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Comprehensive Clinical Assessment, Radiological and Ultrasound Evaluation of Recumbent Cows with Abdominal Dysfunction

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ABSTRACT

Background: Our study aimed clinical evaluation of recumbent cows with abdominal dysfunction in and around Namakkal district of Tamil Nadu, India.

Methods: A total of 132 recumbent cattle brought to Veterinary Clinical Complex, Veterinary College and Research Institute, Namakkal were subjected to detailed clinical examination, radiography and ultrasonography.

Result: The various abdominal dysfunctions noticed in recumbent cows in the present study were peritonitis, reticular disorders, ileus, rumen impaction and rumen lactacidosis. Ultrasound imaging is complementary to clinical evaluation to identify the etiology of recumbent cows with abdominal dysfunctions.

Key words: Abdominal dysfunction, Cattle, Recumbency, Ultrasound.

INTRODUCTION

Recumbency is a state of lying down and unable to stand up unassisted (Forbes *et al*., 1986). Some may be able to stand and even walk around after being lifted, but are still unable to stand by themselves. If treatment of the underlying cause of recumbency is not successful and cattle are unable to rise for >24 hrs after initial recumbency, they may develop a secondary recumbency from pressure damage to muscles and nerves, are termed “downer cow syndrome”. Once the animal become recumbent due to any primary etiology later it will go for the secondary recumbency which will complicate the condition and its recovery (Constable *et al*., 2017). Recumbency due to abdominal dysfunction in ruminants is both a therapeutic and a diagnostic challenge for the veterinary practitioner. Some of them will require immediate surgical treatment and others could be treated medically. They are associated with numerous conditions that affect the abdominal cavity and could also be mimicked by diseases of extra abdominal origin (Smith, 2009). The recumbent cow causes heavy economic loss to farmers and early ambulation would reduce the economic loss. Precise information is not yet available regarding recumbency in the cow with abdominal dysfunctions. The objective of the study was to analyse the various etiologies, diagnostic aids and the treatment strategies in the management of recumbent cows with abdominal dysfunction.

MATERIALS AND METHODS

Study area and study period

The study was conducted in the Department of Veterinary Clinical Medicine, Veterinary College and Research Institute, Namakkal during the period of 2016-19. Animals from Namakkal region and its surrounding areas were selected for the study.

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Selection of cases

Cattle that were brought to the Large Animal Medical Unit of Veterinary Clinical Complex, Veterinary College and Research Institute, Namakkal in recumbency were utilized for the study. They were subjected to detailed clinical examination, rumen fluid examination, radiography and ultrasonography. Based on the anamnesis, clinical and diagnostic investigations 132 recumbent cows were diagnosed as recumbency due to abdominal dysfunction. Animals brought for routine check up and deworming during this period served as a control group for clinical parameters, radiography and ultrasonography.

Clinical examination

Clinical examination of the animal was undertaken as per standard methods (Rosenberger, 1979 and Houston *et al.,* 2000).

Rumen fluid analysis

Rumen fluid was collected from all the animals by using rumen fluid extraction pump. The samples were analysed as described by Rosenberger (1979).

Radiography

Animals were subjected to left lateral radiograph of caudoventral thorax and reticulum as described by Krishnamurthy and Singh (2011) using Wipro GE 525 DX X ray unit. The radiographic exposure of 90-110 kVp, 40-60 mAs and source image distance of 100 cm were employed. Cassette with 12×15 inch blue sensitive X ray film was used for radiography.

Ultrasonography

All the animals under study were subjected to ultrasonographic examination using Esoate Mylab 40 Vet Ultrasound machine and the abdomen was examined using 2.0-3.5 MHz transducer as described by Braun and Gotz (1994).

RESULTS AND DISCUSSION

The various abdominal dysfunctions noticed in recumbent cows in the present study were peritonitis (57 cattle; 43.18 per cent), reticular disorders (30 cattle; 22.73 per cent), ileus (19 cattle; 14.39 per cent), rumen impaction (14 cattle; 10.61 per cent) and ruminal acidosis (12 cattle; 9.09 per cent). The recumbency due to abdominal dysfunctions in cows under the present study was in agreement with the reports of the following authors. Hajighahramani and Ghane (2010) and Aref and Abdel-Hakeim (2013) reported that in severe cases of traumatic peritonitis, reticular affections and intestinal involvement, the animal might become recumbent.

