Theileria annulata induced brisket oedema in a bull and its successful treatment

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Abstract In the present case, jugular vein engorgement and oedema of the brisket region which mimic the signs of pseudopericarditis due to theileriosis in a bull was reported. An adult Ongole crossbred bull with history of weakness, anorexia and oedema at brisket region was referred to Teaching Veterinary Clinical Complex, College of Veterinary Science, Proddatur. Physical examination revealed the presence of ticks over the body, right and left prescapular lymphadenopathy and oedema at brisket region. Blood examination revealed the presence of piroplasms in erythrocytes, schizont in lymphocytes, anaemia and lymphopenia. Bull was treated with injection buparvaquone along with supportive medications. By the 3rd week of therapy improvement was noticed by disappearance of brisket oedema and recurrence was not noticed during the 8 months of observation.

Keywords Bull · Buparvaquone · ECG · Pseudopericarditis · Theileriosis

Introduction

Haemoprotozoan diseases causes severe economic losses to the farmers and livestock industry, because hot and humid climate is highly favourable for tick population (Dumanli et al.

2005). *Theileria annulata* is one of the ticks borne haemoprotozoan disease and transmitted by *Hyalomma anatolicum*. Cattle affected with theileriosis showed the signs of fever, enlargement of superficial lymph nodes and emaciation (Hussein et al. 2004). The present report describes about the clinical and laboratory data from a rare case of pseudo pericarditis showing the brisket oedema due to theileriosis in a bull and its successful therapeutic management.

Case history and observations

A 7 years old Ongole bull was referred to the Teaching Veterinary Clinical Complex, College of Veterinary Science, Proddatur with the complaint of anorexia, weakness and oedema at brisket region from 3 days (Fig. 1). Clinical examination revealed pale conjunctiva mucus membranes, elevated rectal temperature (103.2 °F), tachypnoea (35/min), heart rate of 83 bpm, swollen pre scapular lymph nodes, oedema on the sub mandibulae, neck and brisket region and slight engorgement of the jugular vein (Fig. 2). Auscultation of thorax did not revealed any pericardial friction rubs, gurgling, splashing sounds and reduced rumen motility (1/3 min).

Peripheral blood sample was collected from ear vein and examined for the haemoprotozoans. Blood samples were collected for complete blood count and serum biochemical analysis. Serum total protein, albumin, glucose, blood urea nitrogen, creatinine and aspartate aminotransferase were done by using commercial kits. Dung sample was collected for the screening of parasitic ova. Laboratory procedures followed in the present study were in accordance with previous studies (Sivajothi et al. 2014a, b). ECG was recorded in base apex lead system to know about the cardiac abnormalities (Reddy et al. 2014a, 2015).

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Fig. 1 Bull showing the brisket oedema

Fig. 2 Bull showing the jugular engorgement

Fig. 3 Abnormal QRS complex in ECG (Lead I)

Electrocardiography (ECG) examination revealed high amplitude of QRS complex (Fig. 3). No parasitic ova could be detected in faecal examination. Microscopic examination of the peripheral blood smears were positive for *Theileria annulata* organisms (Fig. 4). Haemato-biochemical and ECG findings were mentioned in Table 1.

Treatment and discussion

Bull was treated with buparvaquone injection @ 2.5 mg/kg body weight IM, 20 % dextrose along with electrolytes @ 10 ml/kg body weight on the day of presentation, inj.

Fig. 4 Presence of piroplasm organism and schizonts in the peripheral blood smear (1000X)

Table 1 Hematological and biochemical analysis and ECG parameters of bull infected with theileriosis

Parameters	First day of presentation	After 30 days of therapy
TEC ($\times 10^6/\text{cumm}$)	4.2	5.6
Hb (g/dl)	7.2	10.5
PCV (%)	22	33
TLC ($\times 10^3/\text{cumm}$)	5.6	7.7
DLC		
Basophils (%)	0	0
Eosinophils (%)	4	3
Lymphocytes (%)	76	66
Monocytes (%)	2	1
Neutrophils (%)	18	30
Platelet count ($\times 10^3/\mu\text{l}$)	212	422
Total protein (mg/dL)	5.2	6.2
Serum albumin (mg/dL)	1.36	1.54
Serum glucose (mg/dL)	42	54
Serum creatinine (mg/dL)	1.67	1.55
BUN (mg/dL)	52	39
AST (μl)	31	35
Heart rate (/bpm)	83	60
P amplitude (mV)	0.20	0.18
P duration (s)	0.06	0.06
R amplitude (mV)	1.30	1.00
QRS duration (s)	0.07	0.07
T amplitude (mV)	0.65	0.45
T duration (s)	0.10	0.09

