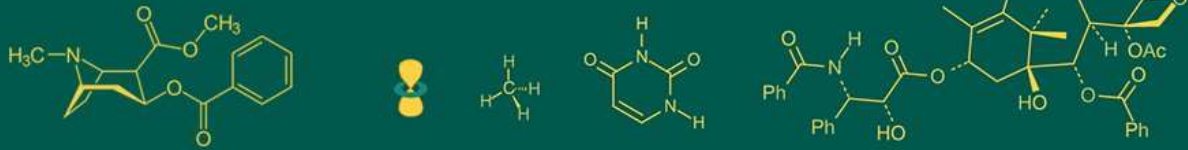


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Occurrence and pathology of pericarditis in cattle (*Bos indicus*)

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Abstract

The present study was conducted to evaluate the occurrence and pathology of pericarditis in cattle. A total number of 436 specimens of cardiovascular system of cattle irrespective of age, sex and breeds were examined. Out of these 122 samples, suspected for abnormalities were further processed for histopathological examination. An overall occurrence of various pathological conditions of cardiovascular system was recorded as 27.98%. The following conditions were observed inflammatory conditions 34 with 27.86%, degenerative changes 38 with 31.15%, circulatory disturbance 15 with 12.30%, parasitic involvement 29 with 23.77%, miscellaneous 6 with 4.92%. Pericarditis condition was recorded in 26 (21.31%) cases. It is concluded that pericarditis is the major heart affection in cattle from Bikaner division causing cardiopathies.

Keywords: Pericarditis, heart, pathology, cattle

Introduction

The cardiovascular system includes the heart and blood vessels (arteries, veins and capillaries), it permits blood to circulate and transport nutrients (such as amino acids and electrolytes), oxygen, carbon dioxide, hormones and blood cells to and from the cells in the body to provide nourishment and help in fighting diseases, maintain homeostasis, stabilize temperature and pH (Levick, 2013) [12]. Certain pathological conditions are common in cardiovascular system of cattle such as traumatic pericarditis, haemopericardium, myocarditis, endocarditis, epicardial haemorrhage, cor pulmonale, calcification, myocardial haemorrhage (Buczinski *et al.*, 2010) [5]. The prognosis of Heart disease in cattle is typically guarded to poor (Buczinski *et al.*, 2010) [5]. Diagnosing heart disease in cattle is challenging because clinical signs can be hidden until signs of congestive heart failure occur and due to limited data on the clinical signs, concomitant findings (Buczinski *et al.*, 2006) [4]. Though extensive studies of heart lesions in human beings have been done, still it is the most intriguing and challenging organ to the pathologists both as regard to its altered structure and function.

Objective

1. To determine the occurrence of pericarditis of cardiovascular system of cattle (*Bos indicus*).
2. To study the gross and histopathology of pericarditis of cardiovascular system of cattle (*Bos indicus*)

Materials and Methods

Collection of samples

The specimens of organs of cardiovascular system of cattle (*Bos indicus*) for the proposed investigation were collected from the carcasses of cattle irrespective of age, sex and breeds. The samples were collected from various municipal areas of Bikaner, Jaipur, Sikar. The samples were also collected from the carcasses submitted to the Department of Veterinary Pathology, College of Veterinary and Animal Sciences, Bikaner for routine post-mortem examination. The samples received from the field veterinarians in the Department of Veterinary Pathology were also included in this study.

During post-mortem examination, the samples were thoroughly examined visually and manually for various pathological abnormalities such as colour, consistency, shape and size, presence of tumors and ulcers. The study was conducted from December 2017 to November 2018. During this period, 436 specimens of cardiovascular system of cattle were examined and out of these, 122 samples showing frank macroscopic lesions were used for further histopathological examination.

Histopathology

Following collection, all the samples were properly preserved in 10 percent formal saline after cutting the affected parts. The parts of affected tissue measured 2-5 mm thickness and presenting the lesions with normal tissue, were used for fixation and further histopathological examination. For histopathological examination, processing of tissue was done by paraffin embedding using Acetone and Benzene technique (Lillie, 1954) [13]. The tissue sections of 4-6 micron thickness were cut and stained with routine Hematoxylin and Eosin staining method as a routine. As far as possible, results were recorded by gross observation and photomicrographs.

