

Case Report

The role of endovascular stent graft in the successful management of esophageal foreign body with dangerous vascular complications

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Abstract: The esophageal foreign body with dangerous vascular complications is a rare but usually fatal disease, including aorto-esophageal fistula (AEF), arterio-esophageal fistula, penetrating aorto-esophageal injury, artery dissection etc. Although surgical intervention is mandatory to these entities, there is little consensus about the optimal management of these conditions due to rare cases reported. With advent of the endovascular surgical strategy, the notion of treatment has been changed, and the successful cases reported had increased. Herein, we report three cases with dangerous vascular complications. First case is a 31-year-old man accidentally swallowing a pill with an oblong plastic packaging one day before admission and clinical manifestation of retrosternal pain and worsening dysphagia, with the diagnose of potential AEF. The second case is a 58-year-old woman swallowing a duck bone accidentally five days before admission and clinical manifestation of mild odynophagia, with the diagnose of aortic intramural hematoma. The third case is a 46-year-old-man swallowing a fish bone accidentally one day before admission and clinical manifestation of mild odynophagia and abnormal foreign body sensation, with the diagnose of one penetrating aorto-esophageal injury. They were all successfully managed by combination of an emergent endovascular stent graft and endoscopic technique, and uneventful with follow-up of 14 months, 19 months and 23 months respectively.

Keywords: Endovascular stent graft, esophageal foreign body, vascular complications

Introduction

The esophageal foreign body with dangerous vascular complications is a rare but usually fatal disease. Aorto-esophageal fistula is a well-known and life-threatening complication of esophageal foreign body [1-3]. Since the first case was described in 1818 [4], there was no successful case reported until 1980 [5]. Other vascular complications have been published as arterio-esophageal fistula, penetrating aorto-esophageal injury, artery dissection. Although surgical intervention is mandatory to these entities, there is little consensus about the optimal management of these conditions due to rare cases reported.

With advent of the endovascular surgical strategy for these complications, the notion of treatment and outcome has been changed. In 2005, Assink et al first used endovascular

stent graft to repair an AEF caused by a foreign body [6]. However, there were few cases to use this technique. And in 2013, Stringari et al first reported a case of non-aberrant subclavian artery-esophageal fistula induced by foreign body which was successfully treated by endovascular stent grafting [7]. Thus, the successful cases of these complications caused by esophageal foreign body using endovascular stent-graft should be accumulative.

Herein, we report one potential AEF, one aortic intramural hematoma (first reported to our knowledge) and one penetrating aorto-esophageal injury caused by accidentally ingested esophageal foreign body successfully managed by combination of an endovascular stent graft and endoscopic technique. In the present study, we also reviewed the English-language literature since 2005 via a PubMed search using the key phrase “aorto-esophageal fistula”,

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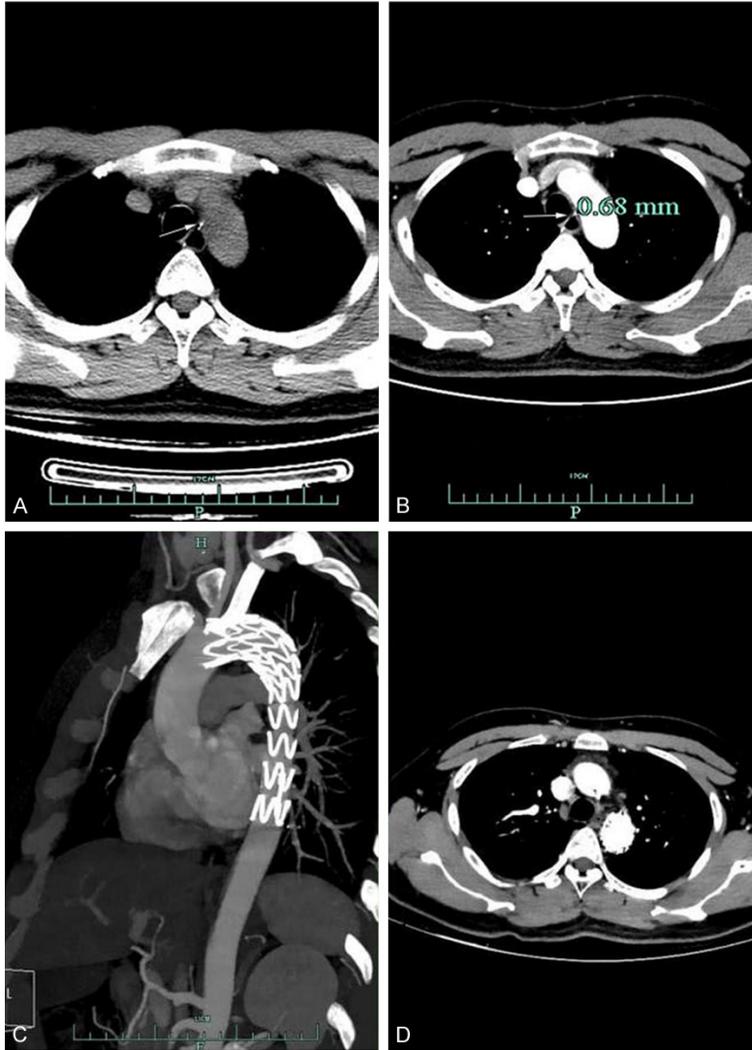


