

DIAGNOSIS AND SURGICAL RETRIEVAL OF EXTRA-RETICULAR METALLIC FOREIGN BODY IN A BUFFALO

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ABSTRACT

The present study illustrated the use of plain and contrast radiography in the diagnosis of extra-reticular metallic foreign body in a she-buffalo. Ultrasonography from the right, left and ventral regions was useful for assessing foreign body induced changes in the peri-reticular region and to diagnose focal reticulo-peritonitis or adhesions. Metallic foreign body from the extra-reticular tract was retrieved, successfully, through the post-xiphoid surgical approach under general anesthesia.

Keywords: *Bubalus bubalis*, buffaloes, foreign body, reticulum, radiography, ultrasonography, surgery, bovine

INTRODUCTION

Cattle and buffalo are voracious eaters and usually ingest metallic foreign bodies along with feed. These are trapped within the honey comb reticular mucosa and, if sharp, may penetrate leading to peritonitis, reticular abscess, thoracic

abscess, pericarditis etc (Singh *et al.*, 1993; Abdelal *et al.*, 2009). Fibrous cord or foreign body tracts are usually formed around these penetrating foreign bodies which limits their further progression (Singh *et al.*, 1993). Clinical manifestations in animals suffering from traumatic reticulo-peritonitis may vary depending upon the nature and extent of pathological lesions. Rumenotomy is indicated for the removal of partially embedded foreign bodies in the reticulum. Cited literature lacks surgical treatment of extra-reticular foreign bodies in bovine animals. The present case report describes radiographic and ultrasonographic findings and surgical retrieval of extra-reticular metallic foreign body under general anesthesia in a buffalo.

CASE HISTORY AND OBSERVATIONS

A 5-year old she-buffalo weighing approximately 450 kg was presented with a history of anorexia and reluctance to sit since one week. Buffalo preferred to stand most of the time. Animal had calved about 2 month back. Defecation and urination status was normal. Pain was elicited on palpation of post-xiphoid area. To rule out foreign

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body syndrome, radiography of the reticular region was advised in right lateral recumbency. Lateral radiograph revealed clearly remarkable diaphragmatic line except some region ventrally, where it was unclear. Linear metallic foreign body opacity was apparent in the sternal region which appeared to perforate the reticular wall completely and was situated outside the reticulum (Figure 1). Abnormal soft tissue or fluid opacity was apparent around the metallic foreign body which was extending up to the apex of the heart on lateral radiograph. Otherwise, caudal thoracic region including heart appeared normal. Contrast reticulography was performed as per the procedure described previously (Kumar *et al.*, 1980; Saini *et al.*, 2007) and it confirmed extra-reticular presence of metallic foreign body (Figure 2).

Right, left and postxiphoid regions were prepared for ultrasonographic examination in standing position as described previously (Kumar *et al.*, 2012). Ultrasonographically, reticular wall serosa appeared irregular with hypoechogenic effusions outside the reticulum from the left lateral and ventral post-xiphoid region whereas smooth contour of the reticulum was seen from right lateral side (Figure 3 and 4). Incomplete but biphasic reticular contractions were seen from the left side and ventrally suggestive of reticulitis and focal adhesions; however, good biphasic reticular motility was observed from the right side. Metallic foreign body could not be visualized, ultrasonographically, in this region.

SURGICAL TREATMENT AND DISCUSSION

Under paravertebral nerve block, left flank laparo-rumenotomy was performed in

standing position with the aim to remove extra-reticular foreign body. Reticular wall was found thickened with partial adhesions on the left side and ventrally, whereas the right reticular wall was free, confirming ultrasonographic findings. A foreign body tract was palpable, extra-reticularly, in the cranio-ventral region but it was not possible to retrieve foreign body. Therefore, it was decided to retrieve it using post-xiphoid approach in dorsal recumbency under general anesthesia. Animal was prepared for general anesthesia by evacuating more than 90% of the rumen contents, similar to as recommended before diaphragmatic herniorrhaphy in bovine (Singh *et al.*, 1980; Saini *et al.*, 2007). Laparo-rumenotomy wound was closed as routine. Postoperatively intravenous fluid therapy with inj. Normal saline solution 40 ml/kg, inj. Ampicillin and cloxacillin 10 mg/kg, intramuscularly, twice a day, inj. Meloxicam 0.2 mg/kg, once in day, intramuscularly. It was advised to keep the animal off-feed and off-water for one day.

