical findings of cattle suffering from traumatic reticuloperitonitis

| Parameter | Control (Healthy) cattle | TRP cattle |
|---|--------------------------|-------------------|
| Rectal Temperature ($^{\circ}\text{C}$) | 37.87 ± 0.03 | $39.88\pm 0.4^*$ |
| Heart rate (/min) | 63.28 ± 1.2 | $78.24\pm 2.3^*$ |
| Respiration (/min) | 22.34 ± 0.36 | $32.21\pm 0.62^*$ |

*Indicates significant difference ($P<0.05$)

Table 2: Hematological findings in cattle suffering from traumatic reticuloperitonitis

| Parameter | Control (Healthy) cattle | TRP cattle |
|---|--------------------------|-------------------|
| Total RBCs ($\text{X}10^6/\mu\text{L}$) | 7.50 ± 0.32 | $4.95\pm 0.12^*$ |
| Total WBCs ($\text{X}10^3/\mu\text{L}$) | 8.20 ± 0.87 | $13.80\pm 0.16^*$ |
| Hb (g/dL) | 11.40 ± 0.24 | $7.60\pm 0.13^*$ |
| PCV (%) | 35.40 ± 0.37 | $39.80\pm 0.20^*$ |
| Neutrophils (%) | 28.50 ± 0.82 | $68.90\pm 0.24^*$ |
| Lymphocytes (%) | 58.70 ± 0.91 | $18.70\pm 0.32^*$ |
| MCV (fL) | 52.50 ± 0.42 | $78.80\pm 0.12^*$ |
| MCH (pg) | 14.90 ± 0.12 | 15.75 ± 0.20 |
| MCHC (g/dL) | 33.60 ± 0.76 | $20.00\pm 0.80^*$ |

*Indicates significant difference ($P<0.05$)

Gokce *et al.* (2007) reported leukocytosis with left-shift neutrophilia in cattle with TRP. Abebe and Nuru (2011) observed significant increase in total leukocyte (WBC) and increase in the percentage of neutrophils and decrease in the percentage of lymphocytes. Omidi (2008) noted a significant increase in leukocyte count in TRP cattle.

In the present study, MCV values were increased and MCHC values were decreased in TRP affected cattle. Whereas Ocal *et al.* (2008) observed that mean MCV levels difference between healthy cattle and TRP affected cattle was insignificant. In the current study an increase in MCV and MCH, decrease in MCHC could be due to decrease in concentration of erythrocyte and Hb in TRP affected cattle.

In the present study, the cattle affected with TRP developing diffuse peritonitis had fever, elevated heart rates, elevated respiratory rates (Table 1), cessation of milk flow and appetite which is in agreement with the findings of Hajjigharamani and Ghane, (2010). Hence, it is concluded that there is a significant decrease in total erythrocytes, hemoglobin concentration and lymphocyte number in cattle affected with traumatic reticuloperitonitis with increase in total leukocytes count, PCV, MCV and neutrophil count. Clinical signs and hematological findings are of great values; however additional diagnostic aids like metal detectors are essential for confirmatory diagnosis.

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