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A Rare Case of Pseudopericarditis in a Kankrej Bull Caused by Theileriosis

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ABSTRACT

A 6 year old Kankrej bull was referred to the Veterinary Clinical Complex, with the complaint of anorexia, weakness, reluctance to move and oedema at brisket region from last 5 days. Clinical examination revealed pale mucous membranes, elevated rectal temperature, tachypnoea, tachycardia, reduced rumen motility, swollen pre-scapular lymph nodes, oedema at the brisket region and slight engorgement of the jugular vein. X-ray was done and the radiographic findings did not reveal any defect. Then ECG was advised and it revealed that the heart was working with a normal sinus rhythm but heart beat was slightly high. Peripheral blood sample was collected from ear vein and examined for the haemoprotozoans. Microscopic examination of the peripheral blood smears was positive for *Theileria annulata* organisms. Blood samples were collected for complete blood count and serum biochemical analysis. After treatment an uneventful recovery was noticed as was seen from the decrease in the fluid of brisket region.

HIGHLIGHTS

- A rare case of pseudopericarditis was observed in a bull suffering from theileriosis.
- The bull exhibited signs such as fever, brisket edema, respiratory distress and weakness.
- This case highlights an unusual cardiac manifestation of theileriosis that veterinarians should consider in endemic regions

Keywords: Kankrej bull, oedema, brisket region, radiograph, ECG

Numerous diseases can affect the cardiovascular system of bovines, including coronary artery diseases (CAD), myocardial infarction, cardiomyopathy, congenital heart disease, aortic aneurysms, endocarditis, myocarditis, pericarditis and venous thrombosis. Among various pericardial disorders, pericarditis is the most commonly recorded disorder found in cattle and buffaloes (Bexiga *et al*., 2008). Pericarditis may arise by different etiological agents, including bacterial and viral infections (Bolin *et al*., 2005), neoplastic diseases (Stoica *et al*., 2004) and secondary to inflammatory processes in adjacent organs or septicemia (Jesty *et al*., 2005). Pericarditis leads to heavy financial losses to the livestock owners due to decrease in production, costly treatment and increased mortality rates. Hence it's timely diagnosis, accurate differential diagnosis and appropriate medicinal therapy in treatable cases is very essential. To diagnose and manage various heart related

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diseases in cattle and buffaloes it is a challenge for the large animal practitioner. Diseases related to heart are usually fatal due to the limited availability and effectiveness of both medicinal and surgical treatments in Cattle and Buffaloes. The economic losses due to heart diseases can be prevented or reduced by early diagnosis, initiation of appropriate treatment or when necessary the timely culling of the affected animal (Buczinski *et al*., 2010). The prognosis of heart diseases in bovines varies from guarded to poor usually depending upon the nature and severity of the disease (Buczinski *et al*., 2006). Bovines showing signs of heart failure mostly have poor prognosis as compared to those animals without such signs which is indicative of early or mild cardiac disease (Buczinski *et al*., 2010). The clinical findings of pericarditis in cattle is characterized by tachycardia, muffled heart sounds, asynchronous heart sounds such as rubbing or splashing sounds, jugular vein distension and edema of the jaw and dewlap, besides ventral abdomen extending to udder (Braun *et al*., 2007), anorexia, decrease in milk production, pyrexia, increased pulse rate (Athar *et al*., 2012). In addition to these other signs like diarrhea and scanty faeces are also observed in some cases (Subramanian *et al*., 2003). Congested mucous membranes and increased capillary refill time are closely associated with pericarditis.

The description of pseudopericarditis is characterized by jugular engorgement and oedema of the brisket and ventral abdominal wall caused due to the pressure at the base of the cranial and caudal vena cava which alters the venous blood to the heart (Radostits *et al*., 2007). The term pseudopericarditis is used because similar symptoms can be seen in cattle with traumatic pericarditis. However the occurrence of pseudopericarditis is quite rare in cattle caused by theileriosis (Sudhakara and Sivajothi, 2017; Satheesha *et al*., 2017). Jugular vein engorgement, oedema and anorexia can be seen in cattle with pseudopericarditis due to theileriosis (Radostits *et al.,* 2007). Pseudopericarditis occurs with the symptoms that are likened to that of pericarditis without any real cardiac abnormalities. The mechanism of formation of pseudopericarditis is explained as pressure on the vena cava due to the swelling of the mediastinal lymph nodes around caudal vena cava and cranial vena cava which inhibits blood backflow leading to clinical manifestations such as oedema and jugular enlargement (Radostits *et al*., 2007). Theileriosis is a tick-borne disease and the clinical symptoms include pale mucus membranes, tick infestation, enlargement of prescapular lymph nodes, and high rise in rectal temperature. In addition to these common symptoms less frequent signs like exophthalmos and pseudopericarditis may also be observed.