On the next subsequent day, the buffalo was restrained in right lateral recumbency and fluid therapy with inj. normal saline solution started. Inj. Midazolam 0.2 mg/kg was administered, intravenously as preanesthetic and after 10 minutes general anesthesia was induced with inj. thiopental sodium 4 mg/kg, as bolus intravenously. Following endotracheal intubation, anesthesia was maintained with isoflurane (1.5 to 2.0%) mixed with oxygen using partial rebreathing circuit. Animal was positioned in dorsal recumbency and prepared aseptically for surgery from post-xiphoid approach. A fibrous tract was felt between the reticular wall and sternal part of diaphragm. It was not possible to excise the full fibrous tract because of its close association with the diaphragm that might have been ruptured during manipulation. With careful dissection and breaking adhesions, the fibrous

tract was partially isolated and was cut in the mid transversally. The tip of linear wire embedded within the diaphragm towards thorax was felt. Using artery forceps, the metallic foreign body was pulled out (Figure 5). Povidone iodine was painted at the site of wire removal and laparotomy wound closed as routine. Uneventful recovery occurred from anesthesia. Postoperatively, inj. Ampicillin and cloxacillin 10 mg/kg, IM, twice a day for 7 days, Inj. gentamicin 2 mg/kg, IM, twice a day for 5 days, inj. Meloxicam 0.2 mg/kg, once a day, IM for 3 days along with bolus yeasac and powder Liv 52 for 1 week. Buffalo resumed appetite shortly after recovery from anesthesia and it was advised to gradually increase the amount of fodder and water intake. Antiseptic dressing of the surgical site was advised with povidone iodine and pressure bandage with broad cotton strips all around the chest to prevent incisional hernia. Immediate post-operative radiograph of the reticular region confirmed removal of metallic foreign body (Figure 6). Buffalo made an uneventful recovery and skin sutures were removed on 15th day of surgery.

Ingestion of metallic foreign bodies is commonly seen in bovine animals maintained near the industrial areas. Buffaloes have been found to be less sensitive to pain and other clinical signs associated with foreign body penetration as compared to cattle (Abdelal *et al.*, 2009). Normally foreign body tracts are body's defense mechanism to curtail further progression of such foreign bodies. The present case study reports a rare incidence of pain associated with peri-reticular foreign body tract in a buffalo. Many animals might otherwise remain asymptomatic throughout their life. Location of the foreign body tract, close to the diaphragm, might be an important factor for inducing pain in the present study. Post-xiphoid region being pressed more with filled rumen might

be the cause for excessive pain to such an extent that animal was reluctant to sit.

Intra-reticular or partially penetrating metallic foreign bodies may be removed through rumentotomy (Fubini *et al.*, 1990; Kumar *et al.*, 2008) but removal of extra-reticular foreign bodies might require laparotomy from post-xiphoid region similar to as done for the repair of diaphragmatic hernia (Singh *et al.*, 1980; Saini *et al.*, 2007). One previous report also described removal of an extra reticular fibrous nodule in a buffalo using post-xiphoid surgical approach under general anesthesia (Sobti *et al.*, 1987). Penetration of sharp metallic foreign bodies may lead to abscess formation in the perireticular region (Braun *et al.*, 1998; Kumar *et al.*, 2008) or rarely on left thoracic wall (Singh *et al.*, 1993; Omidi 2008). Rumenotomy and evacuation of rumen contents has been recommended to create sufficient working space in the region of cranio-ventral abdominal region. Moreover, rumen emptying also prevents regurgitation in bovine animals positioned in dorsal recumbency under general anesthesia. Barium meal reticulography has been reported to diagnose small reticular diaphragmatic hernia (Kumar *et al.*, 1980, Kumar and Saini 2012) and in the present case study, it helped to confirm the extra-reticular foreign body. The factors responsible for either development of an abscess or foreign body tract around penetrating foreign bodies are unknown. Species variation, individual susceptibility or degree of infections at the site of sharp body penetration might determine the extent of pathological process.