Figure 1. (Case 1), CT scan showed a foreign body (arrow) retained in the middle third of the esophagus about T4 level, passing through its wall, and nearly reaching the thoracic aorta (A). CTA showed the distance between the foreign body (arrow) and aortic wall was 0.68 mm, and no signs of inflammation surrounding the aorta and esophagus (B). CTA showed the stent graft had normal morphology and no signs of inflammation 22 days after the operation (C: plane of MPR, D: axial plane).

“arterio-esophageal fistula”, “penetrating aorto-esophageal injury” caused by ingested esophageal foreign body and managed with or without the endovascular stent graft technique.

Case presentations

Case 1

A 31-year-old man presented to our hospital with a history of retrosternal pain and worsening dysphagia after accidentally swallowing a

pill with an oblong plastic packaging one day earlier. He did not complain any hemorrhage. Indirect laryngoscopy revealed no foreign body in the oropharyngeal regions, oral cavity, hypopharyngeal regions, and larynx. X-ray chest examination was normal. His temperature was 38.2°C, and his blood pressure and heart rate were normal. There was no remarkable thoracic and abdominal physical examination. Laboratory findings revealed a white blood cell (WBC) count of 12.0×10^9 g/L with 85.1% neutrophils (NEs). The ingested esophageal foreign body was doubted, then a computed tomography (CT) was performed and showed that there was a foreign body retained in the middle third of the esophagus, passing through its wall, and nearly reaching the thoracic aorta (Figure 1A). Then further CT angiography (CTA) demonstrated distance between the foreign body and aortic wall was 0.68 mm, but there were no signs of inflammation surrounding the aorta and esophagus (Figure 1B). The potential AEF was highly suggested.

After an immediate multidisciplinary discussion, a plan for definitive treatment was established. The surgery procedure

is the same as case 1 with 28×160 mm stent-graft (Lifetech Scientific [Shenzhen] Co., Ltd, Guangdong, China) was inserted via cut down of the right femoral artery, and placed into the thoracic aorta, and a 10×50 mm stent-graft (Gore Viabahn, W.L. Gore & Association, Inc., Arizona, USA) was inserted via cut down of the left brachial artery, and placed into the left subclavian artery, to avoid the risk of further artery damage. Intraoperative angiography showed that the stent-graft was placed well and had normal morphology, and then the patient was transferred to the operating room

