Studies on foreign body syndrome in bovines of Anand district of Gujarat

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ABSTRACT

Twenty female animals selected for study from which 60% buffaloes and 40% cattle with a mean age of 6.32 ± 0.66 years. The mean duration of illness was 20.7 ± 2.13 days and majority recently calved (45%). Mean rectal temperature, respiratory and heart rates elevated and rumen motility decreased. Ferroscopy was positive in fifteen animals. Haematological and Biochemical parameters revealed leucocytosis, neutrophilia and lymphocytopenia, decreased albumin and increased total plasma proteins, globulin, AST, ALT, serum creatinine, blood urea nitrogen and plasma fibrinogen level. Laparorumenotomy revealed adhesion of reticulum and left abdominal wall in seven, reticulum and right abdominal wall in three, reticulum and ventral abdominal wall in one and reticulum with diaphragm in four cases with non-metallic foreign bodies and frothy rumen content in five animals. Ruminitis, sloughing and haemorrhages of ruminal papillae in two cases. Complications like recurrent tympany, subcutaneous emphysema, swelling and discharge at surgical site were managed appropriately and all animals recovered. In-vitro ultrasonographic examination of diaphragm revealed that the right lower half musculo-tendinous junction of diaphragm was thinner than the left lower half musculo-tendinous junction of diaphragm.

Key words: Anand, Bovine, Foreign body syndrome, Gujarat.

INTRODUCTION

Dairy farming is an integral part of agriculture and economy of the farmers is largely influenced by profitable animal rearing. In the present scenario of rapid urbanization, industrialization and acute mineral deficiencies, there is an increasing occurrence of foreign body syndrome (FBS) in bovines. This syndrome has greater impact on the earnings of the Indian farmer. Owing to the indiscriminate feeding behaviour of ruminants, foreign body occurs commonly in reticulum of ruminants lying overt or causing a syndrome namely traumatic reticulo peritonitis or proceeding further to end in traumatic reticulo pericarditis (Singh et al. , 2008). TRP is one of the most frequently occurring digestive diseases of bovines, which has drawn the attention of animal health professionals over the past years (Mousavi et al. , 2007). However, the variability in clinical settings pose a significant challenge in the diagnosis and management of FBS in ruminants. Definitive diagnosis is a necessary pre-requisite to decide on the surgical intervention to be employed. It is a clinical demand to evolve strategies to diagnose and manage traumatic reticulo peritonitis at an early stage.

MATERIALS AND METHODS

The present research work was carried out at the Department of Veterinary Surgery and Radiology, College of Veterinary Science and Animal Husbandry, AAU, Anand and under field conditions at different Panjarapoles. A total 20 clinical cases of cattle and buffaloes were selected with the history of intermittent anorexia and recurrent ruminal tympany not responding to routine medical treatment. The selected clinical cases were subjected to detailed study to arrive at a definitive diagnosis and information regarding age, sex, breed and parity, history of duration of illness, general body condition, feed intake, rumination, consistency of faeces, pregnancy status, presence of acute or chronic recurrent tympany, previous treatment and signs of pain, if any were recorded. Temperature (°C), respiratory rate (per minute), heart rate (per minute), rumen motility (per 5 minute), colour of mucous membrane, hydration status of animals and rumen consistency were recorded in all the animals. A metal detector (Ferroscope) applied over the chest and abdomen to detect the ferromagnetic foreign bodies within rumen and reticulum. From all animals ten ml of blood was collected from jugular vein and haematological parameters like Haemoglobin (g/dl), total leukocyte count (10³/cmm), differential leukocyte count (%), total erythrocyte count (10⁶/cmm), packed cell volume (%) and serum biochemical parameters like Random blood glucose (mg/dl), total plasma protein (g/dl), alanine aminotransferase (IU/L), aspartate aminotransferase (IU/L), serum creatinine (mg/dl), blood urea nitrogen (mg/dl) and plasma fibrinogen (mg/dl) were estimated.