Statistical analysis

This is done by simple percentage calculation method

Results

In the present investigation, a total number of 436 specimens of cardiovascular system of cattle irrespective of age, sex and breeds were examined. Out of these 122 samples, suspected for abnormalities were further processed for histopathological examination. An overall occurrence of various pathological conditions of cardiovascular system was recorded as 27.98 percent. It was observed that out of all affected heart the affected condition like the incidence of inflammatory conditions was 34 with 27.86% which consist pericarditis 26 with 21.31% cases. Based on morphological changes, the types of pericarditis were categorised as haemorrhagic pericarditis, traumatic pericarditis. Based on type of exudation and type of distributed lesion, in the present study 23 (18.85%) cases of traumatic pericarditis were noticed. Macroscopically, pericardium showed

thickening and epicardium showed granulation tissue (Fig. 1). Microscopically, pericardium showed accumulation of fibrinous inflammatory exudates and marked infiltration of polymorphonuclear cells (Fig. 2). Diffused congestion with leucocytic infiltration (Fig. 3). Haemorrhagic pericarditis - haemorrhagic pericarditis was observed in 3 cases with 2.46% incidence. Macroscopically, pericardial surface showed red hemorrhagic area (Fig. 4). Microscopically, pericardium showed haemorrhage and infiltration of lymphocytes (Fig. 5).

Discussion

Occurrence of traumatic pericarditis recorded to the extent of 18.85 percent and it is close approximation to Raji *et al.* (2010) [14] who recorded 17.06% incidence in slaughtered cattle in Zaria abattoir. Macroscopic findings such as pericardium showed thickening and epicardium showed granulation tissue agreed well with the earlier findings recorded by Chanie and Tesfaye (2012) [7], Elhanafy and French (2012) [8]. The microscopic findings of pericarditis such as fibrin sediments and marked infiltration of polymorphonuclear cells along with diffuse congestion in accordance with the findings of Bastianello and Stella (1981) [2], Chanie and Tesfaye (2012) [7], Ghanem, (2010) [9], Vujanac *et al.* (2013) [15] and Hussein and Staufenbiel (2014) [11]. It can be concluded that in the present study lodgments of foreign body was found in or around the pericardium, usually associated with traumatic reticulo-pericarditis or by way of local extension as reported by (Bexiga *et al.* 2008) [3] and (Athar *et al.* 2012) [1]. Haemorrhagic pericarditis - This condition was recorded in 2.46 percent cases in cattle. Macroscopically pericardium showed red hemorrhagic area, this finding was in accordance with the findings of Gill *et al.* (1977) [10], Câmara *et al.* (2014) [6]. Microscopically, severe haemorrhage and infiltration of mononuclear cells such as lymphocytes and monocytes in pericardium were also in accordance with the findings of Gill *et al.* (1977) [10]. In the present study, causes responsible for haemorrhagic pericarditis may be botulism (Câmara *et al.*, 2014) [6], *Pasteurella multocida* type E (Bastianello & Stella, 1981) [2] tropical theileriosis (Gill *et al.*, 1977) [10].



Fig 1: Photograph showing thickening of the pericardium with bread and butter appearance

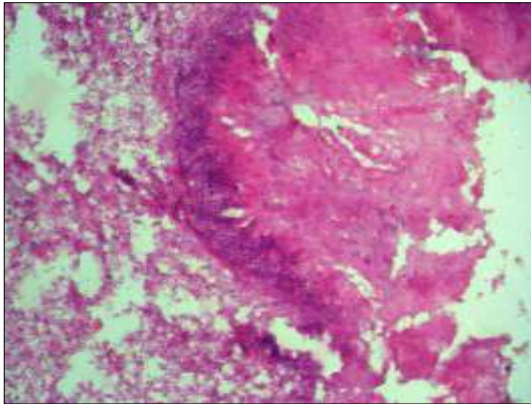


Fig 2: Microphotograph of pericardium showing infiltration with polymorphonuclear cells and fibrin deposition. H&E, 100X

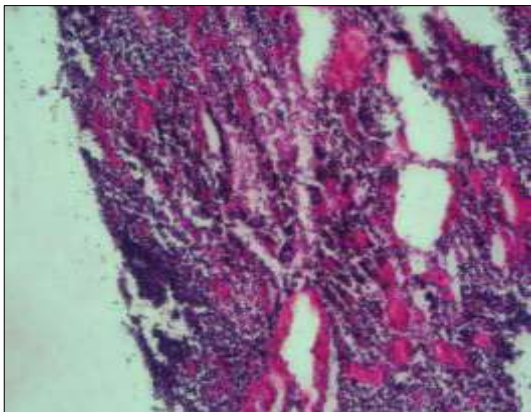


Fig 3: Microphotograph of pericardium showing congestion and leukocyte infiltration. H&E, 100X



