

## ULTRASONOGRAPHIC, RADIOGRAPHIC DIAGNOSIS AND MANAGEMENT OF ESOPHAGEAL OBSTRUCTION IN JAFFRABADI BUFFALOES AND GIR CATTLE

Vineet Kumar<sup>1,\*</sup>, J.V. Vadalia<sup>1</sup>, A.M. Patel<sup>2</sup>, Amit Prasad<sup>3</sup>, S.H. Talekar<sup>2</sup> and P.B. Patel<sup>1</sup>

### ABSTRACT

In the present study ultrasonographic, radiographic diagnosis and management of cervical esophageal obstruction in three Jaffrabadi buffaloes and a Gir cow were described. On palpation a hard swelling was noticed at left ventro-lateral aspect of proximal cervical region. Further ultrasonographic examination of the esophagus revealed a hyperechoic structure within esophageal lumen with marked acoustic shadowing. Left lateral radiograph of the neck revealed a radiopaque structure within esophageal lumen. A severe degree of tracheal wall compression was also noticed in the radiograph. Under xylazine sedation and local analgesia, an emergency esophagotomy was performed. Esophageal incision was closed using a modified two layer suture technique. The animals were recovered without any postoperative complications within 15 days. This modified two layer suture technique could be an effective procedure for closure of esophageal incision in cattle and buffaloes.

**Keywords:** Gir cattle, Jaffrabadi buffaloes, esophageal obstruction, radiography, ultrasonography

### INTRODUCTION

Jaffrabadi buffaloes and Gir cattle are very popular in Surashtra region being native breed of this tract. These animals are strongly linked with the livelihood of an important segment of the population. Esophageal obstruction is a common occurrence in ruminants and is attributable to their feeding habits (Haas, 2010; Harikrishna *et al.*, 2011). The causes of obstruction are many and commonly include foreign bodies (Haven, 1990; Patel and Brace, 1995). An affected animal appears anxious, extends its head and neck, and drools. Variable degrees of bloat and forceful attempts to swallow may be observed (Haven, 1990). Esophageal obstruction is usually located at the cervical esophagus, at the thoracic inlet or at the base of the heart (Church *et al.*, 1972). External palpation may be used to confirm those located in the cervical esophagus (Haven, 1990). Additional diagnostics such as radiography (Haven, 1990; Patel and Brace, 1995) and ultrasonography may help to determine the location of an obstruction. In the present study ultrasonographic, radiographic diagnosis and management of cervical esophageal obstruction in three Jaffrabadi buffaloes and a Gir cow were described.

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<sup>1</sup>Department of Veterinary Surgery and Radiology, \*E-mail: bharadwaj374@gmail.com

<sup>2</sup>Department of Teaching Veterinary Clinical Complex,

<sup>3</sup>Department of Veterinary Medicine, College of Veterinary Science and Animal Husbandry, Junagadh Agricultural University, Junagadh, Gujarat, India

## MATERIALS AND METHODS

### Animals

Three Jaffrabadi she buffaloes and a Gir cow were presented to the Teaching Veterinary Hospital with a primary complaint of inability to swallow that had not responded to medical treatment. Buffalo 1 (case 1) was 6 years old and had anorexia, ptyalorrhea, respiratory distress and scanty feces for one week before presentation. The buffalo was able to drink small amounts of water, but swallowed with difficulty. The buffalo was treated with an antimicrobial, bronchodilator, rumenotonic, antihistaminic and nonsteroidal anti-inflammatory drugs for several days, but there was no improvement. Buffalo 2 (case 2) was 8 years old and had dysphagia, difficult swallowing and tympany for 2 days. The buffalo was treated for bloat without improvement in condition. Buffalo 3 (case 3) was 5 years old and had dysphagia, ptyalorrhea and repeated attempts to swallow for 18 h before presentation. Cow (case 4) was 12 years old and had audible respiratory noises and repeated attempts to swallow for 20 h before presentation.

