

CLINICO-HAEMATO-BIOCHEMICAL CHANGES IN NON-TRAUMATIC PERICARDITIS IN BUFFALOES

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ABSTRACT

A total of 18 cases of non-traumatic pericarditis reported to Veterinary Clinical Complex, LUVAS, Hisar were diagnosed on the basis of clinical symptoms, radiography and echocardiography examination. These 18 cases of non-traumatic pericarditis were subjected to haemato-biochemical estimation. Majority of the animals were showing anorexia, brisket oedema, abducted elbows, tachycardia with muffled heart sound and jugular vein engorgement. High fever, tachycardia and tachypnoea were also observed in the study. Haemato-biochemical estimation of non-traumatic pericarditis cases revealed that there was glucosuria, leucocytosis with neutrophilia, anaemia, erythropenia, lymphocytopenia, hypocalcemia and hypophosphatemia. There was an increased level of liver enzymes, viz., aspartate aminotransferase (AST), gamma glutamyl transpeptidase (GGT), and also increased blood urea nitrogen (BUN).

Key words: Biochemical alterations, Buffaloes, Haematology, Non-traumatic pericarditis,

In global scenario, India ranked first in buffaloes population with 108.7 million buffaloes accounting for about 80% of Asia and 20% of world bovine population (19th Livestock census-2012). Therefore the disease which affects the health and population of buffaloes has direct influence on Indian economy. Amongst various cardiovascular diseases such as coronary artery diseases (CAD), myocardial infarction, cardiomyopathy, congenital heart disease, aortic aneurysms, endocarditis, myocarditis, pericarditis and venous thrombosis; pericarditis is the most common disorder, due to inflammation of pericardium and pericardial sac and is characterised by abnormal heart sound and congestive heart failure (Athar *et al.*, 2012; Braun *et al.*, 2007; Bexiga *et al.*, 2008). In buffaloes, it is often attributable to a reticular foreign body that has penetrated the reticular wall, diaphragms and pericardial sac. It has been recorded that physical penetration of pericardial sac is not essential for the development of pericarditis (Firshman *et al.*, 2006; Radostits *et al.*, 2007). Though the incidence of non-traumatic pericarditis is less but these cases should be properly differentiated from traumatic pericarditis and medical therapy should be initiated. Therefore present study was conducted to acknowledge clinical and haemato-biochemical changes in non-traumatic pericarditis in buffaloes, diagnosed on the basis of radiography and ultrasonography examination.

MATERIALS AND METHODS

The present study was conducted on buffaloes brought to Veterinary Clinical Complex, LUVAS, Hisar with the history and clinical signs of pericarditis such as brisket and ventral oedema, jugular vein engorgement/pulsation, abducted elbow, tachycardia and dyspnoea. On the basis of radiography and

echocardiography examination, 18 buffaloes which were found to be negative for potential foreign body were screened and selected for this study. These cases were subjected to various haematological and biochemical estimations. Blood samples were collected in EDTA coated vials for Haemoglobin (Hb), Packed cell volume (PCV), Total Erythrocyte Count (TEC), Total Leucocyte Count (TLC) estimation using fully automated Haematology cell counter (MS4s, Melet Schloesing Laboratoires, France). Serum samples were collected for biochemical estimations such as aspartate aminotransferase (AST), gamma glutamyl transpeptidase (GGT), blood urea nitrogen (BUN), glucose, calcium (Ca) and phosphorous (P) and performed by using fully automated random access clinical chemistry analyzer (EM Destiny 180, Erba Diagnostics Mannheim GmbH-Germany).

RESULTS AND DISCUSSION

All non-traumatic pericarditis affected buffaloes were having inappetence/ anorexia, dyspnoea, recurrent tympany, brisket oedema, lacrimal discharge, and decrease ruminal motility. Most of the animals were showing abducted elbows, grunting and bruxism (Table 1). Similar findings have also been recorded by Bexiga *et al.* (2008) and Athar *et al.* (2011). The abduction of elbows might be associated with increased pericardial fluid in thoracic cavity. Brisket oedema may be attributed to increased hydrostatic pressure. These animals were also showing tachycardia and muffled heart sound. DeMorusis and Schwartz (2005) have also reported that auscultation of heart with muffled sound was highly specific for detection of non-traumatic pericarditis.

Jugular vein engorgement was also evident in most of the animals affected with non traumatic pericarditis, which could be attributed to right side cardiac

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Table 1
Clinical profile of buffaloes with non-traumatic pericarditis (n=18)

S. No.	Parameters	Status	No. of affected buffaloes
1.	Appetite	Inappetence	11
		Anorexia	7
2.	Posture	Arched back	7
		Sunken back	2
3.	Pain	Bruxism	7
		Grunting	2
4.	Abducted elbows	Present	13
5.	Ruminal motility Normal (2-3/ min)	Decreased (1/min)	10
		Absent (0/2min)	4
6.	Oedema	Throat region	6
		Brisket region	11
7.	Dyspnoea (Open mouth breathing)	Mild	4
		Moderate	11
		Severe	1
8.	Recurrent tympany	Present	14
9.	Lachrymal discharge	Present	16

insufficiency, valvular endocarditis and cardiomyopathy as reported by Athar *et al.* (2011). As opined by Radostits *et al.* (2007) the increased volume of fluid in the pericardial sac increased the severity of cardiac compression resulting in the distension of jugular vein.