Fig 4: Photograph showing haemorrhagic pericardium

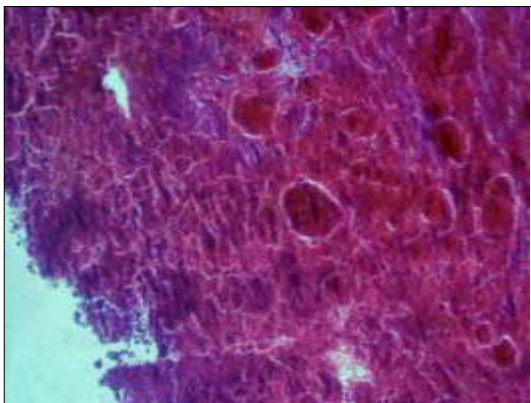


Fig 5: Microphotograph of pericardium showing haemorrhage and infiltration of lymphocytes. H&E, 100X.

Conclusion

Present study indicate higher occurrence (21.31%) of pericarditis in relation to cardiovascular system diseases in cattle. Based on these results further study is warranted to elucidate the causes and occurrence of pathological conditions related to cardiovascular system diseases in cattle.

References

1. Athar H, Parrah JD, Moulvi BA, Singh M, Dedmari FH. Pericarditis in bovines: A review. *International Journal of Advanced Veterinary Science and Technology*. 2012 Nov 23;1(1):19-27.
2. Bastianello, Stella S, Jonker MR. A report on the occurrence of septicaemia caused by *Pasteurella multocida* type E in cattle from Southern Africa. *Journal of the South African Veterinary Association*. 1981 Jun 1;52(2):99-104.
3. Bexiga R, Mateus A, Philbey AW, Ellis K, Barrett DC, Mellor DJ, *et al*. Clinicopathological presentation of cardiac disease in cattle and its impact on decision making. *Veterinary record*. 2008 May;162(18):575-580.
4. Buczinski S, Fecteau G, DiFruscia R. Ventricular septal defects in cattle: A retrospective study of 25 cases. *The Canadian Veterinary Journal*. 2006 Mar;47(3):246.
5. Buczinski S, Rezakhani A, Boerboom D. Heart disease in cattle: diagnosis, therapeutic approaches and prognosis. *The Veterinary Journal*. 2010 Jun 1;184(3):258-63.
6. Câmara AC, Oliveira CD, do Vale AM, Batista JS, Soto-Blanco B. Epidemiology, clinical signs, laboratorial and pathological findings in eight outbreaks of botulism in cattle in Rio Grande do Norte state, Northeastern Brazil. *Acta Scientiae Veterinariae*; c2014. p. 42.
7. Chanie M, Tesfaye D. Clinico-pathological findings of metallic and non-metallic foreign bodies in dairy cattle: A review; c2012.
8. Elhanafy MM, French DD. Atypical presentation of constrictive pericarditis in a Holstein heifer. *Case Reports in Veterinary Medicine*; c2012 Jan 1. p. 2012.
9. Ghanem MM. A comparative study on traumatic reticuloperitonitis and traumatic pericarditis in Egyptian cattle. *Turkish Journal of Veterinary & Animal Sciences*. 2010;34(2):143-53.
10. Gill BS, Bhattacharyulu Y, Kaur D. Symptoms and pathology of experimental bovine tropical theileriosis (*Theileria annulata* infection). *Annales de parasitologie humaine et comparee*. 1977;52(6):597-608.
11. Hussein HA, Staufenbiel R. Clinical presentation and ultrasonographic findings in buffaloes with congestive heart failure. *Turkish Journal of Veterinary & Animal Sciences*. 2014;38(5):534-45.
12. Levick JR. *An introduction to cardiovascular physiology*. Butterworth-Heinemann; c2013 Oct 22.
13. Lillie RD. *Histopathologic technic and practical histochemistry*. The Blakiston; c1954.
14. Raji MA, Salami SO, Ameh JA. Pathological conditions and lesions observed in slaughtered cattle in Zaria abattoir. *Journal of Clinical Pathology and Forensic Medicine*. 2010;1(2):9-12.
15. Vujanac I, Prodanović R, Džmura G, Đurić M, Marinković D, Kirovski D, *et al*. Right heart failure in dairy cow caused by traumatic pericarditis: Case report. *Veterinarski glasnik*. 2013;67(3-4):287-295.