All the animals had an abnormal general condition and demeanour, were listless and had no feed intake. The rectal temperature (99°F, 100°F, 99.9°F and 100.1°F), heart rate (76, 68, 64 and 72 beats/minute) respiratory rate (44, 29, 26 and 22 breaths/minute) and body condition scores in scale of zero to five were 2, 3, 3 and 4 respectively. Case 1 had reduced ruminal contractions (1 per 3 minutes), mild ruminal tympany, sunken eyes and reduced skin turgor. Case 4 had ructus-like peristalsis of the oesophagus every 15 to 20 seconds during examination. These signs were accompanied by repeated coughing and vocalization.

On palpation of the neck in case 1, a hard triangular swelling was identified at left ventro-

lateral aspect of proximal cervical esophagus (Figure 1). Attempted passage of a stomach tube further confirmed the location of the esophageal obstruction. Based on the owner history and clinical examination findings, these cases were tentatively diagnosed as cervical esophageal obstruction. Further, ultrasonographic and radiographic examinations were used for the definitive diagnosis of these cases.

### Ultrasonographic and radiographic examination

B-mode real-time ultrasonography was performed on the standing animal restrained in a traxis without any sedation. Hairs at the cervical esophagus were clipped, shaved and the skin was thoroughly washed. Further, acoustic gel was liberally applied and cervical esophagus was examined using a 3.5 MHz curved array and linear transducer. Ultrasonographic examination of the cervical esophagus confirmed a hyperechoic structure within esophageal lumen with marked acoustic shadowing in the transverse plane (Figure 2).

A survey radiography centered on the neck of the animals was performed. The exposure factors used in this study was 50 mAs and 80 kVp at a film focal distance of 90 cm. A contrast esophagrams were then also performed by drenching of a 2:1 mixture of barium sulphate and sterile normal saline in the cases where plain radiography could not able to give detail of the intraluminal esophageal foreign bodies. Exposed directview computed radiography cassette was subjected to computed radiography (CR) system for detailed study. In case 1, left lateral neck radiograph revealed an obstructing radiopaque structure within esophageal lumen with an internal angle of 80.9°. A severe degree of tracheal wall compression was also noticed in the radiograph (Figure 3). In case 4, contrast

radiological study indicated a partial obstruction at the level of the third cervical vertebrae, measuring approximately 28 mm in length (Figure 4). Following diagnosis of the esophageal obstruction, an emergency esophagotomy was planned. Further retrieved foreign body from the oesophageal lumen was exposed and their size was measured using the CR system.

### **Surgical treatment**

Initial treatment included intravenous fluid therapy consisting of lactated Ringer's solution administered at 20 ml/kg/h, for a total of 15 liters. An intramuscular injection of 10 mg/kg enrofloxacin and 0.5 mg/kg meloxicam was administered approximately one hour prior to surgery. The animals were sedated with 0.05 mg/kg xylazine hydrochloride, diluted in 20 ml of lactated Ringer's solution, given intravenously over 5 minutes and restrained in right lateral recumbency. Following aseptic preparation of the surgical site, a further 20 ml of 2% lignocaine hydrochloride was linearly infiltrated around the proposed site of operation to achieve local analgesia. A 12 cm longitudinal skin incision was made in the cervical part over the obstructing foreign bodies and cutaneous fascia was separated. The esophagus was approached between the sterno-cephalicus muscle and trachea. The operative site was packed with a moistened shroud to avoid contamination by the fluid in the esophagus. After exposing the esophagus, a longitudinal incision was made just cranial to the site of obstruction. The obstructing mass was squeezed cranially towards the incision site and recovered using large alis tissue forceps (Figure 5). Retrieved foreign body (Figure 6a) was measuring approximately 73.82 x 117.56 mm (Figure 6b). The esophageal mucous membrane, submucosa and muscularis layer was healthy

at the site of obstruction in all the animals. The esophageal mucous membrane was sutured using continuous suture pattern and the submucosa and muscularis were closed with the Cushing pattern in separate layers using number 2-0 chromic catgut. After irrigation of the surgical wound with lactated Ringer's solution, skin was apposed with horizontal pattern using number 2 silk. The suture line was sealed with tincture benzoin soaked cotton wool.

