

## Gastrotomy Approach Retrieval of Esophageal Foreign Body using Long Forceps Technique in Five Dogs

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**Abstract :** Five dogs presented to the Veterinary Medical Teaching Hospital of the Konkuk University and Hangang Animal Hospital with a history of foreign body ingestion. On physical examination, five dogs showed lethargy, anorexia, or vomiting. Plain radiographs revealed that radiopaque foreign bodies lodged in the heart base or caudal thoracic esophagus. Positive contrast esophagogram revealed that large foreign bodies severely expanded the esophagus and there was no evidence of leakage of the contrast agent from the esophagus into the thoracic cavity. Gastrotomy for retrieval of esophageal foreign bodies using long forceps technique was performed. Esophageal foreign bodies were successfully retrieved in all dogs. The follow-ups were completed 10 days to 2 years after surgery. The follow-up information was based on physical examination by veterinarians and telephone interview with owners. The owners reported that there was no evidence of complications related to surgery such as vomiting, regurgitation, dysphagia, gagging, hyper-salivation, or anorexia in all dogs.

**Key words :** esophageal foreign body, gastrotomy, long forceps technique, dog.

### Introduction

Esophageal foreign bodies are a common clinical problem in dogs and cats and can become life threatening (11). The most common foreign bodies in dogs are ingested bones or bone and cartilage composites (4,8,10). In cats, fishhooks, needles, and string foreign bodies are more common (6,7). Small breeds of dogs are often affected (8). Clinical signs associated with esophageal foreign bodies include lethargy, anorexia, hypersalivation, regurgitation or vomiting, retching, restlessness, and distress (1,3). Diagnosis is usually made via survey thoracic radiography. Various methods have been performed to treat dogs and cats with esophageal foreign bodies. Gastrotomy approach through a midline laparotomy to esophageal foreign bodies in which long forceps is used to remove foreign bodies has been described in a commonly referenced textbook (6), but there is little published information on the use of long forceps retrieval with gastrotomy approach. The purpose of this case series is to describe the successful long forceps retrieval of esophageal foreign bodies with gastrotomy approach in five dogs.

### Cases

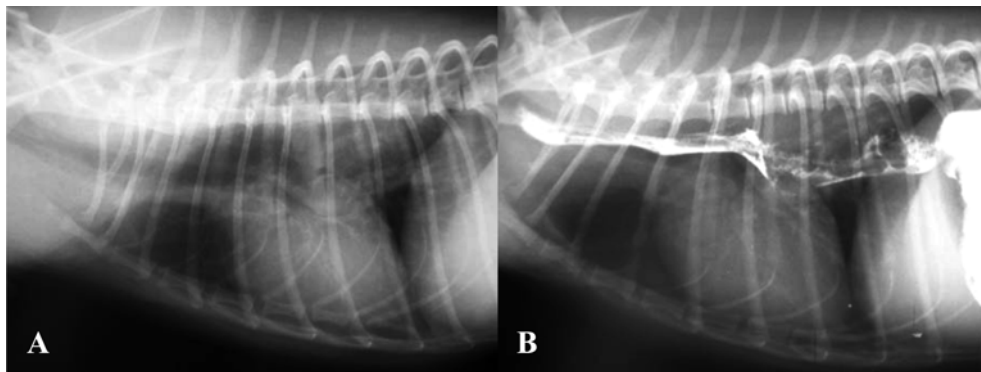
A 4-year-old sexually intact female Maltese weighing 3.4 kg presented to The Hangang Animal Hospital with a history of

progressive anorexia. The owner described the dog ingested large bone and cartilage composites the day before presentation. On physical examination, the dog had lethargy, anorexia, and vomiting. Plain radiographs revealed that a radiopaque foreign body lodged in the caudal thoracic esophagus, between the heart and diaphragm (Fig 1A). Positive contrast esophagogram revealed that a large foreign body severely expanded the esophagus and there was no evidence of leakage of the contrast agent from the esophagus into the thoracic cavity (Fig 1B). A diagnosis of esophageal foreign body was made. Surgical removal of the foreign body was performed on the day of admission.