Clinical signs

Cattle with peritonitis had tachycardia (100 per cent), voided little quantity of dung (100 per cent), bruxism (91.83 per cent), elevated body temperature (81.63 per cent), abdominal distension (79.59 per cent) and were in sternal recumbency (57.14 per cent). Similar findings were reported by Aref and Abdel Hakiem (2013), Habasha and Yassein (2014), Braun *et al.* (2018) and Sasikala *et al.* (2018a) in their study on the traumatic reticulo peritonitis.The predominant clinical signs in cows with reticular disorders were tachycardia (100 per cent), voiding of little quantity of dung (100 per cent), cessation of rumination (100 per cent), abdominal distension (78.26 per cent), bruxism (91.30 per cent), sternal recumbency (65.21 per cent) and anterior abdominal pain with extended neck (Fig 1) (33.33 per cent). Radostits *et al.* (2007) and Sasikala *et al.* (2018b) reported that the most common clinical signs noticed in animals with reticular abscesses were poor body condition, pyrexia, tachycardia, bruxism, mild ruminal tympany and impaired rumen motility. The clinical signs of cows with reticular disorders noticed in the present study were in agreement with the reports of Radostits *et al.* (2007) and Sasikala *et al.* (2018b). Tachycardia (100 per cent), achezia (100 per cent), severe abdominal distension (100 per cent), sternal recumbency (63.15 per cent) and prolapse of the rectum (Fig 2) (10.52 per cent) were noticed in cows with intestinal ileus. Karapinar and Kom (2007) reported anorexia, colic signs, lack of defecation, elevated rectal temperature, tachycardia, tachypnea with reduced ruminal contractions and distended loops of intestine upon rectal examination in cattle with intussusception. Intussusception was one of the important mechanical causes of intestinal obstruction in bovines. Affected animals usually showed non-specific clinical signs such as anorexia, depression, dehydration, tachycardia, empty rectum, abdominal distension and pain (Imran *et al.,* 2011a). Kumar *et al.* (2015) recorded anorexia, abdominal distension, cessation of defecation, abdominal pain and absence of dung in the rectum, distended loops of intestines in cattle with intussusception. Hussain *et al.* (2015) and Khalphallah *et al.* (2016) recorded achezia, regurgitation, dehydration, congested mucous membranes, tachycardia, tachyponea, reduced rumen motility, abdominal pain and empty rectum on rectal examination in cattle with ileus.

Fig 1: Reticular disorder: Anterior abdominal pain and extended neck.

Fig 2: Intestinal ileus: Prolapse of rectum.

In the present study cattle with intestinal ileus had similar clinical signs as reported by the above authors. Cessation of rumination (100 per cent), distended abdomen (35.71), bruxism (42.85 per cent) and sternal recumbency (71.42 per cent) were noticed in cows with rumen impaction. Tripathi *et al.* (2016) and Sasikala *et al.* (2018c) noticed depression, anorexia, restlessness, tympany, ruminal atony, reduced dung output, doughy rumen and suspended rumination in cattle with ruminal impaction. The clinical signs observed in the present study were supported by the reports of above authors.Cattle with rumen lactacidosis had tachycardia (100 per cent), polypnoea (100 per cent), fluid splashing sound in rumen (100 per cent) and were sternal recumbency (50 per cent) voiding semi solid dung (100 per cent). Bashir *et al.* (2015) and Sasikala *et al.* (2018d) in their study on animals with ruminal lactacidosis reported distended rumen, diarrhoea, fluid splashing sounds, reduced rumen pH, dehydration and tachycardia as the predominant clinical signs. Similar findings were reported in the present study.

Rumen fluid examination

Rumen fluid examination in recumbent cattle with ruminal acidosis revealed milky grey, watery, sour odoured rumen liquor with reduced pH (4.13±0.02), increased methylene blue reduction time (13.21±0.25), increased titratable acidity (79.56±0.15) and absence of protozoa. Other cattle with abdominal dysfunctions had aromatic to putrid odour, reduced protozoal concentration and iodophilic activity with normal pH. Milky grey, watery, sour odoured rumen liquor, with reduced pH, increased methylene blue reduction time, increased titratable acidity and absence of protozoa in cattle with ruminal acidosis were in concurrence with Sasikala *et al.* (2018d).

