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Surgical removal of esophageal foreign body by gastrotomy followed by retrieval through oral cavity and stomach in two dogs

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Abstract

An 8-month-old and 6-year-old shih-tzu dogs were presented to the Department of Veterinary Surgery and Radiology, Veterinary college hospital, Hebbal, Bengaluru with the complaint of anorexia, lethargy, regurgitation, vomiting, not passing motion and with the history of swallowed bone. On clinical examination, animals were dull and dehydrated. Radiological examination of lateral thorax revealed the presence of radio-opaque structure in the oesophagus at the base of the heart in the thoracic region of case 1 and at the caudal aspect of thoracic esophagus in case 2. Haematological values showed mild increase in packed cell volume values. For treatment, gastrotomy was performed and stomach tube was used to push the foreign body in a retrograde fashion and the foreign body was extracted out of the oral cavity in case 1. And stomach tube is advanced through oral cavity and foreign body was pushed towards the stomach through hiatal esophagi and removed from stomach. Case follow-up during two weeks showed no postoperative complications and the patients were healthy.

Keywords: Esophageal foreign body, gastrotomy, dog, stomach tube

Introduction

The most common emergencies in dogs is an esophageal foreign body (EFB). When EFB is left untreated, it could lead to pressure necrosis, perforation of esophagus and eventually can lead to death (Delligianni *et al.*, 2020) ^[4]. Dogs of all breeds are susceptible to esophageal foreign bodies, with bones, wooden sticks, and sewing needles being the most frequently encountered. Previous reports have also documented cases involving toys, fish hooks, and various food items (Brisson *et al.*, 2018) ^[2]. In cases of esophageal foreign bodies, clinical signs commonly observed are difficulty swallowing, salivation, retching, gagging, and regurgitation. Because these animals are often dehydrated and in shock, supportive care with fluids and acid-base correction must precede any other intervention (Fossum, 2018) ^[6]. Reports suggest that EFBs occur more often in small breeds such as terriers and poodles, and younger dogs appear to be at higher risk (Deroy *et al.*, 2015) ^[5]. Foreign bodies lodged in the esophagus may cause acute problems including ulcers, esophageal inflammation, wall perforation, entry of air into the chest or mediastinum, and occasionally, damage to the aorta. Broncho-esophageal fistulae and esophageal strictures are considered as the late complications of occlusion (Rousseau *et al.*, 2007) ^[11]. In many referral cases, plain radiography or endoscopy is useful for determining the type of foreign body and its location. However, in rare cases, contrast radiography may also be used. In approximately 50.00 - 80.00% of the reported cases, EFBs were located in the distal esophagus (Brisson *et al.*, 2007; Gianella *et al.*, 2009) ^[2, 7]. The objectives of this study was to describe the two approaches to remove the esophageal foreign body through gastrotomy followed by advancement into the oral cavity or into the stomach.

Materials and Methods

An 8-month-old and a 6-year-old shih-tzu were presented to the Department of Veterinary Surgery and Radiology, Veterinary college, Hebbal, Bangalore with the symptoms of pain,

regurgitation, anorexia, lethargy and not passing stools (Fig. 1). The history showed that the dog had swallowed a bone several hr before referral, while he was playing. After completing clinical and hematological examinations, the cases were immediately forwarded for diagnostic imaging to localize the foreign body with accuracy. The lateral radiograph revealed the presence of radio-opaque structure (bone) in the base of the heart of thoracic esophagus (Fig. 2A) and at the caudal aspect of esophagus (Fig. 2B). Laboratory findings indicated mild dehydration and increase in packed cell volume in case 1 and normal values in case 2; however, no signs of neutrophilic leukocytosis and hypoglycemia were observed in both cases, which could be associated with esophageal perforation. The dogs received intra-venous (IV) Lactated Ringer's solution before surgical procedure.



Fig 1A: CASE 1



Fig 1B: CASE 2

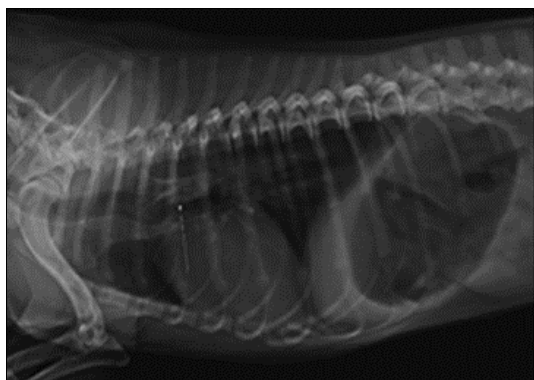


Fig 2A: CASE 1- Radiography of lateral thorax revealed the presence of radio-opaque structure at the base of the heart.