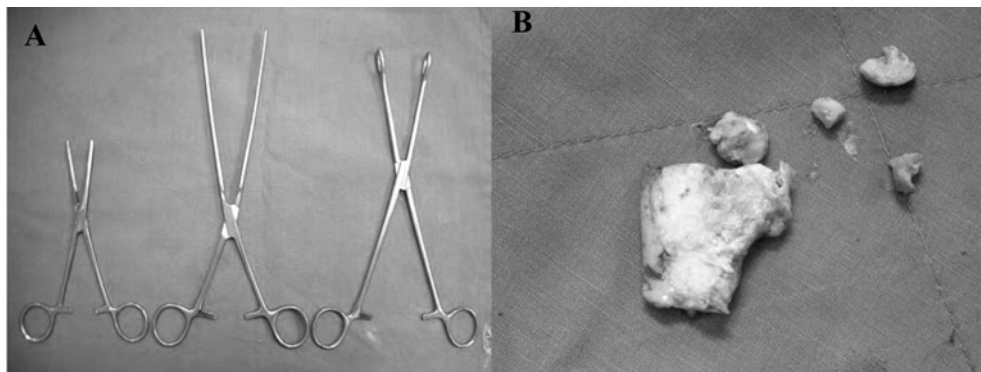
The dog was premedicated for surgery with atropine sulfate (0.02 mg/kg SC; Atropine sulfate inj<sup>®</sup>, Je Il Pharm. Co., Ltd, Korea) and diazepam (0.1 mg/kg IV; Melode<sup>®</sup>, Dong Wha Pharm. Ind. Co., Ltd, Korea), followed by anesthetic induction with propofol (6 mg/kg IV; Provive 1%<sup>®</sup>, Myungmoon Pharm. Co., Ltd, Korea). The dog was intubated and anesthesia was maintained with isoflurane (Isoflurane<sup>®</sup>, Choongwae. Co., Ltd, Korea) and oxygen. Lactated Ringer's solution was administered intravenously at a rate of 5 mL/kg/h until completion of the surgical procedure. The dog received cephradine (30 mg/kg IV; Safdin<sup>®</sup>, Daehan Newpharm. Co., Ltd, Korea) at the time of anesthetic induction.

The patient was positioned in dorsal recumbence. A ventral midline incision was made from the xiphoid process to 3 cm caudal to the umbilicus. The falciform ligament was removed from the xiphoid process. Two stay sutures were placed at 2 cm from both ends of proposed incision. Additional two

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**Fig 1.** Plain radiograph (A) and positive contrast esophagogram (B). A. Plain radiograph reveals that a radiopaque foreign body lodges in the caudal thoracic esophagus, between the heart and diaphragm. B. Positive contrast esophagogram reveals that a large foreign body severely expands the esophagus and there is no evidence of leakage of the contrast agent from the esophagus into the thoracic cavity.



**Fig 2.** Three types of forceps used in this case series (A) and foreign bodies (B). A. Rochester-Carmalt forceps (Case No. 3 and 5), Doyen intestinal forceps (Case No. 1 and 2), and Foerster foreign body forceps (Case No. 4) from the left side. B. One large bone and cartilage composites (size,  $5 \times 5 \times 1$ ) is retrieved from the caudal thoracic esophagus and four small segments (size, from  $1 \times 1 \times 1$  to  $2 \times 2 \times 1$ ) are retrieved from the stomach (Case No. 4).