Preoperatively, all animals were kept off feed and off water for 24 and 12 hours, respectively and all the animals were given Inj. DNS @ 5 lit IV, Inj. Streptomycin @ 5 gm IM, Inj. Meloxicam @ 0.2 mg per
kg body weight IM and liver stimulant Inj. Belamy @ 10 ml IM, 24 hours before the surgery and 5 lit of Inj. Ringer’s Lactate (RL) IV along with similar medicines one hour before surgery. Animals were restrained in standing position in rumenotomy travis and the left flank prepared for aseptic surgery. The desensitization of left flank was achieved by left paravertebral nerve block using 2% lignocaine hydrochloride. Following standard surgical principles and protocols laparorumenotomy was performed and gloved hand inserted into abdominal cavity for the assessment of adhesions/inflammation/abscesses of reticulum and peritoneum with gentle palpation in cranial abdominal area. Following rumenotomy evacuation done and hand was introduced into rumen and reticulum for thorough searching of foreign bodies which removed gently and also magnet was introduced to remove loose foreign bodies. The laparotomy incision was closed in routine manner. The various kind of foreign bodies recovered, their nature and location were studied and recorded. Detailed documentation of metallic and non-metallic foreign bodies was done.

Post-operatively antiseptic dressing of suture line was carried out using povidone iodine solution and Betadine ointment daily for 10 to 12 days post-operatively. Fluid therapy with Inj. dextrose 25 per @ 5 litres IV, daily for three consecutive days was done. Antibiotic coverage for 5 consecutive days using Inj Streptopenicillin @ 5 gm IM, pain management using Inj Meloxicam 0.2-0.3 mg per kg body weight IM, and liver stimulant Inj Belamyl @ 10 ml IM was carried out. Yeast culture 100 gm was given orally for 5 days. All the animals given restricted feeding and drinking water up to 7-8 postoperative days and from ninth day onwards, all the animals were provided with ad libitum feed and water. The post-operative complications were assessed clinically by the nature and pattern of healing, wound infection, swelling and discharge at surgical site. The skin sutures were removed between 10th to 12th postoperative days as per merit of wound healing.

RESULTS AND DISCUSSION

Total 20 animals selected for the present study, among them occurrence of foreign body syndrome was higher in buffaloes (60%) than cattle (40%). Similar findings were reported by Singh et al. (1983) while Ramprabhu et al. (2003) reported higher in cattle than buffaloes. The mean age of the animals suffering from foreign body syndrome was 6.32 ± 0.66 (range 4 to 10) years suggesting that foreign body syndrome is a disease of adult bovines. Similar findings reported by Aref and Abdel-Hakiem (2013). All the animals in this study were females. Similarly, Chanie and Tesfaye (2012) reported higher incidence in females than males. The higher incidence observed in females could be due to higher female population than male in and around Anand. Out of 20 animals, 45% were recently calved, 30% were pregnant and 25% were non pregnant. FBS mostly occurred in periparturient period because of increase in intra-abdominal pressure due to pregnancy and parturition attributed to penetration of foreign body and occurrence of clinical signs. Similar findings were reported by Aref and Abdel-Hakiem (2013).

History of affected animals revealed anorexia, recurrent tympany not responding to routine medicinal management, sudden drop in milk yield, retarded or suspended rumination, decreased amount of faeces, distended left flank, abducted elbow, jugular pulsation and wasting body condition. Out of affected animals 35% had partial and 65% had complete anorexia which might be due to rumen impaction or reticular foreign bodies causing ruminoreticular hypomotility, improper mixing of ingesta and loss of appetite attributed to the persistence of the pain due to the foreign body followed by an atony of the fore-stomach and deterioration of health status of the animals. Similar findings were reported by Patel et al. (2012). In the present study majority of the animals (90.00%) showed recurrent tympany might be due to large amount indigestible material in rumen and alterations in the rumino-recticular motility posing difficulty to eruption. Similar findings were reported by Behera et al. (2013) and Nayak et al. (2014). While abnormal rumination was observed in all animals, among them 75% showed suspended while 25% showed decreased rumination. Similar findings were reported by Nikam et al. (2012). Reduced or absence of rumination might be due to piercing of the foreign body and irritation or damage to the reticular nerve endings leading to ruminal atony (Raidurg, 2010).

