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## Traumatic Reticulopericarditis in murrah buffalo: Case report

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### Abstract

An 8 years old Murrah buffalo carcass was handed over to Veterinary Pathology Department, COVAS, Parbhani, and Maharashtra for post mortem examination. Clinical examination revealed subnormal rectal temperature, suspended rumination, polypnea, sluggish heart beating. Laboratory investigations revealed leukocytosis with neutrophilia, decrease hematocrit and microcytic hypochromic anemia. The liver enzyme activity found to be elevated. Postmortem examination showed, subcutaneous haemorrhages, hydroperitoneum, hydrothorax with emphysematous lung lobes. There were multiple thin repeated fluid filled cysts on lung lobes. There was suppurative and fibrinous exudate noted in pericardium. Fibrin deposition on heart gave “bread and butter” like appearance with adhesion to surrounding tissue. Penetrating foreign body (iron binding wire) was noted in heart with well developed ‘fibrous track’ connecting diaphragm and pericardium. Considering the above record the buffalo died due cardiorespiratory failure as result of adhesive traumatic reticulopericarditis.

**Keywords:** Trauma, pericarditis, buffalo, pathology, traumatic reticulopericarditis

### Introduction

In ruminants, traumatic pericarditis is a sporadic disease that is triggered by penetrating any foreign bodies such as (needles, metal wire and nails) on pericardium surface originating from the reticulum, diaphragm, and pericardial sac, resulting in traumatic pericarditis (Ibrahim and Gomaa, 2016) [13], which lead to gathering of serous/fibrin containing inflammatory exudates results in follow of aggregating disturbances in heart function almost leads to unexpected death in animals (Braun *et al.*, 2007 and Braun, 2009) [8, 7]. Pericarditis results from many etiological factors which, spreads through the hematogenous routes by various bacterial, viral infections and sometime anaerobic infection was much less common (Grunder, 2002 and Braun, 2009) [12, 7]. Increased in heart rate and sounds like friction or splashing sounds, engorgement of jugular vein and brisket oedema was the key clinical signs noted in animals. However, not all animals exhibit these symptoms, making a diagnosis difficult in some cases (Grunder, 2002) [12]. The traumatic pericarditis leading to loss of productive capacity (Aref and Abdel-hakiem, 2013) [3], treatment cost higher (Nugusu *et al.*, 2013) [20] and health disturbances due to cardiac function (Attia, 2016) [6]. Incidence of mortality contribute around (23.38%) due to traumatic pericarditis in bauffalo was recorded by Ramprabhu *et al.* (2003) [22] in India. Similar incidences were also recorded in the foreign countries due to animal mismanagement (Misk *et al.*, 1984) [18].

It was likewise seen that as of recently calved and feeble bison have a higher pace of rate than dry and lactating buffalo (Ramprabhu *et al.*, 2003) [22]. Frequency rate was higher in dairy cattle when contrasted with beef cattle since they were bound to be taken care of a cleaved feed, like silage or roughage (Kahn, 2005) [14]. Besides, a high frequency was recorded during the dry spell and collect seasons (Sharma and Kumar, 2006) [23]. It more commonly affects females, especially in the third trimester of gestation (Braun *et al.*, 2007; Mohamed, 2010; Attia, 2016) [8, 18, 6]. Because the weight and size of the pregnant uterus makes it possible for the organ to work as a pendulum when the animal moves, applying physical pressure to the rumen and reticulum, collaborating for penetration by an existing object.

(Fubini and Divers, 2008) [8]. Because of its high significance in health and animal production, traumatic pericarditis is as yet a question of overall concern. Thus, the objective of the present case report was to highlight the necropsy along with histopathological findings observed in a case of traumatic pericarditis.

### Materials and Methods

**Case history and clinical findings:** An eight-year-old Murrah buffalo weighed 450 kg carcass was present to the Department of Vet. Pathology for postmortem examination as referred by the TVCC Complex. The TVCC gave general information, including history, herd size, management methods, clinical symptoms shown by animals during the course, as well as a haemato-biochemical report, which include a recent parturition in the past, anorexia in the past 8 days, suspended rumination, subnormal rectal temperature, mouth breathing, sluggish heart beating, heart rhythm could not be assessed, and no feces in the rectum on per rectal examination. Leukocytosis with neutrophilia,

**Traumatic Reticulo-pericarditis Buffalo:** A decrease in hematocrit, and microcytic hypochromic anemia were noted through hematological investigations. Significant increase in the levels of liver enzyme *i.e.*, ALT, AST and alkaline phosphatase, in addition to an increased albumin-globulin ratio (A:G=86.25), was among the biochemical results.

### Results and Discussion

**Gross observations:** At necropsy, nothing remarkable alterations were seen during external examination. The internal examinations revealed were subcutaneous hemorrhages and brisket edema. Notable amount of clear fluid were recorded in the peritoneum. On opening of the thoracic cavity, approx. around 10–15 liters of watery fluid were seen. The lungs were emphysematous; lobes were adhered with the pleura, ribs and the diaphragm. There were multiple thin, fluid-filled cysts on the lung lobes. The pericardium sac was thickened diffusely and approx. contained 1 liter of AMBE colored flocculent fluid with free-floating fibrin. There was suppurative and fibrinous exudates were noted in the pericardium surface whereas, fibrin also deposited on the epicardial surface of heart giving its appearance as bread-and-butter. The fibrin deposited on the heart and lung lobes were found to be adhered to the pleural surface. The penetrating iron binding wire piece was recovered from the heart, which were completely lodged in the myocardium layer of the heart which correlated with the well-developed fibrous tracks connecting the reticulum, diaphragm, and pericardium.