Ultrasonography is recent imaging modality which has many advantages like real time dynamic mode, easy, safe, quick and economical and has been reported as a decision making tool in bovine reticular or abdominal disorders (Braun, 2005; Athar *et al.*, 2010; Kumar *et al.*, 2012). It

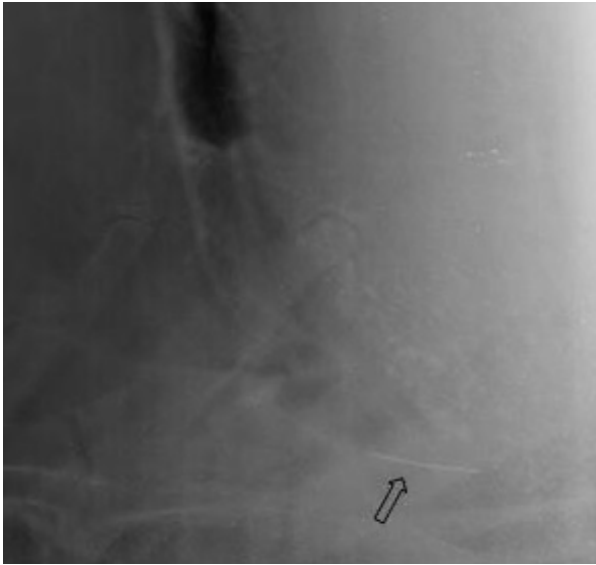


Figure 1. Lateral radiograph showing linear metallic foreign body opacity in the sternal region (black arrow), present outside the reticulum.

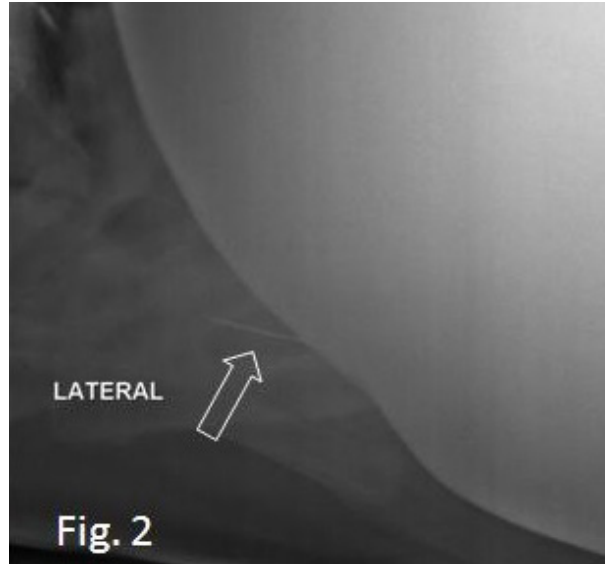


Figure 2. Contrast radiograph demonstrating extra-reticular sharp metallic foreign body opacity (white arrow).

