Diagnosis of Traumatic Reticuloperitonitis

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Introduction

Traumatic reticuloperitonitis, also known as hardware disease is relatively common diseases in adult cattle caused by the ingestion of foreign bodies. Among the numerous diseases of foreign body syndrome in ruminant species, traumatic reticuloperitonitis (TRP) and traumatic pericarditis (TP) are the most common. TRP is a sporadic disease in ruminants caused by perforation of the reticulum due to ingestion of foreign materials. Cattle are more susceptible to foreign body syndrome than small ruminants because they do not use their lips for prehension and are more likely to eat chopped feed [1]. Lack of oral discrimination in cattle may lead to ingestion of foreign bodies that would be rejected by other species. Moreover, the honeycomb-like structure of the reticulum provides many sites for fixation of a foreign body, and contractions of the reticulum may be sufficient to push a sharp foreign body through the wall, inducing the disease. Development of severe sequelae to the penetration of the reticular wall depends on the characteristics of the foreign body as well as the direction and the extent of the penetration [2]. Traumatic reticuloperitonitis develops as a consequence of perforation of the reticulum. It is important as differential diagnosis of other diseases marked by stasis of the GI tract because it causes similar signs. Traumatic reticuloenteritis is most common in mature dairy cattle, occasionally seen in beef cattle, and rarely reported in other ruminants. Cattle commonly ingest foreign objects because they do not discriminate against metal materials in feed and do not completely masticate feed before swallowing. The disease is common when green chop, silage, and hay are made from fields that contain old rusting fences or baling wire, or when pastures are on areas or sites where buildings have recently been constructed, burned, or torn down. The grain ration may also be a source due to accidental addition of metal. The disease presents considerable difficulty in diagnosis because ruminal atony and abdominal discomfort may occur in other diseases. Previously, the diagnosis of traumatic reticuloperitonitis was based on routine physical examination, total and differential leukocyte count and radiography. With the advent of modern diagnostic instruments in the diagnosis of ruminant disorders, more sophisticated techniques have been developed - ultrasonography, ferroscopy and laparoscopy to arrive at an early confirmatory diagnosis. Most of the clinical cases brought to the hospital are of chronic type. The total and differential leukocyte count alone cannot be relied upon as a diagnostic aid for this condition, so the study was planned to diagnose traumatic reticuloperitonitis in cattle sufficiently early, to minimize the complications and restore production under field conditions and to compare the efficacy of different diagnostic tests in making an early diagnosis. Treatment of the typical case seen early in its course may be surgical or medical. Either approach improves the chances of recovery from ~60% in
untreated cases to 80–90%. Surgery involves rumenotomy with manual removal of the object(s) from the reticulum; if an abscess is adhered to the reticulum, it should be aspirated (to confirm that it is an abscess) and then drained into the reticulum. Antimicrobials should be administered perioperatively. More advanced cases, those with obvious secondary complications, or those that do not respond to initial medical or surgical therapy should be evaluated from an economic perspective; if the cow is of limited value, slaughter should be considered if the carcass is likely to pass inspection [3].

MATERIALS AND METHODS

The examinations were carried out on 50 cows with traumatic reticuloperitonitis and were classified in four groups as follows:

Group A: Traumatic reticuloperitonitis[localised] \(n=17\)
Group B: Traumatic reticuloperitonitis [diffuse] \(n=13\)
Group C: Traumatic pericarditis \(n=14\)
Group D: Diaphragmatic hernia \(n=2\)

All the cows underwent a clinical examination and special examination according to the method of Rosenberger [1] and abdominocentesis. In addition, the haematocrit, leukocyte count, blood biochemical profiles were performed and glutaraldehyde coagulation test was performed as described by Braun et al., [2]. Sulkowitch test on urine was performed according to Hall [3]. A metal detector [ferroscope] was applied over the ventral and ventrolateral parts of chest and abdomen to detect a ferromagnetic foreign body according to Riger [4]. The reticulum was examined radiographically according to Nageli [5]. The areas over the reticulum and the left and right sides of the thorax up to the level to elbow joints were clipped. The remaining hair was removed with depilatory cream, transmission gel was applied and the cows were examined ultrasonographically with a 3.5 MHz linear array transducer with a radius of 40mm. Exploratory rumenotomy permitted a thorough check to be made of the amount, composition, degree of comminution, odor, or color of the rumen contents and parts of the rumen wall. Exploratory laparotomy was performed following the standard procedure [6]. The data obtained were statistically analyzed wherever applicable to study the significance of group versus control for the two different species by least square analysis [7].

Results:

Traumatic reticuloperitonitis and allied syndrome were recorded in 68.14% of dairy. All the animals were controller 4 years old. Out of the 50 animals, 25 (50%) animals were recently calved, 11 animals (22.00%) were pregnant and 14 animals (33.00%) were non-pregnant. The general behavior and attitude of all the animals was unsettled. The rectal temperature was between 38.86°C to 39.52°C in cows. The heart rate was between 42.80 and 86.00 and the respiratory rate was between 33.58 and 39. Ruminal motility was reduced in all cases. The areas of the rumen wall. Exploratory rumenotomy permitted a thorough check to be made of the amount, composition, degree of comminution, odor, or color of the rumen contents and parts of the rumen wall. Exploratory laparotomy was performed following the standard procedure [6]. The data obtained were statistically analyzed wherever applicable to study the significance of group versus control for the two different species by least square analysis [7].