All the animals (100.00%) in this study passed scanty and pasty faeces. In chronic cases of FBS, the amount, composition and consistency of faeces become abnormal which might be due to abnormal increase in transit time or retention of ingesta in the alimentary tract and increased peristaltic movement of intestine. The symptoms recorded are in accordance with the observation of Boodur et al. (2010).

The signs of pain like arching of back, abducted elbows, difficulty while lying down or getting up and reluctant movement were variably observed in all animals might be due to metallic foreign body penetration and also due to large amount of compact impacted non-metallic foreign body exerting pressure on the vital organs. The animals were reluctant to move and movements were sluggish particularly, while walking downhill and often accompanied by painful grunting (Blood et al., 1983). Arching of back and abducted elbows also observed in cases with huge quantity of non-metallic foreign bodies in fore stomach (Tyagi and Singh, 1993 and Radostits et al., 2003).

The increased (Table 1) mean rectal temperature, respiratory and heart rates recorded in all animals might be due to infection, inflammation, systemic reaction, elevated body temperature, evidence of abdominal pain also
physiological and pathological changes associated with foreign body in rumen and reticulum. Similar findings observed by Reddy et al. (2014). Mean ruminal motility per five minute decreased due to localized reticular adhesions and inflammation might be attributed to the pain caused by the different types of penetrating and non-penetrating reticular foreign bodies in all the animals. These findings were similar to the observations of Suthar and Patel (2009) reported decreased rumen motility in cases of FBS.

Congestion of conjunctival mucous membrane observed in 75% of the animals, whereas 10% showed light pink and 15% pale watery mucous membrane while 5% showed severe dehydration, half of the animals (50%) showed moderate dehydration, 35% showed mild dehydration and 10% animals had normal hydration status might be due to febrile condition and reduction in food and water intake. Reddy et al. (2014) also reported congested mucous membrane and dehydration in FBS of bovines.

All the animals selected for the study had doughy ruminal consistency. This is in accordance with earlier findings reported by Dabas et al. (2013).

Out of twenty affected animals fifteen animals were positive for metal detector test at ventral and ventrolateral parts of chest compared to abdomen. The ferroscopy was not useful in diagnosis of TRP (Begg, 1950), because the penetrating object may be non-metallic while metallic non penetrating foreign body may harmless as most of the bovines carry some metallic objects in reticulum. The metal detector test was found useful in diagnosis and rapid collection of data on incidence of foreign body in the fore-stomach of the ruminants (Radostitis et al., 2003).

The haematological parameters (Table 2) revealed mean haemoglobin concentration, mean total erythrocyte count and mean packed cell volume were within normal range indicated all animals were not at the risk of anaemia while mean total leucocyte count was higher might be due to localized infection and inflammatory conditions. Similar findings were reported by Vedpathak et al. (2010) and Nikam et al. (2012). While Reddy et al. (2014) and Nayak et al. (2014) reported that animals affected with FBS showed lower haemoglobin concentration. Increased total leucocyte count alone not a reliable indicator of inflammation in large animals (Coles, 1974).

Differential leucocyte count revealed neutrophilia with lymphocytopenia might be due to the presence of foreign body inside the fore-stomach producing purulent exudates on tissue injury, which then absorbed in blood and lymph channels leading to body intoxication. These findings were in agreement with the findings of Singh et al. (2008) and Reddy et al. (2014). Neutrophilia was suggestive of inflammatory changes in the body associated with traumatic reticulo-peritonitis/pericarditis. The decreased in mean lymphocyte count was inversely proportionate to the neutrophil count in any inflammatory condition, specifically in septicaemia. Neutrophilia along with lymphocytopenia were suggestive of inflammatory or septicaemic condition in the body and not solely indicative of traumatic reticulo-peritonitis/pericarditis (Vedpathak et al., 2010).

The mean eosinophils and monocytes were within normal range. Similar findings recorded by Raut (2009) and Nikam et al. (2012).