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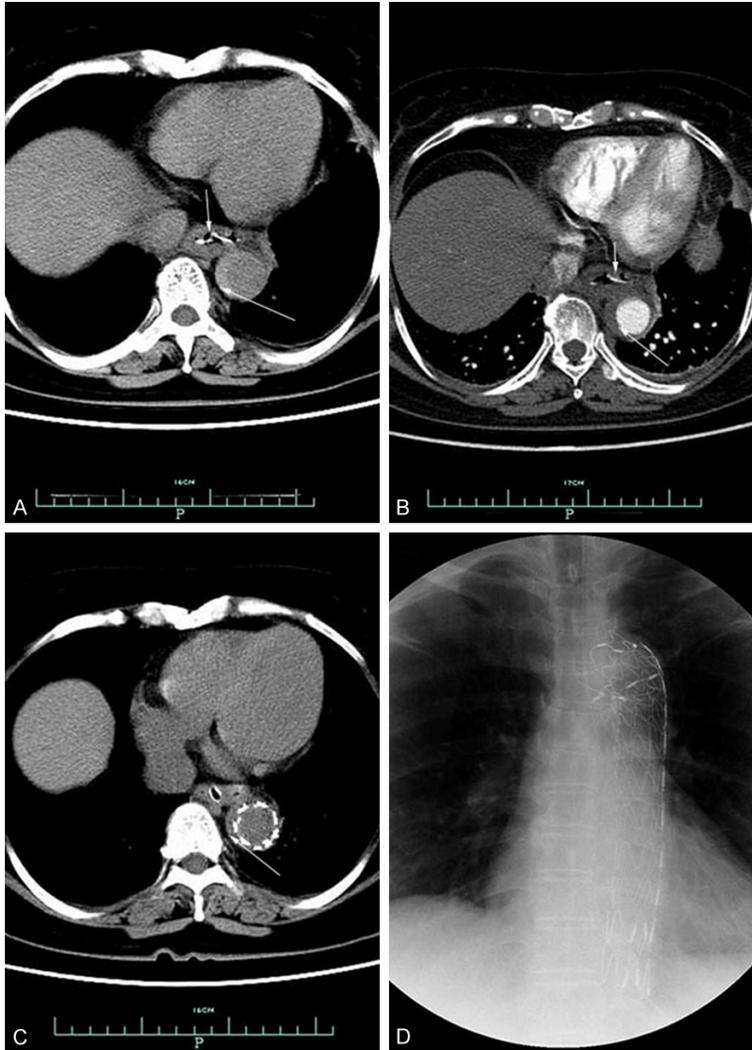


Figure 2. (Case 2), CT scan showed a foreign body (short arrow) retained in the lower esophagus and abnormal shadow of hyperdense (long arrow) surrounding the aorta (A). CTA also showed the foreign body (short arrow) and shadow of hyperdense (long arrow) surrounding the aorta, and no signs of inflammation surrounding the aorta and esophagus (B). CT postoperatively showed reduced shadow of hyperdense (arrow) surrounding the aorta, no signs of inflammation and the stent graft had normal morphology (C). X-chest postoperatively showed the stent graft had normal morphology (D).

to retrieve the foreign body by endoscopy. During general anesthesia, underwent an esophageal endoscopy, swelling esophageal mucosal and inflammatory exudates were observed, and the oblong plastic plate was found 23 cm away from the incisors, which was successfully taken out with little bleeding.

Esophageal drainage and fasting were administered postoperatively. Nutrition via a nasal tube was administered for 3 days after the procedure. A wide spectrum intravenous antibiotic

therapy was prescribed for 7 days after endoscopic management. Esophageal imaging with meglumine diatrizoate showed no leak and good passage through the conduit 7 days after endoscopic management.

He had no fever or vomiting, and no signs of hemorrhage. Laboratory findings showed that the patient's WBC count was 8.4×10^9 g/L with 69.3% NEs after 7 consecutive days of administration of the antibiotic treatment. The patient was discharged in good condition and switched to oral antibiotics 7 days after the procedure.

Twenty-two days after the operation, the CTA was performed, and it showed that the stent graft had normal morphology and no signs of inflammation (Figure 1C and 1D). The patient remained asymptomatic and uneventful at follow-up 14 months later.

Case 2

A 58-year-old woman, who swallowed a duck bone accidentally five days before, later noticed mild odynophagia, no hematemesis and no fever. The patient had no history of hypertension, cardiogenic disease, and atherosclerosis.

The local district hospital had taken a chest X-ray, which showed foreign body lodging at the lower esophagus. It is unsuccessful to take out the bone with gastroscopy. Then CT was taken and showed abnormal shadow of hyperdense surrounding the descending aorta (Figure 2A).

The patient complained of aggravating odynophagia and retrosternal pain, and did not complain any hemorrhage. She was admitted to our hospital and further CTA demonstrated intramural hematoma of the descending aorta

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(**Figure 2B**). The patient was hemodynamically stable. Her hemoglobin level was 97 g/L.

