

Esophageal foreign body removal through gastrotomy using a covault hook in a female dog: A case report

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Abstract

One of the most critical emergencies in dogs is esophageal foreign bodies. The most important foreign body reported in the esophagus is bone; however, there are also reports of fish hooks lodged in the esophagus. This case report describes the history, clinical signs, radiographic findings and surgical management of an esophageal foreign body due to a single-barbed fish hook in a 4-month-old Siberian Husky female dog with regurgitation, pain, anorexia and lethargy. In this case, plain radiography was taken to determine the type and location of the foreign body and it was confirmed that a single-barbed fish hook was lodged in the heart base of thorax. Depending on the type of foreign body, penetrable or non-penetrable as well as the location, a variety of methods including endoscopy, fluoroscopy, and surgery are used for its removal. For treatment, for the first time, a covault hook was utilized to remove the foreign body *via* gastrotomy. Case follow-up during two weeks showed no postoperative complications and the patient was healthy.

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Introduction

One of the most common emergencies in dogs is an esophageal foreign body (EFB). When EFB is left untreated, it could lead to pressure necrosis of the esophagus, perforation and even death.¹ The most common EFBs reported in the veterinary literature consist of bones, sticks and sewing needles.² Toys, fish hooks and food material are other objects being reported in previous studies.³ Typical clinical signs in cases with EFB include dysphagia, salivation, retching, gagging, regurgitation and effort to swallow. Affected animals are usually dehydrated and referred in shock; therefore, fluid therapy and correction of the acid-base balance should be done before starting any other treatment.⁴ In previous reports, the EFBs have been frequently reported in small breed dogs including terriers and poodles and younger dogs were more predisposed.⁵ Acute complications associated with EFBs include ulceration, esophagitis, esophageal perforation, pneumothorax, pneumomediastinum and even aortic perforation. Broncho-esophageal fistulae and esophageal strictures are considered as the late complications of occlusion.⁶ 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.^{3,7}

This case report describes the history, clinical signs, radiographic findings and surgical management of an esophageal foreign body due to a single-barbed fish hook in a female dog.

Case Description

A 4-month-old Siberian Husky female dog was referred to the Veterinary Hospital, Lorestan University, Khorramabad, Iran, with symptoms of regurgitation, pain, anorexia and lethargy (Fig. 1A). The history showed that the dog had swallowed a fishing hook several hr before referral, while she was playing around Keeyow Lake in Khorramabad city, Lorestan province, Iran. The clinical and hematological examinations were performed and the case was immediately referred to the diagnostic imaging to determine the exact location of the foreign body. The radiograph revealed that there was a single-barbed fish

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hook in the heart base of thoracic esophagus (Fig. 1B). The hook was measured as 3.20×1.30 cm. The curved portion of the fish hook was positioned caudally and the eye and point of the hook were positioned cranially. The position of the barbed point was dorsolateral. Laboratory findings indicated mild dehydration and increase in packed cell volume; however, no signs of neutrophilic leukocytosis and hypoglycemia were observed, which can be associated with esophageal perforation. The dog received intravenous (IV) Lactated Ringer's solution (Iran Injectable and Pharmaceutical Products Co., Tehran, Iran) before surgical procedure.



Fig. 1. A) A female Siberian Husky with sign of lethargy; **B)** Right lateral radiograph of the thorax. Arrow shows the single-barbed fish hook lodged in the base of the heart.