stay sutures were placed on each side of intended incision. The stomach was isolated from remaining abdominal contents with moistened  $4 \times 4$  gauze. Incision was made parallel to the long axis of the stomach. Gastric contents were aspirated using suction. Then foreign body was palpated through the esophageal hiatus blindly. There was no evidence of adhesion of the foreign body to surrounding tissues. A foreign body forceps was introduced through the esophageal hiatus until the end of forceps palpated the foreign body. Then the jaw of the foreign body forceps was gently opened to expand the caudal esophagus. The foreign body forceps was introduced more cranially and then gently grasped the foreign body. The foreign body grasped with the foreign body forceps was withdrawn from the caudal esophagus. The size of foreign body was 5 cm in length, 5 cm in width, and 1 cm in height (Fig 2B). The stomach was closed in two layers. The first layer was a simple continuous pattern using 3-0 polyglycolic acid (Dexon II<sup>®</sup>; Covidien Animal Health and Dental Division, USA). The second layer was a Cushing pattern using 3-0 polyglycolic acid. The linea alba was closed using 3-0 polyglycolic acid in a simple continuous pattern. The subcutane-

ous tissues and skin were closed using 4-0 polyglycolic acid and 3-0 nylon (Nylon<sup>®</sup>; Namhae. Co., Ltd, Korea) respectively. Postoperatively the dog was placed on meloxicam (0.1 mg/kg PO; Metacam<sup>®</sup>, Boehringer-Ingelheim Vetmedica, Inc, USA) for pain and received cephradine (30 mg/kg IV; Safdin<sup>®</sup>; Daehan Newpharm. Co., Ltd, Korea) for 3 days. Food was offered 12 hours postoperatively since there was no vomiting. The follow-up was completed by telephone 3 months after surgery. The owner was asked if there was vomiting or anorexia related to surgery. The owner reported that there was no evidence of complications related to surgery.

During the period from 2003 to 2008, gastrotomy approach retrieval of the esophageal foreign body using long forceps technique was performed at the Veterinary Medical Teaching Hospital of The Konkuk University and Hangang Animal Hospital in a total of five dogs including the case detailed in this report. Signalment, location of foreign body, type of foreign body, clinical signs, whether an adequate approach of foreign body was obtained, and adhesion to surrounding tissues are summarized in the Table 1. Foreign bodies ranged in size from  $3 \times 1 \times 1$  cm to  $5 \times 5 \times 1$  cm in length, width, and

**Table 1.** Signalment, location of foreign body, type of foreign body, clinical signs, whether a adequate approach of foreign body was obtained, and adhesion to surrounding tissues in five dogs with gastrotomy for retrieval of esophageal foreign body

Case No.	Breed	Age (year)	Sex	Weight (kg)	Location of foreign body	Type of foreign body	Clinical signs	Period from ingestion to retrieval	Adequate approach of foreign body	Adhesion to surrounding tissues
1	Schnauzer	3	M	6.75	CTE	Bone	V	15 days	Yes	Yes
2	YT	2	M	2.35	HB	BCC	V	5 days	Yes	Yes
3	YT	2	M	3.5	CTE	Bone	V, H/S	3 days	Yes	No
4	Maltese	4	F	3.4	CTE	BCC	V, A	1 day	Yes	No
5	YT	3	M	1.44	CTE	Bone	A	7 days	Yes	Yes

M, Male; CTE, Caudal Thoracic Esophagus; V, Vomiting; YT, Yorkshire Terrier; HB, Heart Base; BCC, Bone/Cartilage composites; H/S, Hyper-salivation; F, Female; A, Anorexia

height. Gastrotomy approach retrieval was the first choice in the four. For the one case, an endoscopic approach was first performed; however, this was changed to gastrotomy approach because a foreign body was not retrieved or advanced owing to large size of foreign body and adhesion to surrounding tissues. Foreign bodies were retrieved using a Doyen intestinal forceps in two cases, Rochester-Carmalt forceps in two cases, and Foerster foreign body forceps in one case (Fig 2A). The follow-ups were completed 10 days to 2 years after surgery. The follow-up information was based on physical examination by veterinarians and telephone interview with owners. The owners were asked if there was vomiting or anorexia related to surgery. The owners reported that there was no evidence of complications related to surgery such as vomiting, regurgitation, dysphagia, gagging, hyper-salivation, or anorexia.