The patient underwent an emergency surgery. Endovascular graft exclusion with a 34×200 mm stent-graft (Lifetech Scientific [Shenzhen] Co., Ltd, Guangdong, China) had been taken to treat aortic intramural hematoma. Intraoperative angiography showed that the stent-graft was placed well and had normal morphology. And then with the endoscopy a duck bone, which was 2.0 cm×3.0 cm in size and penetrated into the wall of esophagus, was found at the lower esophagus and removed.

Thirteen days after the operation, CT showed reduced shadow of hyperdense surrounding the aorta, no signs of inflammation and the stent graft had normal morphology (**Figure 2C**). X-chest showed the stent graft had normal morphology (**Figure 2D**). At the 19-month follow-up, she is well, with normal activity and no symptoms of infection or hemorrhage.

Case 3

A 46-year-old-man who swallowed a fish bone accidentally one day before, later noticed mild odynophagia, abnormal foreign body sensation, no hematemesis and no fever. Next day, the symptom of odynophagia became severe and retrosternal pain appeared. The local district hospital had taken a CT, which showed the sharp foreign body penetrating through the esophageal wall and into the aorta.

The patient was admitted to our hospital and further CTA (**Figure 3A**) and MPR (multi-planer reformation) (**Figure 3B**) demonstrated a strip-shaped sharp foreign body penetrating through the esophageal wall and into the thoracic aorta on the tracheal carina level. He did not complain any hemorrhage. His vital signs were normal. Her hemoglobin level was 110 g/L. The diagnosis of esophageal foreign body with penetrating aorto-esophageal injury was made.

With a multidisciplinary surgical discussion, the patient underwent an emergency surgery. A 28×160 mm stent-graft (Lifetech Scientific [Shenzhen] Co., Ltd, Guangdong, China) was inserted via cutting-down of the right femoral artery, and placed into the thoracic aorta. Intraoperative completion angiogram showing complete coverage of traumatic aorta by the

stent graft (**Figure 3C**). And then with the esophagoscope, a bone, which penetrating into the aorta, was found in the mid-esophagus and removed.

Half a month after the operation, the X-ray (**Figure 3D**) and CT (**Figure 3E**) showed satisfactory results and no signs of inflammation. At the 23-month follow-up, he has normal activity and no symptoms of infection or hemorrhage.

Discussion

FB ingestion is one of the most common otolaryngologic complaints encountered in the emergency department [8]. Various types of FB may be ingested, most pass harmlessly through the gastrointestinal tract but sharp or pointed FBs are likely to cause complications. Some severe and even life-threatening complications are associated with significant morbidity and mortality [9-11]. Among them, vascular complications (aorto-esophageal fistula, aortic intramural hematoma, arterio-esophageal fistula, penetrating aorto-esophageal injury, artery dissection, etc.) have even higher mortality rate without timely surgical treatment. Many factors favor the development of major complications, which include advanced age, the shape of the foreign body (sharp), a long duration of impaction, and the impaction site [8, 12].

Of all the major complications, an AEF is a particularly rare but usually fatal complication of a FB in the esophagus [13-15]. Early diagnosis, rapid and appropriate treatment including surgical intervention is essential. Diagnosis of an esophageal AEF relies heavily on clinical manifestations and endoscopic or radiographic findings [2].

The characteristic AEF syndrome was first described by Chiari in 1914 [16], as the Chiari triad of symptoms: chest pain, sentinel arterial upper gastrointestinal tract hemorrhage, and exsanguination after an asymptomatic interval. Thus, the possibility of an AEF must be considered in patients with a history of FB ingestion. Any history of such ingestion is significant, the symptoms may be heterogeneous. CT is useful for early diagnosis of an AEF caused by an ingested esophageal FB. Wei found that multi-detector computed tomography (MDCT) was useful to classify esophageal injuries caused