Serum biochemistry (Table 3) revealed there was no apparent change in mean blood glucose level in all animals. FBS animals having normal values of blood glucose were also noted by Brar et al. (2000) and Nikam et al. (2012).

The mean ALT, AST and total plasma protein were above the normal range might be due to the reflection of cellular destruction, inflammatory response to the ingested foreign bodies and damage of myocardial layer and extra pressure in the pericardial sac also haemoconcentration and response to inflammation which corroborated the findings in accordance with the findings of Reddy et al. (2014).

The lower mean albumin and higher mean globulin values than normal range Brar et al. (2000) might be due to inflammation in the fore-stomach of the animals which corroborated with findings of Yoshida (1986).

<table>
<thead>
<tr>
<th>Physiological parameters</th>
<th>Mean ± SE (n = 20)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Temperature (°C)</td>
<td>39.51 ± 0.15</td>
</tr>
<tr>
<td>Respiration rate (breaths/minute)</td>
<td>34.20 ± 1.20.</td>
</tr>
<tr>
<td>Heart rate (beats/minute)</td>
<td>70.25 ± 1.99</td>
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<tr>
<td>Ruminal motility per 5 minute</td>
<td>3.3 ± 0.3</td>
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</tbody>
</table>

Table 2: Haematological parameters Mean (± SE)

<table>
<thead>
<tr>
<th>Haematological parameters</th>
<th>Mean ± SE (n = 20)</th>
<th>Normal value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Haemoglobin (g/dl)</td>
<td>10.36 ± 1.30</td>
<td>8 – 15</td>
</tr>
<tr>
<td>Total Erythrocyte Count (10^12/cmm)</td>
<td>6.08 ± 0.67</td>
<td>5 – 10</td>
</tr>
<tr>
<td>Total Leucocyte Count (10^12/cmm)</td>
<td>15.6 ± 2.58</td>
<td>4 – 12</td>
</tr>
<tr>
<td>Differential Leucocyte Count (%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Neutrophils (%)</td>
<td>60.6 ± 6.31</td>
<td>15 – 45</td>
</tr>
<tr>
<td>Lymphocytes (%)</td>
<td>30.3 ± 5.99</td>
<td>45 - 75</td>
</tr>
<tr>
<td>Eosinophils (%)</td>
<td>2.75 ± 0.24</td>
<td>2 – 20</td>
</tr>
<tr>
<td>Monocytes (%)</td>
<td>4.5 ± 0.70</td>
<td>2 - 7</td>
</tr>
<tr>
<td>Packed Cell Volume (%)</td>
<td>30.68 ± 3.31</td>
<td>24 - 48</td>
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Table 3: Biochemical parameters recorded Mean (± SE)

<table>
<thead>
<tr>
<th>Biochemical parameter</th>
<th>Mean (± SE) (n = 20)</th>
<th>Normal value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blood Glucose (mg/dl)</td>
<td>39.35 ± 2.03</td>
<td>35 – 55</td>
</tr>
<tr>
<td>TPP (g/dl)</td>
<td>9.15 ± 0.26</td>
<td>6.2 – 8.2</td>
</tr>
<tr>
<td>Albumin (g/dl)</td>
<td>2.24 ± 0.19</td>
<td>2.8 – 3.9</td>
</tr>
<tr>
<td>Globulin (g/dl)</td>
<td>5.20 ± 0.48</td>
<td>2.9 – 4.9</td>
</tr>
<tr>
<td>ALT/SGPT (IU/L)</td>
<td>45.32 ± 5.34</td>
<td>6.9 – 35.3</td>
</tr>
<tr>
<td>AST/SGOT (IU/L)</td>
<td>121.60 ± 3.45</td>
<td>60 – 118</td>
</tr>
<tr>
<td>BUN (mg/dl)</td>
<td>35.10 ± 1.90</td>
<td>7.8 – 24.6</td>
</tr>
<tr>
<td>Serum Creatinine (mg/dl)</td>
<td>1.91 ± 0.18</td>
<td>0.6 – 1.8</td>
</tr>
<tr>
<td>Plasma fibrinogen (mg/dl)</td>
<td>915.58 ± 83.46</td>
<td>450 - 750</td>
</tr>
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The mean BUN, mean serum creatinine and mean plasma fibrinogen was higher in all animals might be due to renal insufficiency resulted from reduction of renal blood flow with subsequent prerenal azotaemia and severe inflammatory process with tissue damage following foreign body penetration. Similar findings were recorded in cattle by Ghanem (2010) and Nikam et al. (2012). In bovines the fibrinogen is more sensitive indicator because of greater production in inflammatory process (Brar et al., 2000).