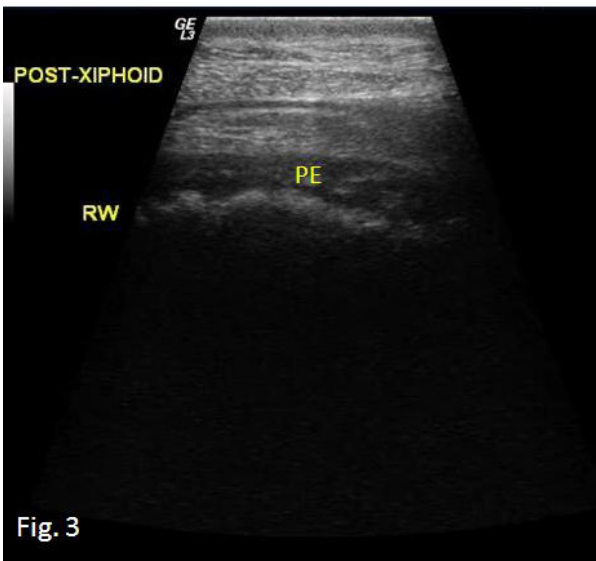


Figure 3. Ultrasonograph showing irregular reticular wall serosa with hypoechoogenic effusions (PE) outside the reticulum (RW) from the ventral post-xiphoid region.

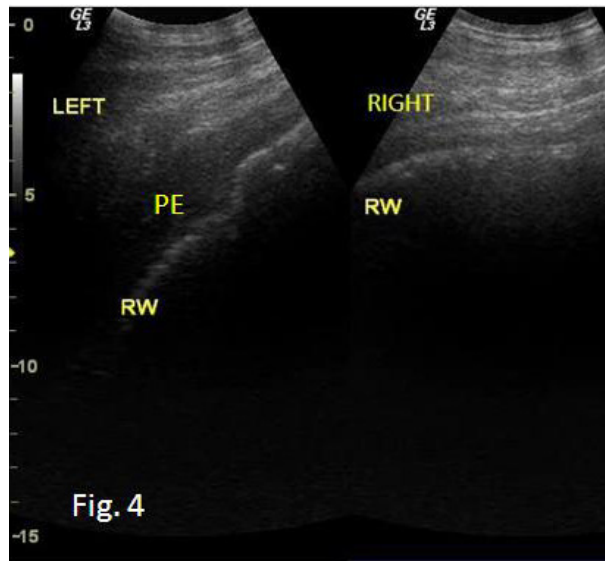


Figure 4. Ultrasonograph showing smooth contour of the reticulum (RW) from right side whereas hypoechoogenic effusions (PE) detected from the left side.



Figure 5. Photograph showing surgically removed metallic wire measuring 5.5 cm.

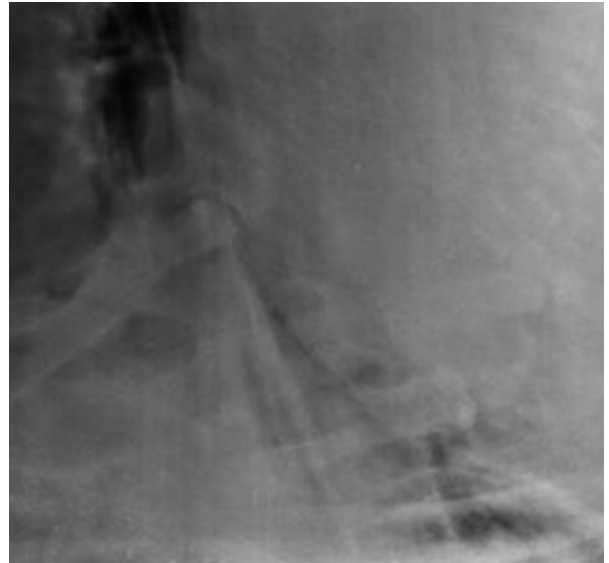


Figure 6. Radiograph of the reticular region taken immediately after removal of foreign body.

has been recommended to examine reticulum, ultrasonographically, from the right, left and ventral regions to diagnose traumatic reticulo-peritonitis and focal or diffuse adhesions (Kumar *et al.*, 2012). Moreover, ultrasonography is more sensitive tool to visualize fibrinous changes or abscess in the perireticular region which could not be seen using radiography (Braun *et al.*, 1993; Omid, 2008). General anesthesia protocol using midazolam and thiopental and maintenance with inhalation anesthesia (halothane or isoflurane) has been reported suitable for bovine (Saini *et al.*, 2007).

In summary, a combination of radiography (plain and contrast) and ultrasonography may be useful to diagnose extra-reticular foreign body that may be retrieved, using post-xiphoid approach under general anesthesia.

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