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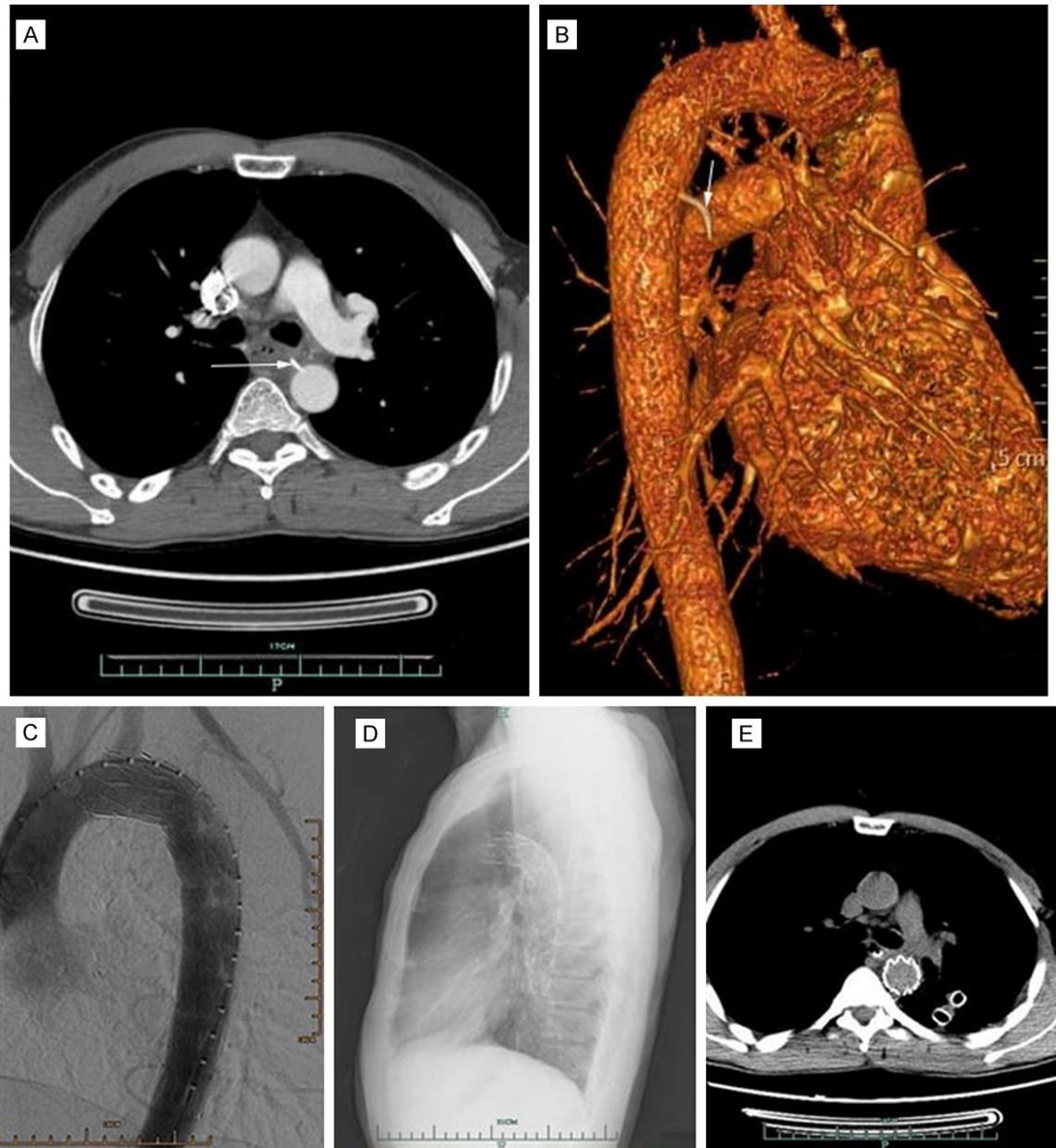


Figure 3. (Case 3), CTA (A) and MPR (B) preoperatively showed the sharp foreign body (arrow) piercing the aorta through the esophagus. Intraoperative completion angiogram showing complete coverage of traumatic aorta by the stent graft (C). Postoperative X-ray (D) and CT (E) showed satisfactory results and no signs of inflammation half a month later.

by FB ingestion; MDCT predicted the risk of an AEF and usefully guided treatment [2]. CT angiography (CTA), however, more sensitive in terms of the early diagnosis of AEF, and can reveal subtle details of lesions of the aorta and the relationship between such lesions and the FB. Intraoperative conventional angiography is the gold standard used to establish graft integrity and eliminate hemorrhage [17]. Endoscopy is

important for direct visualization of esophageal FBs, revealing damage inside the esophagus, and affords other therapeutic benefits. However, endoscopy cannot detect FBs that have pierced the esophagus and entered surrounding tissue [14]. Moreover, endoscopic examination may cause iatrogenic injury, as the FB may shift and penetrate the adjacent aortic wall [3].