## Discussion

Esophageal foreign bodies are not spontaneously advanced into the stomach since they are obstructed in the esophagus, leading to inflammation, adhesion, or perforation that can become life threatening. Choosing an appropriate technique for retrieval of esophageal foreign body and prompt performing the retrieval technique are very important to reduce complications and save life. Presently available options include oral removal with fluoroscopic guidance or endoscopy, advancement of the foreign body into the stomach, esophagotomy through a thoracotomy, or gastrotomy through a midline laparotomy or left intercostal thoracotomy and diaphragmatic incision (2,5,6,9,12). Non-surgical retrieval of esophageal foreign body under fluoroscopic guidance has been described to retrieve esophageal foreign body orally using grasping forceps (9). In this technique, grasping forceps are introduced into the esophagus. Then the forceps are used to free the esophageal mucosa from the foreign body in a sweeping motion before retrieval attempt under fluoroscopic guidance. Endoscopy has been described as a primary option for retrieval of esophageal foreign body (2,6). In this technique, insufflation of air through the endoscope is performed to dilate the esophagus around the foreign body. Then the foreign body is grasped with rigid forceps, gently rotated to free it, and withdrawn, with any

sharp points facing caudally. This technique is associated with low morbidity and mortality (2). However, this technique can not be performed without an expensive equipment and with the esophagus perforated. Advancement of the foreign body into the stomach has been described in cases where foreign bodies are not retrieved cranially (6,7). In this technique, a gastrotomy is not required if foreign bodies are digestible or unless they subsequently cause clinical signs. Esophagotomy has been indicated for immovable foreign body and a high risk of causing or worsening perforation of the esophagus by attempting removal (11). In one report in 1982, a gastrotomy was performed in two dogs instead of oral removal with fluoroscopic guidance or endoscopy for retrieval of esophageal foreign bodies (12). In this report, endoscopic examination of the esophagus revealed a bony foreign body unamendable to advancement or removal with the endoscope or retrieval forceps. Then transdiaphragmatic approach to distal esophagus was performed to retrieve foreign bodies. In the cases reported here, a gastrotomy approach through a midline laparotomy provided a surgical window of adequate space for retrieval of esophageal foreign bodies obstructed in the heart base or caudal thoracic esophagus and may also be helpful in cases where endoscopic retrieval fails to remove or advance a foreign body with the endoscope or retrieval forceps or in cases where endoscope is not available.

Bony foreign bodies are most commonly located in the caudal thoracic esophagus. The next two most commonly reported locations for bony foreign bodies are the thoracic inlet and heart base (6). In this report, the caudal thoracic esophagus was the most common location for obstruction of esophageal foreign bodies, accounting for 80% of cases.

Various forceps in length can be used for gastrotomy approach retrieval, depending on location of foreign bodies. Rochester-Carmalt forceps, relatively shorter than Doyen intestinal forceps and Foerster foreign body forceps, can be used in case where foreign bodies are obstructed in the caudal thoracic esophagus. Doyen intestinal forceps and Foerster foreign body forceps can be used in case where foreign bodies are obstructed in the heart base. Short forceps is easily manipulated and long forceps is possibly used to retrieve foreign body located far from esophageal-gastric junction. Foerster

foreign body forceps with wide jaw should be helpful to retrieve fragile cartilages or bones lodging for a long period.

Some technical consideration in surgery might increase the likelihood of a successful surgery. Jaw of the foreign body forceps should be gently opened to expand the caudal esophagus after the end of forceps palpates the foreign body to create space around foreign bodies and free the esophageal mucosa from the foreign body. This procedure is similar to insufflations of air through the endoscope in endoscopic retrieval technique.

A limitation of this report was impossibility to determine if there was injury on the esophageal mucosa since endoscope was not available; however, injury (if there was injury) on the esophageal mucosa unlikely caused esophageal stricture in this report since there was no clinical sign such as vomiting or regurgitation postoperatively.