The position of the reticulum was normal in 34.62% cases in group 1, 28.57% cases in group B and 33.33% in group C. No clear position was seen in 65.38% in group 1, 71.43% in group B and 66.66% in group BI. Radiography of the reticular contents showed metallic foreign bodies in 65.38% cases in group 1, 14.29% cases in group B and 41.69% cases in group BI. Sandy material was noted in 15.83% cases in group I and 14.29% cases in group B. Fluid shadow was noted in 5.71% cases in group A and 37.50% cases in group CI. Maximum increase in fibrinogen controlalues was obsercontroled in group D cows (13.1 ± 0.43) followed by groups B (12.74 ± 0.55), A(10.34 ± 0.22) and D (8.40 ± 0.14) when compared to the control (5.33 ± 0.13). Maximum increase in fibrinogen controlalues was recorded in group BI buffaloes (13.00 ± 0.62) followed by A (10.57 ± 0.28) and D (9.50 ± 0.00). Group C cows (4.68 ± 0.33 : 1) had lowest plasmaprotein: fibrinogen (PP:F) ratio followed by groups B (4.89 ± 0.32:1), I(6.32 ± 1.19 : 1) and D (6.46 ± 0.17 : 1). In glutaraldehyde coagulation test reduced clotting time ((3 - 6 minutes) was noticed in 28.57% cases in group B cows, 37.5% in group C cows and 37.5% in group B. Animals which had more than 14.00 g/L fibrinogen were positDe for glutaraldehyde coagulation test.
in group C. Extensive fluid accumulation of an anechoic or hypoechoic nature was seen in 71.43% in group BI. Homogeneously echogenic fluid accumulation was noticed in 28.77% in group C.

Discussion:

Traumatic reticuloperitonitis and allied syndromes are one of the most commonly occurring diseases of the digestive tract of cattle. They result from injury or perforation of the reticulum by a sharp foreign body. A tentative diagnosis can be made on the basis of the results of a clinical examination but in difficult cases additional diagnostic aids are required. The clinical examination of the animals is an important procedure in the diagnosis of traumatic reticuloperitonitis in cattle. The typical signs included an arched back, a tucked up or tense abdomen, a rectal temperature above 390C, abnormal ruminal findings such as reduced or absent ruminal motility or ruminal tympany, positive pain response tests, faeces containing poorly digested material and a shorter than normal glutaraldehyde test[2] . The probability that a cow has a condition increases as the number of typical clinical signs displayed increases. In the haematological profile, leukocytosis with left shift was indicative of traumatic reticulo-pericarditis and localised reticuloperitonitis. Neutrophilia in the absence of leukocytosis was indicative of diffuse traumatic reticuloperitonitis. The haematological observations concurred with the findings from previous studies [8, 9]. Significantly high increase in globulin and fibrinogen levels and decreases in albumin and plasma protein: fibrinogen ratio [PP:F] were noticed. This was in agreement with previous findings [10,11,12]. The changes in haematological values and biochemical parameters such as elevation of fibrinogen, aspartate aminotransferase and alkaline phosphatase were suggestive of inflammatory changes in the body not only traumatic reticulo-peritonitis/pericarditis. They can provide important clues for the presence of inflammatory changes. The diagnosis of bovine traumatic reticuloperitonitis and allied syndrome was based on clinical signs and haematological findings, however neither results in the confirmation of the disease. Although the haematological examination was of considerable value as a diagnostic aid in TRP, these alterations were non-specific and were seen in association with other bacterial infections following severe stress [13]. In the glutaraldehyde coagulation test, positive results were obtained only from those animals having more than 14.00. g/L fibrinogen. Clotting of blood did not occur in the rest of the cases which might be due to less concentration of critical substances released by the massive exudation, plasma protein and plasma fibrinogen[2]. In Sulkowitch test animals having lowered calcium were detected positive for TRP. However, Hall[3] opined that even normal animals during the winter season produced positive results. Radiography was best suited for visualization of metallic foreign bodies in and outside the reticulum and the position of the foreign body was not a reliable indicator of the condition. Radiography is the best method for visualizing them and for obtaining accurate information about their position and nature [5,14]. Ultrasonographic examination revealed the presence of fibrinous changes or abscesses that could not be visualized by radiography. The major advantage of ultrasonography overcomes the problem of locating the lesion but also its size and extent. In contrast, ultrasonography failed to identify any metallic objects including magnets. This was in agreement with earlier findings [2]. All the three techniques, namely, ultrasonography, radiography and metal detector failed to detect the presence of non-metallic foreign bodies like polythene bags which are a major environmental pollutant.

REFERENCES