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Table 1. AEF treated with the endovascular stent graft

First Author	Year	Gender/ Age (year)	Foreign body	Diagnostic interval (day)	Treatment	Outcome
Assink J [6]	2005	M/32	Fish bone	10	Endovascular stent graft/ Open surgery for repair of the esophageal defect	Uneventful 18 months
Zamora CA [20]	2005	F/71	Fish bone	10	Endovascular stent graft after intercostal thoracotomy of abscess draining	Uneventful 12 months
Metz R [21]	2006	M/31	Chicken bone	9	Endovascular stent graft/Esophagectomy	Uneventful 8 months
Kelly SL [15]	2009	M/59	Fish bone	6	Endovascular stent graft/Open surgery for the aortic repair	Uneventful 19 months
Hill SJ [22]	2010	F/9	Bolster of percutaneous endoscopic gastrostomy tube	3	Two aortic endovascular stent grafts/Open surgery for resection of esophagus	Uneventful 12 months
Chen AP [23]	2011	M/54	Fish bone	6	Endovascular stent graft only	Uneventful 2 months
Lai H [3]	2011	M/54	Fish bone	6	Twice unsuccessful aorta endovascular stent graft/Open surgery for the aortic repair and reconstruction of digestive tract	Uneventful 13 months
Chen X [24]	2012	M/22	Chicken bone	7	Endovascular stent graft/Thoracoscopic mediastinal debridement/Retrievable esophageal stent graft	Uneventful 6 months
Fang CC [25]	2012	F/79	Fish bone		Thoracic endovascular stent graft	Uneventful 12 months
Xi EP [13]	2013	M/25	Fish bone	39	Endovascular stent graft/Mediastinal debridement and irrigation with thoracotomy	Uneventful 12 months
Berna P [26]	2013	/63			Endovascular stent graft and thoracotomy	Uneventful 12 months
Kawamoto S [27]	2015		Press-through package		Endovascular stent graft only	Uneventful 104 months
Wei Y [2]	2015	M/31	Chicken bone	8	Endovascular stent graft and mediastinal drainage using video-assisted thoracoscopic surgery	Uneventful 3 months
		M/66	Teeth prosthesis	5		
		M/75	Fish bone	8		
Mezzetto L [9]	2016	M/79	Mutton bone	2	Endovascular stent graft	Uneventful 6 months
Liang H [1]	2016	M/64	Chicken bone	30	Endovascular stent graft	Uneventful 24 months
	2016	M/71	Fish bone	12	Endovascular stent graft and video-assisted thoracoscopic surgery	Uneventful 6 months

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Table 2. AEF treated with open surgery or no surgery

Author	Year	Gender/Age (year)	Foreign body	Diagnostic interval (day)	Treatment	Outcome
Jin T [28]	2005	M/49	Fish bone	7	Open surgery	Died after 6 days for a secondary rupture of the aorta
Hunt I [29]	2007	F/44	Razorblades	11	Open surgery	Died in the open surgery
Park DH [30]	2007	F/35	Fish bone	12	Open surgery	Unreported
Ahmed M [31]	2007	M/22	Chicken bone	9	No surgery	Died before diagnosis
Kunishige H [32]	2008	F/79	Fish bone	11	Open surgery	Uneventful 2 months
Hamilton JM [33]	2009	M/1.6 (19 months)	Button batteries	13	Open surgery	Died in the open surgery
Tighe D [34]	2009	F/14	Chicken bone	6	Open surgery	Unreported
Al-Saqri [35]	2010	M/42	Sharp bone	5	Open surgery	Died after surgery
Mortensen A [36]	2010	M/1.7 (14 months)	Button battery	10	No surgery	Died before diagnosis
Zhang X [14]	2011	32 cases (22M, 10F)/17-78	Fish bone (14 cases), chicken bone (7 cases), pork chop (5 cases), duck bone (4 cases), suture (1 case), sheet iron (1 case)		13 cases with nonsurgical measures, 19 cases with open surgery	13 cases with nonsurgical measures died of hemorrhage, 19 cases with open surgery and 3 survived for uneventful 12-48 months
Chen AP [23]	2011	F/57	Fish bone	6	Open surgery	Committed suicide after 12 months for unbearable of the fistulation
Lai H [3]	2011	F/54	Fish bone	7	Open surgery	Uneventful 42 months
	2011	M/62	Chicken bone	5	Open surgery	Uneventful 46 months
	2011	F/57	Duck bone	8	Open surgery	Uneventful 20 months
Pae SJ [37]	2012	F/4	Battery		Open surgery	Died in the open surgery
Venara A [38]	2012	F/70	Rabbit bone	15	Open surgery	Uneventful 60 months
Xi EP [13]	2013	M/17	Chicken bone	7	Open surgery	Died during operation
		M/35	Chicken bone	1	Open surgery	Died after operation
		M/20	Fish bone	3	No surgery	Died
		M/20	Chicken bone	9	Open surgery	Uneventful 2 months
Kubota S [39]	2013	3 patients	Fish bone			
Wei Y [2]	2015	M/74	Fish bone	7	Open surgery	Died after the open surgery
		M/70	Chicken bone	4		
		F/78	Fish bone	13		
Liang H [40]	2016	F/41	Chicken bone	8	Open surgery	Uneventful 48 months
Clarke NS [41]	2016	F/6	Foreign body		Open surgery	Uneventful 5 months