### **Postoperative care**

The animals were placed on nil per os, intravenous fluid therapy for 7 days. Antimicrobial treatment with enrofloxacin (5 mg/kg intramuscularly, once daily) and metronidazole (25 mg/kg intravenously, twice daily) was continued for 7 days. Analgesia was provided with meloxicam (0.2 mg/kg intramuscularly, once daily) for three days. The bandage was changed and the wound lavaged daily with sterile saline containing 0.1% povidone iodine solution till wound healing. Skin sutures were removed on the postoperative day 12. The long term outcomes of the animals were inquired by telephone contact with the referring veterinarian and the owner.

## **DISCUSSION**

Intraluminal esophageal obstruction or choke is a common occurrence in ruminants. Affected animals are greedy feeders or have nutritional deficiencies, which makes them to eat foreign bodies, leading to esophageal obstruction (Haas, 2010; Harikrishna *et al.*, 2011). Complete esophageal obstruction may causes severe bloat which may be life threatening if not treated on time. Therefore, a prompt diagnosis and treatment



Figure 1. Image showing bulging (arrow) at obstruction site in a female Jaffrabadi buffalo.



Figure 2. Ultrasonogram showing hyperechoic structure with prominent acoustic shadowing.

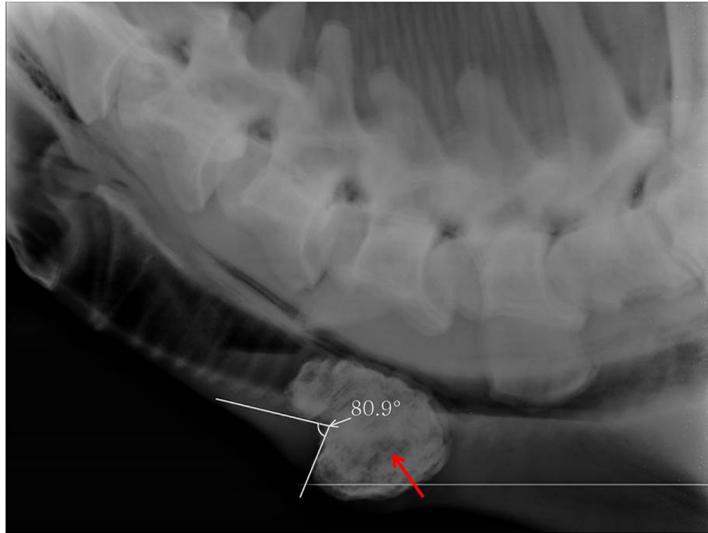


Figure 3. Left lateral radiograph of the neck showing presence of a radiopaque structure (arrow) within esophageal lumen with an internal angle of 80.9° and severe compression of tracheal wall.

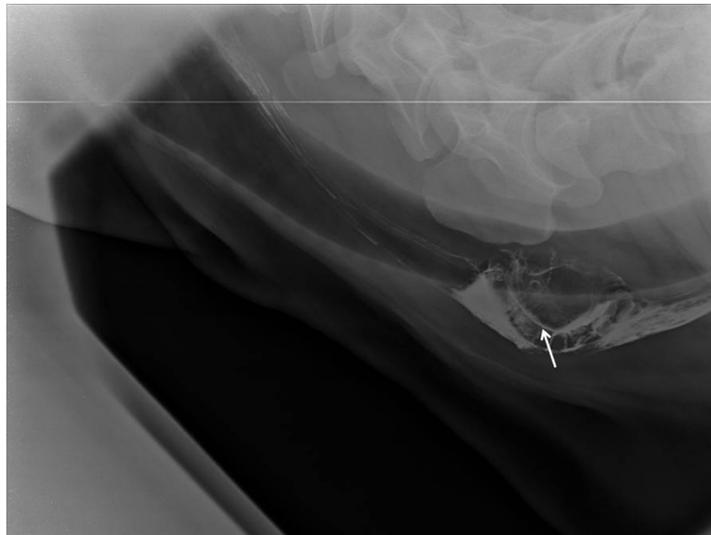


Figure 4. Left lateral radiograph of the neck showing presence of a radiolucent structure (arrow) within esophageal lumen in a Gir cow.