meloxicam @ 0.5 mg/kg body weight, IM, inj. chlorpheniramine maleate @ 0.5 mg/kg body weight, IM for 3 days. Haematinic injection and phosphorus injection was given @ 15 ml intramuscularly weekly twice. After first week of therapy, recovery was noticed by the reduction in the oedema at brisket region (Fig. 5). In the second week, bull was treated with haematinic (iron and folic acid

Fig. 5 After therapy—reduction in the oedema size

Fig. 6 After therapy—reduction in the jugular engorgement

Fig. 7 Improvement in the ECG findings (Lead-I)

supplement) boli @ 2/day for 5 days along with mineral mixture. By 3rd week of treatment absence of jugular vein engorgement, improved appetite and activeness of the animal and normal ECG waves were noticed (Figs. 6, 7).

In theileriosis, parasites invade to lymphoid cells and at a later stage of infection invade to the erythrocytes and causes fever, anemia and leads to death (Soulsby 1982). Diagnosis of the theileriosis can be done based on the clinical findings and microscopic examination of stained blood and lymph node aspiration cytology smears (Dumanli et al. 2005). In the present study disease was diagnosed based on the peripheral blood smears examination.

Due to cellular lysis, endogenous pyrogen liberates in the blood stream causing raise of body temperature which may leads inappetence (Glass et al. 2003). In early stage of infection, macro schizont proliferate inside the lymphocyte causing inflammatory reaction and lymphoid hyperplasia which leads to enlargement of superficial lymph nodes (Jabbar et al. 2008). In this stage anaemia and reduction in haemoglobin concentration and the total erythrocytes count were due to the destruction and the removal of the infected erythrocytes by reticulo- endothelial system (Singh et al. 2001). The leukogram showed significant decreases in TLC with lymphocytosis. Haematological abnormalities observed in this case were in consonance with Hussein et al. (2004) and Nazifi et al. (2009). Recorded high amplitude QRS complex might be due to the changes in the conduction system of heart. Increased heart rate and anorexia indicate excitation of the sympathetic system.

Theileria annulata infection causes hepatic tissue damage leads to increase in AST levels. Recorded hypoproteinaemia and hypoalbuminaemia is possibly due to the harmful effect of toxic metabolites of *Theileria* and also due to liver dysfunction. These results were in agreement with Saber et al. (2008). In the present case study, recorded serum hypoproteinaemia might be due to theileriosis. It was confirmed by the feeding history collected from the owner who feeds high protein rich feed to the four bulls in his yard. Out of four only one bull showed the brisket oedema along with theileriosis.

Pseudopericarditis is a rare circulatory system disorder in cattle. Pseudopericarditis developed due to the pressure at the base of the cranial and caudal vena cava returning blood to the heart. This condition may occur due to tumours, abscesses, echinococcus cysts, swollen lymph nodes resulting from tuberculosis and leukosis, one-sided pleuritis and diaphragmatic hernia. This type of condition may be seen in cattle with traumatic pericarditis. In theileriosis, swelling of the local lymph nodes may be observed (Kettle 1995). Mediastinal lymph nodes around the base of cranial and caudal vena cava returning blood to the heart may be affected by *Theileria* species. In this condition, jugular engorgement, oedema, inappetence are the clinical signs. Signs reported in this study were also similar to the signs described for pseudopericarditis in the literature (Radostits et al. 2000; Keles et al. 2003). Present case was differentiated from other possible diseases which may be responsible for development of the oedema (Sivajothi and Reddy 2014). Percussion and auscultation of the heart, pain tests and examination with ferroscope to detect hard ware disease, haematological and faecal sample examination was done to differentiate the present case with other diseases (Reddy et al. 2014b).

Conclusion

Present case reports about a rare case of brisket oedema due to theileriosis in a bull and its successful management.

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