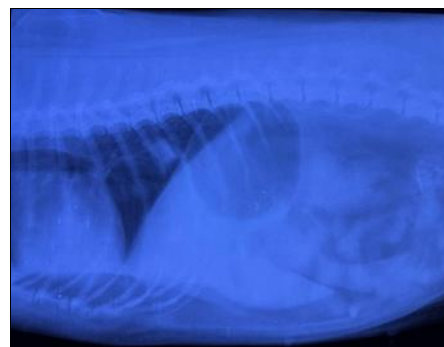


Fig 2B: CASE 2 – Radiography of lateral thorax revealed the presence of radio-opaque structure at the caudal esophagus at thoracic cavity

Pre- medication with Inj. Ceftriaxone (@25 mg/kg B.Wt) IV and Inj. Atropine sulphate (@0.045 mg/kg B.Wt) IM were given. Pre-anesthesia was performed using Inj. Xylazine (1 mg/kg B.Wt). Pre-emptive analgesic Inj Meloxicam (@0.2 mg/kg B.Wt) IV was administered. The animal was anaesthetised and maintained using 2.5% Thiopental sodium and was given to effect intravenously. Endotracheal tube was intubated. The dog was placed in the dorsal recumbency and the surgical area was prepared aseptically with povidone iodine 7.5% scrub solution. A linear incision made on the skin from xiphoid to umbilicus on skin, subcutaneous tissue and linea alba to access the stomach in both cases. After securing the stomach with two stay sutures, the gastrotomy was performed by making a stab incision on the ventral surface, located between the greater and lesser curvatures close to the cardia. In case 1, a stomach tube was passed through stomach entering hiatal esophagii in a retrograde manner towards the foreign body which was located near the base of the heart and pushed the foreign body anteriorly. Then the foreign body was retrieved per orally by retrieving forceps. In case 2, gastric tube was passed through oral cavity advanced through esophagus towards the bone located at the caudal aspect of the esophagus and pushed the bone towards the stomach through hiatal esophagii and that foreign body was removed from stomach. After the esophageal foreign body removal in both cases, gastrotomy incision was closed by Cushing followed by lembert suture pattern using Polydioxone No. 2-0. The abdominal muscles were apposed using Polyglactin 910 No. 0 with simple interrupted suture pattern. The subcutaneous tissue was sutured in a simple continuous manner using Polyglactin 910 No. 0. Skin was closed with Polyamide No. 0 in a cross mattress suture pattern.

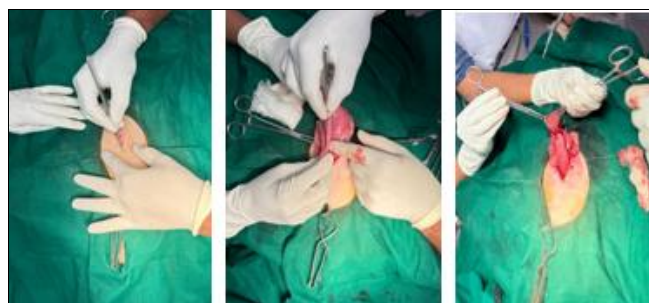


Fig 3: A linear incision made on skin from xiphoid to umbilicus, dissecting subcutaneous tissue and linea alba, exteriorizing the stomach and gastrotomy was performed.



Fig 4A: CASE 1; Stomach tube was passed through stomach anteriorly pushing the foreign body towards oral cavity.