All the buffaloes were showing increased rectal temperature, pulse rate and respiration rate with mean values of 103.59±0.27 °F, 89.89±2.17 per minute and 30.72±1.28 per minute, respectively (Table 2). Similar finding has also been reported by Imran *et al.* (2011). Fever is the defensive mechanism of body which occurs in disease condition leading to tachycardia and tachypnoea.

The mean values of Hb, TEC and PCV were decreased in all the buffaloes affected with non-traumatic pericarditis. Similar finding have been reported by Athar *et al.* (2011). The mean value of TLC (16.05±0.43) was

Table 2
Mean rectal temperature, pulse rate and respiration rate of animals suffering from non traumatic pericarditis

S. No.	Parameters	Control mean Values Sharma <i>et al.</i> , 2013	Affected animals (Mean±SE)
1	Temperature(°F)	101.0-102.0	103.59±0.27
2	Pulse rate (per minute)	40-60	89.89±2.17
3	Respiration rate(per minute)	12-16	30.72±1.28

remarkably increased, which has also been reported by Ramprabhu *et al.* (2003), Imran *et al.* (2011) and Tharwat (2011). The mean percentage of neutrophils was recorded very high (73.04±2.37) in buffaloes affected with non-traumatic pericarditis. Similar results have also been reported by Imran *et al.* (2011). Neutrophilia might be due to inflammatory changes in pericarditis and endotoxemia due to bacterial infection. Associated lymphocytopenia was also seen which could be due to increased cortisol level which alter lymphocyte kinetics and causes decrease in their efflux from lymphoid tissue as well as redistribution with in haematopoietic tissue (Lester *et al.*, 2015). Increased mean values of AST, BUN and glucose were recorded in all the affected buffaloes. The values of GGT and AST were very high in buffaloes suffering with non-traumatic pericarditis (Table 3). Similar findings had been reported by Elhanafy and French (2012) and Bexiga *et al.* (2015). AST is located in both liver and myocardial tissue; cardiac disease leads to hypoxic hepatitis, which results in a rise in serum transaminase activity caused by anoxic necrosis of the centrilobular liver cells (Fuhrmann *et al.*, 2010; Henrion, 2012). The severity of heart disease increases with the release of endogenous vasoconstrictors, such as norepinephrine, renin-angiotensin, vasopressin, and endothelin (Miller *et al.*, 1989; Francis *et al.*, 1990), which affect kidney function and therefore BUN might be increased. There was appreciable decrease in Ca and P values (Table 3) which was due to anorexia/starvation leading to low absorption from small intestine as reported by Braun *et al.* (2007) and Reef *et al.* (2009).

In case of non-traumatic pericarditis, haematology revealed leucocytosis with neutrophilia indicating

Table 3
Alteration in mean haemato-biochemical values in 18 non-traumatic pericarditis affected animals

Parameters	Control mean values (^a Sharma <i>et al.</i> , 2013) (^b PetitClerc and Solberg,1987)	Mean value of affected animals (Mean±SE)
Hb (g/dl)	12.5 ^a	9.10±0.28
PCV (%)	44.3 ^a	27.53±0.67
TEC (×10 ⁶ /μl)	6.8 ^a	4.36±0.12
TLC (×10 ³ /μl)	6.7 ^a	16.05±0.43
DLC	N (%)	28.7 ^a
	L (%)	60.6 ^a
	E (%)	2.9 ^a
	B (%)	- ^a
	M (%)	7.8 ^a
AST (U/L)	24.21-93.40 ^b	263.72±22.44
GGT (U/L)	2.75-21.86 ^b	62.38±7.43
BUN (mg/dl)	13.28-64.11 ^b	32.12± 25.00
Glucose (mg/dl)	22.33-97.49 ^b	130.51±1.21
Ca (mg/dl)	7.45-13.82 ^b	9.14±0.20
P (mg/dl)	5.71-10.35 ^b	4.60±0.18

bacterial infection. Increased value of GGT and AST suggested liver dysfunction due to cardiac disease in non-traumatic pericarditis.

CONCLUSION

Haemato-biochemical estimation of non-traumatic pericarditis cases revealed that there was glucosuria, leucocytosis with neutrophilia, anaemia, erythropenia, lymphocytopenia, hypocalcemia and hypophosphatemia. There was an increased level in liver enzymes and AST, GGT and BUN.

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