Radiography

Lateral survey radiograph of caudoventral thorax and reticular region in apparently healthy cows showed a clear, intact diaphragm separating the thoracic and abdominal cavity. Cattle with traumatic reticuloperitonitis showed presence of foreign body in the reticulum (Fig 3) on radiography. Aref and Abdel-Hakiem (2013) conducted radiographic study on 196 cattle with foreign body syndrome and observed sharp foreign bodies in reticulum, reticular adhesion, diaphragmatic hernia and traumatic pericarditis. Sasikala *et al.* (2018a) found metallic foreignbodies in cattle with traumatic reticuloperitonitis on radiography. The findings in the present study were in concurrence with the above authors. No change in silhouette of reticulum in radiography could be appreciated in cattle with reticular abscess. In the present study, no change in silhouette of reticulum in radiography could be appreciated in cattle with reticular abscess. Saini *et al.* (2005) and Kumar *et al.* (2008) opined that radiography was not considered as a reliable tool for diagnosis of reticular abscess. Athar *et al.* (2010) reported that radiography was not effective for diagnosis of non radio-opaque foreign bodies and functional disorders in cattle. The radiographic observations in the present study were supported by the reports of the above authors.

Ultrasonography

The ultrasonographic features in cows with reticular abscess included anechoic cystic structure with echogenic capsule and it was found between abdominal wall and reticulum. The content of the abscess was echogenic in some places

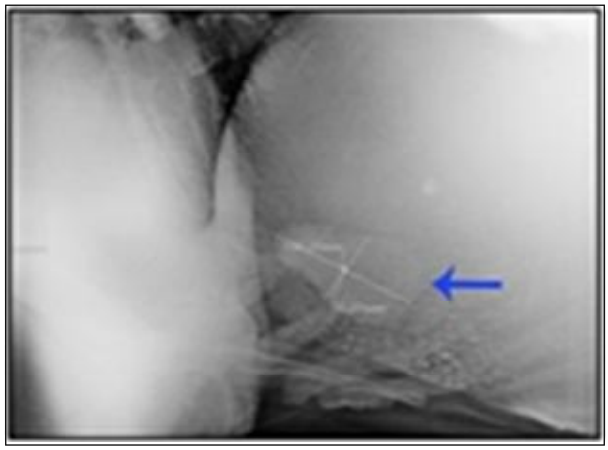

Fig 3: Radiopaque foreign body in reticulum (Arrow).

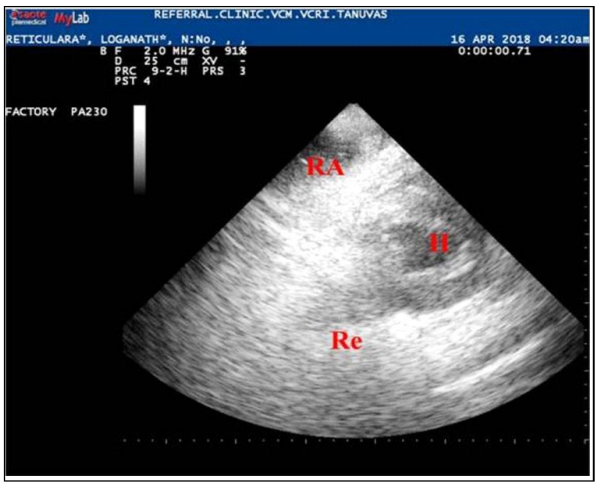

Fig 4: Ultrasonography in a recumbent cow with reticular abscess. (RA-Reticular abscess; Re- Reticulum; H-Heart).

Fig 5: Ultrasonography in a recumbent cow with ileus.

Fig 6: Ultrasonography in a recumbent cow with intussusception (target lesion).

(Fig 4). Athar *et al*. (2010) and Sasikala *et al*. (2018b) reported that the ultrasonographic characteristics of reticular abscess included an echogenic capsule surrounding hypoechogenic lumen with internal echogenic speckled appearance. Similar findings were recorded in the present study. Reticular contractions were absent in all the cattle with reticular disorders. The ultrasonographic imaging in cows with traumatic reticuloperitonitis depicted abnormal contour of reticulum surrounded by anechoic fluid with or without echogenic deposits. The ultrasonographic imaging in cows with traumatic reticuloperitonitis depicted abnormal contour of reticulum surrounded by anechoic fluid with or without echogenic deposits Braun *et al.* (2009) recorded fibrinous adhesions, changes in the reticular wall and indistinct reticular contour in cattle with peritonitis. Athar *et al*. (2010b) reported the presence of anechoic fluid without echogenic margins and floating fibrinous shreds in diffuse peritonitis. Ultrasonography features of peritonitis in cattle included reduced or absence of reticular motility, increased volume of peritoneal fluid in anterior abdomen with fibrinous adhesions between reticulum and abdominal wall (Scott, 2012).