Left flank laparorumenotomy revealed different pathological conditions of rumen and reticulum, cranial abdominal adhesion between the reticulum and left abdominal wall in seven animals, reticulum and right abdominal wall in three animals, reticulum and ventral abdominal wall in one animal. Adhesion between the reticulum and diaphragm observed in four cases and these animals suffered diaphragmatic hernia with varying size of rings. There was no signs of adhesion or inflammation in five cases. Gross examination of rumen (Fig. 1) revealed ruminitis and area of sloughing and haemorrhages of ruminal papillae in two cases. Similar surgical findings were observed by Nikam et al. (2012). Large amounts of metallic and non-metallic foreign bodies (Fig. 2) included different penetrating and non penetrating kind of wire pieces, nails, rupees coins, bolts, screw and rings while non-metallic foreign bodies like different kind of polythene bags, bunch of nylon threads, nylon ropes, cotton cloth pieces, sand and stones were found in the reticulo-rumen of twenty animals caused stretching and
distension of these structures, leading to pathological changes in reticulorumenal wall and had a negative effect on reticulo-ruminal motility patterns and adverse effect on microbial populations of these digestive system contributing even more in the pathogenesis of the condition (Blood et al., 1983).

Among the twenty animals, four cases were suffering from diaphragmatic hernia, of which two died during surgery and two animals showed recurrent tympany on 10th post-operative day. Postoperative complications like slight swelling and discharge from surgical site observed in four animals on 7th postoperative day, subcutaneous emphysema in two animals on 2nd postoperative day which got absorbed spontaneously in a few days. The post-operative recurrent tympany and similar complications also reported by Fubini and Ducharme (2004) and Nikam et al. (2012). The skin sutures were removed between 10th to 12th postoperative days based on wound healing in all the animals.

The diaphragm of six buffaloes collected from slaughter house were subjected to in-vitro ultrasonographic studies using linear probe (12-18 MHz). The thickness of various regions of diaphragm were measured which revealed that right upper half muscular portion of diaphragm thicker (0.37 ± 0.03 cm) than left upper (0.33 ± 0.03 cm), while the thickness of right (0.49 ± 0.07 cm) and left (0.49 ± 0.04 cm) lower half muscular portion of diaphragm were similar. Thickness of right upper half musculo-tendinous junction of diaphragm (0.19 ± 0.01 cm) was lower than left (0.21 ± 0.01 cm). Thickness of right lower half musculo-tendinous junction of diaphragm (0.20 ± 0.02 cm) was lower than left lower (0.25 ± 0.02 cm), while thickness of central tendinous portion of diaphragm was (0.13 ± 0.005 cm) (Table 4).

**CONCLUSION**

Incidence of FBS were more prevalent in buffaloes than cattle. FBS was the disease of adult bovines. Most consistent findings were complete anorexia, recurrent tympany, suspended rumination, scanty/pasty faeces and congested mucous membrane. Clinical parameters observed were increased temperature, respiratory rate, heart rate and decreased ruminal motility. Diagnostic modalities such as ferroscopy, clinical assessment and hematobiochemistry ensured confirmative diagnosis. Surgical management was observed to be effective method for achieving satisfactory outcome of FBS. Restoration and maintenance of the rumen physiological environment and ecosystem resulted in favourable prognosis of rumen surgery. Right lower half musculo-tendinous junction of diaphragm of buffalo was thinner than other regions.

**REFERENCE**