**Microscopic observations:** Histopathology was performed on collected tissues of the heart samples and preserved in 10% formal saline solution. Marked depositions of fibrin on both the pericardial

**Traumatic Reticulo-pericarditis Buffalo:** Epicardium surface of heart were noted. There was marked inflammation with neutrophilic and lymphocytic infiltrates in the pericardium, epicardium, and myocardium surface of the heart observed.

### Discussion

As a part of the stomach which has very high pressure on the surface of reticulum, as feed material accidentally found

foreign penetrating body *i.e.*, needle, during digestive processing due to the sharpening of the metal object perforates through the path of reticulum to diaphragm to pericardial layer to heart leads to cause traumatic pericarditis. Due to their anatomical configuration of the reticulum is of honeycomb shape, penetrating foreign bodies can easily attach to the mucosa of the reticulum without causing injury. During advanced pregnancy, physiological alteration such as uterine muscular contractions during delivery phase encourage foreign body to perforate in the reticular wall during reticular contraction (Ghanem, 2010; Anteneh and Ramswamy, 2015; Ibrahim and Gomaa, 2016) [11, 2, 13].

In some animals, due to foregut contractions, potential foreign bodies such as nails, needle and binding wires pierce the reticulo-diaphragm and lead to further complications. Average wall has plentiful of low sift hold strain receptors, so any injury to average reticular wall muscular build lead to brokenness of these receptors which result in lessened and hypomotility of rumeno-reticulum with variable level of tympany.

Due to penetration of foreign body, leakage of reticular fluid which leads to peritonitis commences 24 hrs. Results in increase in temperature, pulse rate and rigor specially in abdomen muscles. At the site if inflammation, affected tissues release cytokines, including interleukin (IL)-1, IL-6, and tumor necrosis factor (TNF). Such proinflammatory substances leakage leads to tempt limited and general reactions, typically acute phase protein, protein depletion in muscle, pyrexia, leukocytosis and hormonal alteration.

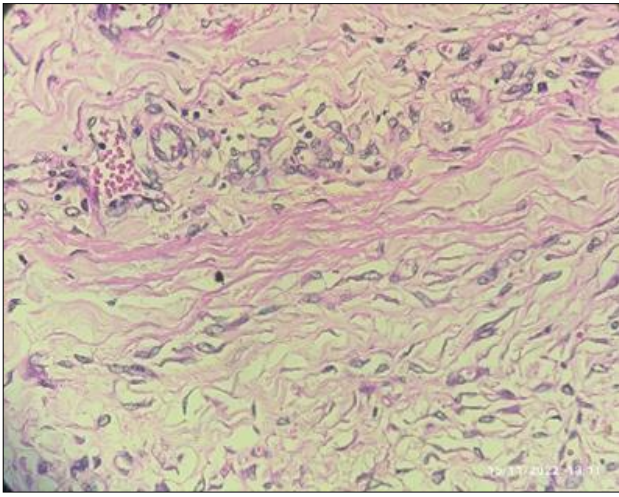


**Fig 1:** Pericardial sac contained amber flocculent fluid with free-floating fibrin threads

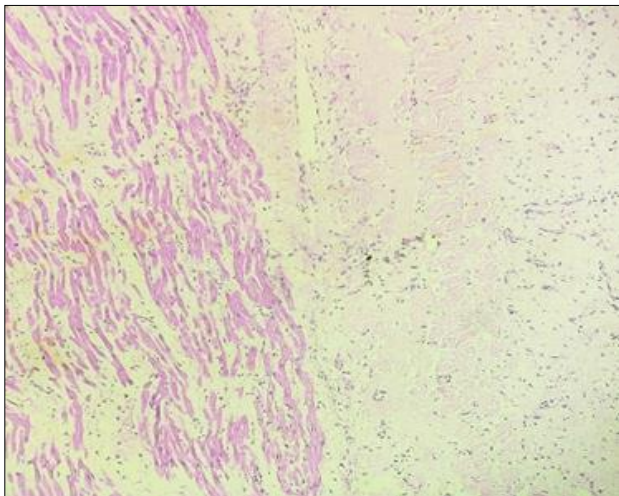


**Fig 2:** Bread & butter appearance of epicardium (shaggy heart) & thickening of pericardium heart





**Fig 3:** Pericarditis characterized by fibrin with infiltrating cells (H&E X 100)



**Fig 4:** Note characteristic fibrin on epicardium with MNC infiltration (H&E X 100)

When a foreign body penetrates the reticulum, it targets multiple nearby organs, causing damage and allowing the contents to spill into the thoracic or peritoneal cavities (Abdelaal *et al.*, 2009 and Khalphallah *et al.*, 2017) <sup>[1, 15]</sup>. When that foreign body penetrates pericardial layer of heart causing an accumulation of inflammatory fluid in the pericardial sac (Kumar *et al.*, 2012; Yildiz *et al.*, 2019) <sup>[16, 24]</sup>. Exudate further classified into three general forms, depending on the nature of contents such as effusive, fibrinous and constrictive, and their combinations can occur (Athar *et al.*, 2012) <sup>[5]</sup>.

**Conflict of interest:** Authors have no conflict of interest in this study.

### Conclusion

Considering the case history, clinical observations, haemato-biochemical and necropsy findings, of the Murrah buffalo might have been died due to cardiovascular failure caused by traumatic reticulopericarditis.

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