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Popular Article

Comprehensive Review of Traumatic Pericarditis in cattle

S. Vijay*, B. Karthikeyan*, Potlapalli Sahithi*, M. Saravanan[1], S. Yogeshpriya[2], M. Veeraselvam[2], K.Karthika[2] , P.K.Ramkumar[3] and K.Jayalakshmi[3]

*Post Graduate Students, Department of Veterinary Medicine, Veterinary College and Research Institute, Orathanadu-614625.

[1]Assistant Professor and Head, Department of Veterinary Medicine, Veterinary College and Research Institute, Orathanadu-614625

[2]Assistant Professor and Head, Department of Veterinary Medicine, Veterinary College and Research Institute, Orathanadu-614625

[3]Assistant Professor, Veterinary Clinical Complex, Veterinary College and Research Institute, Orathanadu-614625

Tamilnadu Veterinary and Animal Sciences University, Tamilnadu state.

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Introduction

Pericarditis is an inflammation of the pericardium usually caused by a reticular foreign body which penetrates the reticular wall, diaphragm, and pericardial sac in cattle. Key signs of traumatic pericarditis in ruminants includes tachycardia, muffled or abnormal heart sounds, jugular vein distension, and edema. Radiographs often reveal foreign bodies, while ultrasonography detects pericardial effusion and pleural effusion. Diagnostic tools like the glutaraldehyde test, leukocytosis, hyperfibrinogenemia, and elevated liver enzymes aid the diagnosis. Radiography and ultrasonography are crucial for diagnosis when clinical signs are inconclusive.

Etiology

Pericarditis, characterized by inflammation of the pericardium and the accumulation of inflammatory products, often leads to progressive heart function disturbances and fatal outcomes. In cattle, it typically arises from long, thin, sharp foreign bodies like wire, needles, or nails penetrating the reticulum, diaphragm, and pericardial sac. This condition is known as traumatic pericarditis. Pericarditis can also result from the hematogenous spread of infectious diseases such as colibacillosis, pasteurellosis, salmonellosis, and anaerobic infections.

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Clinical signs

The clinical signs of traumatic pericarditis are extensively documented in standard textbooks and recent case reports. Tachycardia is the primary clinical indicator, with heart rates often severely elevated, reaching up to 130 bpm. Muffled heart sounds and asynchronous abnormal heart sounds are characteristic due to pericardial effusion and fibrinous changes. Distension of jugular veins, edema in various regions, and altered posture are common. Cattle typically exhibit abnormal demeanor, signs of pain, fever, elevated respiratory rates, and reduced ruminal motility. While fever is common, its absence does not rule out traumatic pericarditis. Additionally, tests for reticular foreign bodies are positive in a significant proportion of affected cows.

Haematological and biochemical changes

The glutaraldehyde test, indicating inflammation through fibrinogen and globulin elevation, is crucial for diagnosing pericarditis as clotting time is shortened in over 90% of cases. Leukocytosis and hyperfibrinogenemia also point to inflammation. Elevated levels of γ-glutamyltransferase (γ-GT) and aspartate aminotransferase (ASAT), along with increased bilirubin, signify hepatic congestion, often mistaken for primary liver disease in cases of right-sided cardiac insufficiency. Proper clinical examination is essential for accurate interpretation of laboratory findings. Although elevated cardiac troponin levels have been observed in cattle with pericarditis, it's not yet confirmed as a specific diagnostic marker. Nonetheless, it may aid in assessing the extent of heart damage in cases of traumatic reticuloperitonitis.

Diagnosis

Pericardial fluid aspiration from the pericardial sac is a diagnostic option, with the characteristic smell often indicative of traumatic pericarditis in cattle. The fluid, displaying an inflammatory response, can undergo bacteriological examination. However, this procedure carries risks, including potential infection spreading to the pleural cavity.

Radiography plays a crucial role in diagnosing traumatic reticuloperitonitis in cattle, although there are limited studies on the subject. Lateral radiographic views of the caudoventral thorax and reticulum are standard, revealing foreign bodies perforating the cranial reticular wall and diaphragm or situated cranial to the reticular wall. Gas formation in the thorax often indicates bacterial infection, with a gas-fluid interface suggesting abscess formation. Radiodense foreign bodies, typically wire or nails, are common findings. However, traumatic pericarditis cannot be ruled out solely based on the absence of a visible foreign body, as thick adhesions or migration of the foreign body may obscure detection. Interpretation of radiographic findings must align with clinical observations to establish a diagnosis of traumatic reticuloperitonitis.

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Ultrasonography is the preferred method for imaging and characterizing pericardial effusion in cattle. It involves using a 5.0 MHz linear or convex transducer on standing cows, scanning from the third to fifth intercostal spaces on both sides of the thorax. Traumatic pericarditis typically presents with a large amount of hypoechogenic fluid in the thorax, sometimes containing fibrin strands or clots. This fluid compresses and displaces the lungs, occasionally obscuring the heart. Additionally, echogenic deposits and fibrin strands may be observed on the epicardium, with rare instances of pericardial abscesses. The cardiac ventricles are often compressed to varying degrees depending on fluid accumulation. Abdominal ultrasonography may reveal reticular changes indicative of traumatic reticuloperitonitis, along with ascites due to cardiac insufficiency.

Differential diagnosis

The differential diagnosis for traumatic pericarditis in cattle can be challenging due to overlapping clinical signs with other conditions. Right-sided heart failure from causes such as valvular endocarditis, cardiomyopathy, or cardiac leucosis should be considered, especially in cases presenting with distension of jugular veins and tachycardia. Distension of jugular veins without signs of cardiac insufficiency could indicate obstruction or compression of the cranial vena cava by a thrombus or thoracic mass. Additionally, pleural effusion can result from various causes unrelated to heart disease.

Treatment

Various case reports have documented limited success and long-term survival in a few cattle with traumatic pericarditis. However, traditional therapeutic options such as pericardiocentesis and pericardial lavage have been proven ineffective in most cases. Pericardiotomy with pericardial lavage and closure, as well as pericardiostomy with 5^{th} rib resection, have been attempted but with poor outcomes overall. While some individual cases have shown survival, the prognosis remains generally poor. Therefore, in most circumstances, euthanasia is the recommended course of action for cattle with traumatic pericarditis, except in cases involving high-value animals or embryos where treatment may be attempted with owner involvement in daily pericardial lavage until wound closure. However, long-term antimicrobial administration may pose challenges, especially in milking cows with extended withdrawal times, making treatment economically unviable for commercial cows.

Conclusion

The clinical examination alone may not always provide a definitive diagnosis of traumatic pericarditis, as not all typical signs may be present in every case. In uncertain cases, radiography and ultrasonography of the heart and reticulum are recommended. Radiography

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helps identify metallic foreign bodies and their location within the abdomen or thorax. Ultrasonography aids in detecting and characterizing effusions in the thorax, pericardium, and abdomen. These imaging modalities provide valuable additional information for accurate diagnosis and treatment planning.

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