### Conclusion

This case series described the successful surgical retrieval of esophageal foreign bodies obstructed in the heart base or caudal thoracic esophagus through gastrotomy approach using long forceps technique in five dogs. A study of large case series with long-term follow-up is warranted to better determine the overall success and complication rates of gastrotomy approach retrieval of esophageal foreign bodies.

### References

1. Kim YK, Uhm MY, Seo EG, Ha MH, Wang JH, Jeong JJ, Chang HH, Lee HC, Cho KW, Lee HJ, Yeon SC. Endoscopic retrieval of esophageal fishhooks using cerclage wire: a case report. *J Vet Clin* 2007; 24: 622-626.
2. Lee SY, Yoo JH, Park C, Park HM. Endoscopic removal of esophageal foreign body in a moluccan cockatoo (*cacatua moluccensis*). *J Vet Clin* 2007; 24: 29-31.
3. Burgos-Rodriguez AG, Forrester SD, Larson MM, Harper TAM, Karnik PS. What is your diagnosis? *J Am Vet Med Assoc* 2003; 223: 43-44.
4. Cohn LA, Branson KR, Kerl M, Johannes CM. Fatal hemothorax following management of an esophageal foreign body. *J Am Anim Hosp Assoc* 2003; 39: 251-256.
5. Fossum TW. Surgery of the esophagus. In: Small animal surgery, 3rd ed. St. Louis: Mosby. 2007: 372-409.
6. Kyles AE. The oesophagus. In: Brockman DJ, Holt DE (eds), Manual of canine and feline head, neck and thoracic surgery. Cheltenham: British small animal veterinary association. 1998: 116-122.
7. Kyles AE. Esophagus. In: Slatter D (ed), Text book of small animal of surgery, 3rd ed. Philadelphia: Saunders. 2003: 573-592.
8. Leib MS, Sartor LL. Esophageal foreign body obstruction caused by a dental chew treat in 31 dogs. *J Am Vet Med Assoc* 2008; 232: 1021-1025.
9. Moore AH. Removal of oesophageal foreign bodies in dogs: use of the fluoroscopic method and outcome. *J Small Anim Pract* 2001; 42: 227-230.
10. Rousseau A, Prittie J, Brousard JD, Fox PR, Hoskinson J. Incidence and characterization of esophagitis following esophageal foreign body removal in dogs: 60 cases (1999-2003). *J Vet Emerg Crit Care* 2007; 17: 159-163.
11. Sale CSH. Results of transthoracic esophagotomy retrieval of esophageal foreign body obstructions in dogs: 14 cases (2000-2004). *J Am Anim Hosp Assoc* 2006; 42: 450-456.
12. Taylor RA. Transdiaphragmatic approach to distal esophageal foreign bodies. *J Am Anim Hosp Assoc* 1982; 18: 749-752.

## 위 절개술 접근과 긴 겸자를 이용한 식도 내 이물 제거 5례

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**요 약** : 이물 섭취 병력을 보이는 다섯 마리 개가 건국대학교 부속 동물병원과 한강 동물병원에 내원하였다. 신체 검사에서 무기력, 식욕 감퇴, 구토 증상을 보였으며 일반 방사선 사진에서 심장 앞쪽 또는 뒤쪽 흉부 식도에 이물이 걸려 있는 것을 확인하였다. 식도의 조영 촬영에서 큰 이물에 의한 식도 팽창을 확인 할 수 있었으며 흉강 내로의 조영제 누수는 관찰 되지 않았다. 위 절개술을 통한 식도 내 이물 제거를 긴 겸자를 이용하여 실시 하였다. 다섯 마리 모두에서 식도 내 이물을 성공적으로 제거하였다. 수술 후 10일 또는 2년에 정기 검진이 마무리 되었으며 수술과 관련한 구토, 연하 곤란, 식욕 저하, 과다 유연과 같은 합병 증상이 없음을 확인하였다.

**주요어** : 식도 내 이물, 위 절개술, 긴 겸자, 개.