Fig 4B: CASE 2; Stomach tube was passed through oral cavity pushing the foreign body towards the stomach



Fig 5A: CASE 1 – Foreign body retrieved through oral cavity



Fig 5B: CASE 2- Foreign body retrieved through stomach



Fig 6: Gastrotomy incision was closed by Cushing followed by lembert suture pattern using polydioxone No. 2-0. The abdominal muscles were apposed using Polyglactin 910 No.0 with simple interrupted suture pattern. The subcutaneous tissue was sutured in a simple continuous manner using Polyglactin 910, No-0. Skin was closed with Polyamide, No.0 in a cross mattress suture pattern

Postoperative care: Intravenous fluid therapy (DNS, RL) and antibiotic (Ceftriaxone at 25 mg/kg, q12hr, IV) was followed for 5 more days. The owner was advised to keep the dog off-feed for 5 days followed by liquid diet for 2 days followed by semi-solid diet. Sucralfate (1.00 g) was provided to aid in the repair of the esophageal and gastric mucosae. Skin sutures were removed two weeks later. Both the cases recovered uneventfully without any complications.

Results and Discussion

This study reveals the removal of esophageal foreign body per orally and through stomach. In both cases, the esophageal foreign body was removed without any post-operative complications.

One of the emergencies in veterinary medicine is EFB according to Juvet. In dogs and cats, bones represent the most typical oesophageal foreign bodies, but sharp items like needles and fishhooks, along with rawhide toys, balls, string, and other miscellaneous objects, are also commonly reported. Objects become trapped in the esophagus either due to their size preventing passage or because sharp edges penetrate and anchor into the mucosal lining. Fossum described that the foreign bodies are most commonly found in thoracic inlet, the base of heart and diaphragmatic hiatus because extraesophageal structures limit the esophageal dilatation at these sites. Sustained esophageal obstruction by a foreign body enhances peristaltic activity; however, excessive or prolonged pressure at a single site may cause necrosis of the mucosa and subsequent perforation. If esophagitis occurs, it might interfere with esophageal motility and lower esophageal high-pressure zone function. Food that does not pass the obstruction accumulates and may be regurgitated or might cause proximal esophageal distension. Prolonged distension disrupts normal neuromuscular function and reduces peristalsis. Esophageal perforation and aspiration pneumonia are the major complications.

Sharp objects may abrade or lacerate the esophageal mucosa, causing irritation and inflammation of the underlying tissues (esophagitis) or hemorrhage. Perforation of the esophageal wall by sharp items may result in contamination of adjacent tissues with bacteria, ingesta, and bodily secretions. Occasionally sharp objects perforate the esophageal wall and one of the great vessels at the base of the heart, causing severe hemorrhage into the mediastinum. Foreign bodies might penetrate the esophageal wall and establish a fistula with the trachea, bronchi, pulmonary parenchyma or skin.

Various approaches have been described in prior studies for managing esophageal and gastric foreign bodies, but surgical intervention on the esophagus itself is generally avoided. The esophagus's unique anatomy—characterized by discontinuous blood supply and persistent motility—predisposes it to poor

healing and significant postoperative morbidity, a concern noted by Fossum. There are various methods for removal of a foreign body including endoscopy, fluoroscopy and surgery. The initial treatment of choice for esophageal foreign body extraction is endoscopy. If endoscopic retrieval proves unsuccessful, or if the object is sharp and threatens perforation, surgical intervention via gastrotomy or esophagotomy is recommended (Binvel *et al.*, 2018; Moore, 2001) ^[1, 9]. In cases where the foreign body is located in the lower esophagus near the stomach, attempts are made to push it into the stomach for removal by gastrotomy. If this is not feasible, esophagotomy is performed. For cranial thoracic esophageal foreign bodies, surgical entry is via the left 3rd or 4th intercostal space. Objects lodged at the heart base—most often bones—are approached through the right 4th or 5th intercostal space, while the caudal esophagus is accessed through the left 9th intercostal space (Fossum, 2018) ^[6]. A transdiaphragmatic gastrotomy is an alternative approach for removing foreign bodies lodged in the caudal esophagus. In this gastrotomy method, access to the stomach is provided by an incision in the diaphragm and it is better to access the stomach through an abdominal incision, because the esophagus is visible when the foreign body is removed and it could be checked for leakage and perforations after removal (Orton, 2017) ^[10]. In the present case, limited access to endoscopy and the elevated risk of complications from esophageal surgery led to the decision to remove the foreign body via gastrotomy.

Conclusion

In summary, esophageal bone foreign body can be dislodged either by advancement into the stomach or per os with gastrotomy depending on its location. Younger age and larger relative total bone size were also associated with the decision to remove a foreign body. Gastric advancement of foreign body should be considered in cases where oral removal is not feasible.

Conflict of Interest

Not available

Financial Support

Not available

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