Figure 5. Intraoperative image showing obstructing foreign body within esophagus.

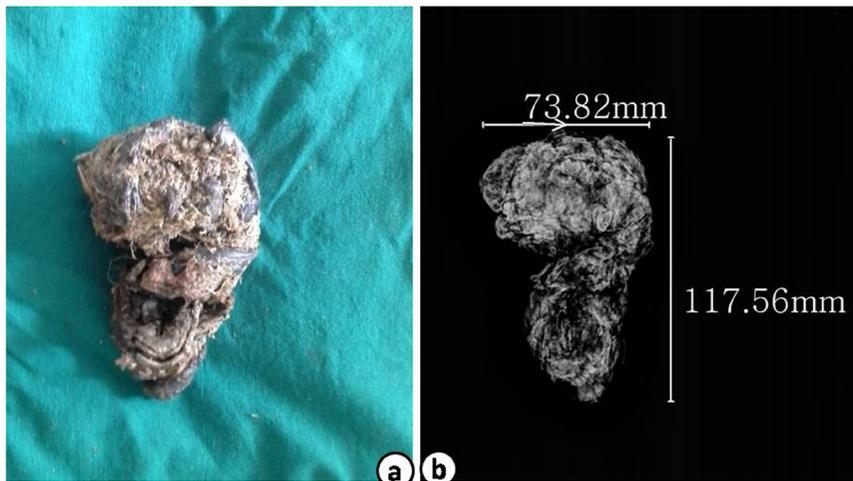


Figure 6. (a). Image showing an electric wire with rubber covering retrieved from esophagus (b) Radiograph of recovered electric wire showing size of 73.82 x 117.56 mm.

would be mandatory. In the present study, observed clinical signs in the animals with esophageal obstructions were anorexia, forceful attempts to swallow, ptyalorrhoea, variable degree of ruminal tympany and respiratory distress. Similar signs were reported in earlier studies (Patel *et al.*, 1995; Ruben, 1997; Haas, 2010; Sureshkumar *et al.*, 2010; Harikrishna *et al.*, 2011; Gangwar *et al.* 2013). In this study, palpation, passing of stomach tube, ultrasonography and radiography (plain and contrast depending upon the nature of obstructing foreign bodies) were used to confirm the nature and location of the obstructing foreign bodies. Using these diagnostic modalities, intraluminal esophageal obstructions were observed at cranial cervical region. External palpation (Haven, 1990) and passing a flexible endoscope into the esophagus (Patel and Brace, 1995) have been used to confirm the cervical esophageal obstruction. Additional diagnostics such as radiography (Patel and Brace, 1995; Tiwari *et al.*, 2011) and ultrasonography (Tiwari *et al.*, 2011) have been used to confirm the nature and location of the obstructing foreign bodies. Further, esophagotomy was performed and obstructing bodies were retrieved. Long standing esophageal obstruction (>24 h) may be associated with pressure necrosis of the esophageal wall and eventually cause poor prognosis. However, in the present study, the esophageal mucous membrane and muscularis layer at the site of obstruction was healthy that might result in uncomplicated healing of repaired esophagus. Although stricture or fistula formations are often associated with esophageal surgery, complications were not seen in any animals during long follow-up.

## CONCLUSION

The ultrasonography and radiography (plain and contrast) could be valuable diagnostic modalities to confirm the nature and location of the esophageal obstructing foreign bodies. Further, modified two layer suture technique could be an effective procedure for closure of esophageal incision in buffaloes and cattle.

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