Ultrasonography of the cows with ileus of the small intestine was done by assessing the diameter, motility and anatomical arrangement of the small intestine. Dilated small intestine had a diameter of more than 3.5 cm. The contents of the small intestine appeared predominantly echogenic and rarely anechoic (Fig 5). In cows with ileus, ultrasonography revealed marked reduction or absence of intestinal motility. Braun (2009) reported that one to three dilated intestinal loops in the cranial abdomen were typical of duodenal ileus, the normal diameter of the duodenum was 0.9 to 5.5 cm, while in cows with duodenal ileus, diameter ranged from 6.5 to 9.9 cm. Tharwat (2011) concluded that ultrasound examination of the intestine was particularly useful in cattle suspected for ileus to decide on surgery or slaughter.

Ultrasonography of cows with intussusception showed alternating echogenic and anechoic lines appearing as bull's eye lesion or target pattern. When viewed longitudinally, the typical lumen within lumen appearance had a "sandwich" configuration (Fig 6). Ultrasonography of cows with intussusception showed alternating echogenic and anechoic lines appearing as bull's eye lesion or target pattern. When viewed longitudinally, the typical lumen within lumen appearance had a "sandwich" configuration. Ultrasonographic appearances of intussuscepted segment were reported as "sandwich configuration" on longitudinal imaging (Karapinar and Kom, 2007; Lejeune and Lorenz, 2008) and "target-like" pattern on cross-section imaging (Pravettoni *et al.,* 2009). Ultrasonography features observed in intussusception in the present study were in accordance with above reports (Karapinar and Kom, 2007; Lejeune and Lorenz, 2008).

CONCLUSION

Ultrasonography was effective in diagnosing abdominal dysfunctions in recumbent cows. It was complementary to clinical and radiographic techniques.

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REFERENCES

Aref, N.M. and Abdel- Hakiem, M.H. (2013). Clinical and diagnostic methods for evaluation of sharp foreign body syndrome in buffaloes. Veterinary World. 6: 586-591.

Athar, H., Mohindroo, J., Kumar, A., Singh, K. and Sangwan, V. (2010). Diagnosis and surgical management of reticular abscess in bovines. Indian Journal of Veterinary Surgery. 31: 33-36.

Bashir, S., Hussain, T., Dar, M.A., Dar, A.A., Bhat, A.A. and Farooq, J. (2015). Ruminal lactic acidosis in cow: Clinical assessment. Journal of Livestock Science. 6: 73-76.

Braun, U., (2009). Ultrasonography of the gastrointestinal tract in cattle. Veterinary Clinics of North America: Food Animal Practice. 25: 567-590.

Braun, U. and Gotz, M. (1994). Ultrasonography of the reticulum in cows. American Journal of Veterinary Research. 55: 325-332.

Braun, U., Rauch, S. and Hassig, M. (2009). Ultrasonographic evaluation of reticular motility in 144 cattle with vagal indigestion. Veterianry Record. 164: 11-13.

Braun, U., Warislohner, S., Torgerson, P., Nuss, K. and Gerspach, C. (2018). Clinical and laboratory findings in 503 cattle with traumatic reticuloperitonitis. Veterinary Research. 14: 66-68.

Constable, P.D., Hinchcliff, K.W., Done, A.H. and Grunberg, W. (2017). Veterinary Medicine. A Textbook of the Diseases of Cattle, Horses, Sheep, Pigs and Goats. 11th Edn., W.B. Saunders Elsevier, Philadelphia. PP: 436-621.

Forbes, E., Knight, A. and Turner, G.W. (1986). The Australian Oxford Mini Dictionary. Melbourne: Oxford University Press.

Habasha, F.G. and Yassein, S.N. (2014). Advance techniques in traumatic reticuloperitonitis diagnosis: A review. Al-Qadisiya Journal of Veterinary Medicine Sciences. 13: 50-57.

Hajighahramani, S. and Ghane, M. (2010). Traumatic reticulperitonitis in cattle of Khorramabad (center of Lorestan provenience, west of Iran). Global Veterinaria. 5: 135-139.

Houston, D.M., Radostits, O.M. and Mayhew, I.G.J. (2000). Veterinary Clinical Examination and Diagnosis. W.B. Saunders, London. PP: 10-25.