Pre-anesthesia and sedation were performed using intra-muscular (IM) acepromazine (0.10 mg kg^{-1} ; Alfasan, Woerden, The Netherlands) plus atropine (0.02 mg kg^{-1} ; Daroo Paksh, Tehran, Iran). Anesthesia was induced by IV injection of ketamine (7.00 mg kg^{-1} ; Alfasan) and diazepam (0.20 mg kg^{-1} ; Chemi Darou, Tehran, Iran) with equal volumes. Endotracheal intubation was done and anesthesia was maintained with 3.00% isoflurane in pure oxygen. Prior to surgery, prophylactic IV cefazolin (22.00 mg kg^{-1} ; Alborz Darou pharmaceutical Co., Tehran, Iran) was administered. The dog was positioned in the dorsal recumbency and the surgical area from xiphoid to umbilicus was shaved and scrubbed. A ventral midline incision was made to access the stomach. Then, the stomach was packed with moist sterile gauze sponges and two stay sutures were placed on the stomach. A gastrotomy was performed starting by a stab incision between the greater and lesser curvatures of the stomach in the ventral surface adjacent to the cardia. The assistant inserted a ballooned Foley catheter from mouth into the esophagus and guided it near the site of the foreign body. Subsequently, the balloon was inflated with air. A covault hook was used to grasp the curved part of the fish hook, which was positioned caudally and it was gently pulled towards the stomach at the time of inspiration (Fig. 2A). Simultaneously, the assistant led the catheter to the stomach to dilate the esophagus and to prevent damage to the esophageal lumen. By pulling the covault hook, the fish hook came out slowly through the stomach (Fig. 2B). After the esophageal foreign body removal, gastrotomy incision

was closed by two layers of Cushing suture pattern. Then, surgical gloves were changed and celiotomy incision was sutured as usual.

Postoperative care. Oral meloxicam (0.10 mg kg^{-1} ; Farabi Pharmaceutical Co., Isfahan, Iran) was used to relieve postoperative pain and the skin sutures were removed two weeks later. The owner was advised not to feed the dog for up to 24 hr and starting to feed the animal with small amounts of soft food after this time. Fluid therapy was performed during this period. Antibiotic therapy (15.00 mg kg^{-1} Amoxicillin, q12hr, orally, Farabi Pharmaceutical Co.) was done for five days after surgery and sucralfate (1.00 g per dog , Soha Pharma Co., Karaj, Iran) was administered to help healing the esophagus and stomach mucosae. Case follow-up did not show any postoperative complication after two weeks and the patient was completely improved.

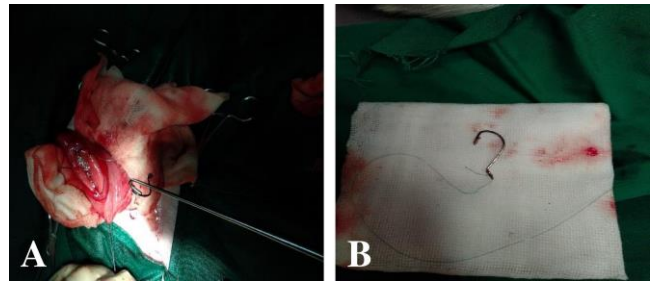


Fig. 2. A) The fish hook removal *via* gastrotomy using a covault hook; **B)** Photograph of the surgically removed single-barbed fish hook.

Discussion

One of the emergencies in veterinary medicine studied extensively is EFB.⁸ Thoracic inlet, the base of heart and diaphragmatic hiatus are the most common sites where EFBs are trapped.⁴ Fish hooks are usually found in the base of the heart.⁹ Previous studies have adopted various methods to remove foreign bodies from the esophagus and stomach; however, in all these studies, attempts have been made to avoid esophageal surgery. The esophagus, has a segmental blood supply and due to its continuous peristaltic movements, its healing is prolonged and post-surgical complications are high.⁴ There are various methods for removal of a foreign body including endoscopy, fluoroscopy and surgery. The endoscopy is the first choice for EFBs removal; however, where endoscopy is not effective or the foreign body is penetrable and the risk of esophageal perforation is high, foreign body removal *via* gastrotomy or esophagotomy is advised.^{10,11} When the foreign body is in the caudal part of esophagus and vicinity of the stomach, an attempt is made to direct the foreign body into the stomach and to remove it *via* gastrotomy. However, where the foreign body cannot be directed to the stomach, the esophagotomy is adopted. For EFBs in the cranial part of the thorax, esophagotomy could