Case Presentation, Observations and Diagnosis

A 6 year old Kankrej bull was referred to the Veterinary Clinical Complex with a 5-day complaint of anorexia, weakness, reluctance to move and oedema in the brisket region (Fig. 1).

Fig. 1: Kankrej Bull with brisket oedema

Before referral, the Bull was treated by a local veterinarian with antibiotics, analgesics, diuretics, laxatives and ruminotorics. Although the oedema initially reduced but recurred after some days and the condition of the animal deteriorated despite the ongoing therapy. Clinical examination pale conjunctival mucous membranes, elevated rectal temperature (103.2 ^{o}F), tachypnoea (35/min), tachycardia (83/bpm), reduced rumen motility (1/3 min), swollen pre-scapular lymph nodes, oedema at the brisket region and slight engorgement of the jugular vein. Auscultation of thorax did not reveal any abnormal heart or lung sounds.

Faecal examinations were done and were found to be negative for any parasites. X-ray was done and the radiographic findings did not reveal any detectable abonrmality. Subsequently an ECG was advised and it revealed that the heart was working with a normal sinus rhythm but heart beat was slightly high. The QRS complex on the second lead appeared predominantly as

a QS complex (Fig. 2), with an amplitude measuring approximately –0.6 mV.

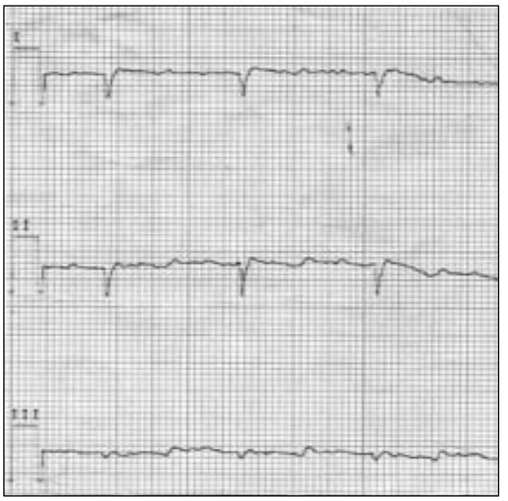

Fig. 2: Electrocardiogram findings of Pseudopericarditis caused by Theileriosis (25 mm/sn, 1mv=10mm)

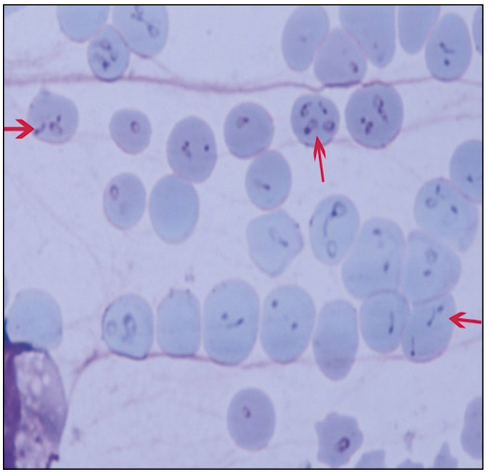

Fig. 3: Blood smear with theileriosis showing erythrocytes infested with Theileria parasites parasites (arrows)

Peripheral blood sample was collected from the ear vein and examined microscopically for the haemoprotozoans. Blood smears examination was positive for *Theileria annulata* organisms (Fig. 3). In addition to this, blood samples were collected for conducting various tests like complete blood count and serum biochemical analysis including total protein, albumin, globulin, glucose, blood urea nitrogen, creatinine, aspartate aminotransferase and lactate dehydrogenase were done by using commercial assay kits.