Hussain, S.A., Uppal, S.K., Randhawa, C.S. and Sood, N.K. (2015). Bovine intestinal obstruction: Blood gas analysis, serum C-reactive protein and clinical, haematological and biochemical alterations. Journal of Applied Animal Research. 43: 224-230.

Imran, S., Tyagi, S.P., Kumar, A., Kumar, V., Sharma, A. and Sharma, S. (2011). Usefulness and limitation of ultra-sonography in the diagnosis of intestinal intussusception in cows. Veterinary Medicine International. 10: 1-6.

Karapinar, T. and Kom, M. (2007). Transrectal ultrasonographic diagnosis of jejunoileal intussusception in a cow. Irish Veterinary Journal. 60: 422- 424.

Khalphallah, A., Aref, N.E.M., Elmeligy, E. and El-Hawari, S.F. (2016). Clinical and ultrasonographic obser-vations of functional and mechanical intestinal obstruction in buffaloes (*Bubalus bubalis*). Veterinary World. 9: 475-480.

Krishnamurthy, D. and Singh, A.P. (2011). Contrast Techniques. In: Veterinary Radiology. Basic Principles and Radiographic Positioning. CBC Publishers, New Delhi. PP: 184-189.

Kumar, A., Kumar, A., Mohindroo, J., Singh, T. and Gupta, A. (2015). Ultrasonographic diagnosis and surgical management of intussusception in cattle. Indian Journal of Veterinary Surgery. 36: 116-118.

Lejeune, B. and Lorenz, I. (2008). Ultrasonographic findings in two cows with duodenal obstruction. The Canadian Veterinary Journal. 49: 386-388.

Pravettoni, D.N., Morandi, M., Rondena, P., Riccaboni, D.D., Zani, M., Scandella and Belloli, A.G. (2009). Repeated occurrence of jejuno-jejunal intussusception in a calf. The Canadian Veterinary Journal. 50: 287-290.

Radostits, O.M., Gay, C.C., Hinchcliff, K.W. and Constable, P.D. (2007). Veterinary Medicine. A Textbook of the Diseases of Cattle, Horses, Sheep, Pigs and Goats. 10th Edn., W.B. Saunders Elsevier, Philadelphia. PP: 352-353.

Rosenberger, G., (1979). Clinical Examination of Cattle. 2nd Edn., Verlag Paul Parey, Berlin and Hamburg, Germany. PP: 184-212.

Saini, N.S., Kumar, A., Mohindroo, J., Singh, S.S., Anand, A., Mahajan, S.K. and Toor, A.S. (2005). Clinical features and survival in reticular abscessation in buffaloes. Buffalo Journal. 21: 167.

Sasikala, K., Vijayakumar, G., Balasubramaniam, G.A. and Kumaresan, A. (2018c). Endoscopic evaluation of rumen impaction by polythene bags in a Tharparkar cow. Indian Veterinary Journal. 95: 74-75.

Sasikala, K., Vijayakumar, G., Sivaraman, S. and Balasubramaniam, G.A. (2018a). Clinicodiagnostic studies on traumatic reticuloperitonitis in cattle - A review of 110 cases. International Journal of Livestock Research. 8: 150-159.

Sasikala, K., Vijayakumar, G., Sivaraman, S. and Balasubramaniam, G.A. (2018b). Clinico-diagnostic studies on reticular abscess in cattle - A review of four cases. International Journal of Current Microbiology and Applied Sciences. 7: 524-527.

Sasikala, K., Vijayakumar, G., Sivaraman, S. and Balasubramaniam, G.A. (2018d). Clinico-pathological studies and management of ruminal lactacidosis in crossbred cattle. International Journal of Livestock Research. 8: 120-125.

Scott, P., (2012). Abdominal ultrasonography as an adjunct to clinical examination in cattle. In Practice. 34: 66-72.

Smith, B.P., (2009). Large Animal Internal Medicine. 4th Edn., Mosby-Elsevier, St. Louis, Philadelphia, USA. PP: 474-478.

Tharwat, M., (2011). Diagnostic ultrasonography in cattle and buffaloes with intestinal obstruction. Journal of Agriculture and Veterinary Science. 4: 67-80.

Tripathi, A.K., Soodan, J.S. and Kushwaha, R.B. (2016). Clinical, haematobiochemical and therapeutic studies on rumen impaction in buffaloes. Buffalo Bulletin. 35: 325-329.