be approached by the left 3rd or 4th intercostal space. The EFBs lodged in the base of heart (most common place for fish hooks) are approached by the right 4th or 5th intercostal space and caudal esophagus is approached by left 9th intercostal space.⁴ 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.¹² Fish hooks are penetrable foreign bodies and have different types in terms of barbs (single-barbed or treble). Endoscopy is very effective in fishing hooks removal and in a study; it has been found that the success rate of their removal is 84.00%. However, this percentage was reported to be about 66.00% in cases where the hook was treble and the rate of endoscopic failure and complications was higher after removal of the foreign body.⁹ In previous reports, one of the reasons that surgery was used instead of endoscopy was that sometimes the fishing hook was not seen with an endoscope and there was a possibility of esophageal rupture.¹⁰ In this case, due to the lack of access to the endoscope and the high complications of esophageal surgery, it was preferred that the foreign body be removed through gastrotomy.

In the present study, for the first time the covault hook was used to remove a foreign body from the esophagus and no postoperative complications were observed after surgery. In previous cases of fish hook removal from the esophagus, traumatic injury to dorsal vertebral arteries, esophageal-aortic fistulas and pulmonary vein involvements have been reported.^{13,14} However, in this case, no postoperative complications were observed.

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Conflict of interest

The authors declare no conflict of interest.

References

- Delligianni A, Papazoglou LG, Savvas I, et al. Transdiaphragmatic gastrotomy for the extraction of distal esophageal foreign bodies in 13 dogs (1997–2016). *J Am Anim Hosp Assoc* 2020; 56(1): 17-22.
- Dunlap AE, Risselada M. Caudal mediastinal fish hook foreign body with pulmonary artery penetration in two dogs. *J Am Anim Hosp Assoc* 2019; 55(1): e551-01. doi:10.5326/JAAHA-MS-6787.
- Brisson BA, Wainberg SH, Malek S, et al. Risk factors and prognostic indicators for surgical outcome of dogs with esophageal foreign body obstructions. *J Am Vet Med Assoc* 2018; 252(3): 301-308.
- Fossum TW. Surgery of the digestive system. In: Radlinsky M, Fossum TW (Eds). *Small animal surgery*. 5th ed. Philadelphia, USA: Elsevier Inc. 2018; 376-380.
- Deroy C, Corcuff JB, Billen F, et al. Removal of oesophageal foreign bodies: comparison between oesophagoscopy and oesophagotomy in 39 dogs. *J Small Anim Pract* 2015; 56(10): 613-617.
- Rousseau A, Prittie J, Broussard JD, et al. Incidence and characterization of esophagitis following esophageal foreign body removal in dogs: 60 cases (1999–2003). *J Vet Emerg Crit Care* 2007; 17(2): 159-163.
- Gianella P, Pfammatter NS, Burgener IA. Oesophageal and gastric endoscopic foreign body removal: complications and follow-up of 102 dogs. *J Small Anim Pract* 2009; 50(12): 649-654.
- Juvet F, Pinilla M, Shiel RE, et al. Oesophageal foreign bodies in dogs: factors affecting success of endoscopic retrieval. *Iran Vet J* 2010; 63(3): 163-168.
- Michels GM, Jones BD, Huss BT, et al. Endoscopic and surgical retrieval of fishhooks from the stomach and esophagus in dogs and cats: 75 cases (1977-1993). *J Am Vet Med Assoc* 1995; 207(9): 1194-1197.
- Binvel M, Poujol L, Peyron C, et al. Endoscopic and surgical removal of oesophageal and gastric fishhook foreign bodies in 33 animals. *J Small Anim Pract* 2018; 59(1): 45-49.
- Moore AH. Removal of oesophageal foreign bodies in dogs: use of the fluoroscopic method and outcome. *J Small Anim Pract* 2001; 42(5): 227-230.
- Orton EC, Monnet E. *Small animal thoracic surgery*. 1st ed. New Jersey, USA: John Wiley-Blackwell 2017; 104-107.
- Iwamuro M, Okada H, Kawai D, et al. Endoscopic removal of a fishhook in the esophagus. *Gastrointest Endosc* 2009; 70(3): 550-551.
- Keir I, Woolford L, Hirst C, et al. Fatal aortic oesophageal fistula following oesophageal foreign body removal in a dog. *J Small Anim Pract* 2010; 51(12): 657-660.