Table 1: Hematological and biochemical analysis of bull infected with theileriosis

Parameters	First day of Presentation	After 20 days of therapy
TEC ($\times 10^6$/cumm)	4.3	5.2
Hb (g/dl)	6.7	8.4
PCV (%)	21	25
TLC (10^3/cumm)	5.4	5.9
Basophils (%)	0	0
Eosinophils (%)	3	3
Lymphocytes (%)	74	71
Monocytes (%)	3	2
Neutrophils (%)	20	24
Platelet count ($\times 10^3$/µL)	208	386
Total protein (mg/dl)	5.5	5.9
Serum albumin (mg/dl)	1.45	1.67
Globulin (mg/dl)	4.03	4.25
Serum glucose (mg/dL)	38	43
Serum creatinine (mg/dL)	1.76	1.62
BUN (mg/dL)	63	48
AST (µl)	34	30
LDH (IU/L)	520	486

Therapeutic Management

Treatment was started with Inj Buparvaquone @2.5 mg/kg BW IM once, Streptomycin sulphate and penicillin @ 1ml/25 kg BW. Supportive therapy included Inj Flunixin meglumine @1.1 mg/kg BW IM OD, Inj furosemide @2 mg/kg BW IM OD,: Inj Pheniramine maleate @10 ml IM OD, Haematinic injection and phosphorus injection was given @ 15 ml intramuscularly twice weekly. Additional supportive treatments included a combination of Inj Vitamin B1, B6 & B12@ 15ml/day IM, Inj Ascorbic acid@ 30 ml IM OD. The treatment protocol was continued for 5 days and an uneventful recovery was noticed after 20 days as was seen from the decrease in the fluid of brisket region. Following the initial treatment, the bull was given haematinic preparation (iron and folic acid supplement) bolus @ 2/day for an additional week along with mineral mixture to enhance proper recovery.

RESULTS AND DISCUSSION

The clinical signs like brisket oedema, jugular vein distension (cording), reluctance to move and lack of appetence are the common symptoms associated with traumatic pericarditis. (Radostits *et al*., 2007). In the present case the observed clinical manifestations almost resembles with the symptoms of traumatic pericarditis but the symptoms exhibited are due to Theileriosis hence it can be considered as Pseudopericarditis secondary to Theileriosis. The development of brisket oedema and jugular cording has been reported in Pseudopericarditis caused by Theileriosis and is justified that as the mediastinal lymph nodes around the caudal and cranial vena cava become swollen and exerting pressure on the vena cava and thereby impeding venous return to the heart (Keles *et al*., 2003). In theileriosis at an advanced stage of infection there is invasion to the erythrocytes which leads to fever, anemia and eventually death (Soulsby, 1982). Significantly elevated rectal temperature is seen which indicates systemic reaction and is caused by the toxemia present in the early stage as endotoxins lead to the release of inflammatory cytokines causing the pyrexia (Radostits *et al*., 2007). Additionally, the enlargement of superficial lymph nodes occurs in the early stage of infection, macro schizonts proliferate inside the lymphocyte causing inflammatory reaction and lymphoid hyperplasia (Jabbar *et al*., 2008).

Due to the removal of the infected erythrocytes by reticulo-endothelial system, anaemia develops which leads to a reduction in haemoglobin concentration and in the total erythrocytic count (Singh *et al*., 2001). The leukogram showed significant decrease in TLC along with lymphocytosis. Haematological abnormalities observed in this case were consistent with findings reported by Hussein *et al*. (2004) and Nazifi *et al*. (2009). *Theileria annulata* infection leads to increase in AST levels due to hepatic tissue damage. By the contribution of the toxic metabolites of Theileria and also due to liver dysfunction, hypoproteinaemia and hypoalbuminemia is found which is in agreement with Saber *et al*. (2008). In a study, BUN concentration was significantly increased probably because of renal damage associated to the increase in haemoglobin catabolism (Dede, *et al*., 2014). Theileriosis also causes hypoglycaemia which may result from persistent fever and inappetence developed by the severity of disease and its duration (Hussein, *et al*., 2007).

The clinical signs reported in this case were suggestive of pericarditis but the findings indicated that the underlying cause of pericarditis was Theileriosis. Hence the disease was diagnosed as Pseudopericarditis due to Theileriosis which is very unusual and rare. In addition to the clinical signs; haemato-biochemical estimations, ECG and X-ray findings proved useful in the diagnosis of this disease. In this case study, treatment with Buparvaquone and other supportive drugs resulted in complete recovery from the clinical symptoms.

CONCLUSION

Cases of pericarditis secondary to theileriosis are extremely rare. This means that while pericarditis is a known condition, it is very uncommon for it to occur as a result of Theileriosis. Based on this rare observation, a logical conclusion is drawn that theileriosis should be considered as a potential differential diagnosis. This suggests that when a veterinarian encounters a case of pericarditis in a ruminant, they should also consider theileriosis as one of the possible causes (even though it's rare). This is important for making an accurate diagnosis. This means that if a ruminant shows signs typical of pericarditis the veterinarians should not rule out theileriosis without proper testing.

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