Table 3. Cases with the arterio-esophageal fistula due to an esophageal foreign body

First Author	Year	Gender/Age (year)	Foreign body	Diagnostic interval (day)	Treatment	Outcome
Peonim V [43]	2010	F/42	Chicken bone		Open surgery	Died
Stringari C [7]	2013	M/45	Fish bone	14	Endovascular stent graft and a thoracotomy for mediastinal drainage	Uneventful 6 months
Floré B [44]	2014	M/45	Chicken bone	35	Endovascular stent graft	Uneventful 70 months
Berry AC [45]	2014	F/20	Pork bone	14	Open surgery	Survived surgery with unmentioned follow-up
Lee YJ [46]	2015	M/50	Fish bone	28	Endovascular stent graft and a video-assisted thoracic surgery	Survived surgery with unmentioned follow-up
Lin CS [47]	2016	M/62	Paper star	30	Endovascular stent graft and a thoracotomy for esophageal surgery and mediastinal drainage	Uneventful 1 month

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To date, no consensus treatment for AEFs caused by esophageal FBs has emerged. Several management protocols have been described, which include open surgery (excision of the damaged aorta combined with in-situ aortic repair or aortic replacement, repair of the esophageal defect, and mediastinal debridement or drainage), immediate control measures (percutaneous embolization, use of Sengstake-Blakemore tubes, placement of covered esophageal stents, endovascular stent graft), and various combinations of these techniques [18]. Despite advances in surgical techniques, conventional open surgical treatment of an AEF is often associated with uncontrollable bleeding and contamination, the operative and perioperative mortality rates are high [19].

With the rapid development of new endovascular techniques, endovascular aortic stent grafts have been shown to afford significant advantages compared with traditional open surgery when treating aortic fistulae [13]. The first emergency endovascular repair of an AEF caused by a FB was reported by Assink in 2005 [6], and since then the successful cases reported had increased.

With literature review, we found 77 cases with AEF since 2005 (**Tables 1** and **2**). Among them 18 (23.4%) had used the technique of the endovascular stent graft as one of the staged procedures or a definitive treatment, all patients survived the surgery, with follow-up time from 2 months to 8 years after the procedure; 38 (49.4%) had underwent open surgery, only 12 survived with follow-up times from 2 months to 5 years; 16 (20.8%) died when nonsurgical measures were applied; and specific details were lacking for 3 patients. So conservative therapy was catastrophic, and all led to death [3, 14]. The endovascular stent graft had a lower mortality rate than open surgery, and in selected patients, endovascular stent repair could serve as a definitive treatment for an AEF [27, 42]. The endovascular stent repair alone had the risk of fistula recurrence or stent graft infection; in the future, endovascular stent grafts made of infection-resistant material may become the sole treatment for an AEF [15].

An arterio-esophageal fistula due to an esophageal foreign body is another rarely happened but usually life-threatening entity (**Table 3**), which is usually associated with the left

subclavian artery, and rarely associated with innominate artery right common [45], right common carotid arterio-esophageal fistula [48], left lingual artery esophageal fistula [49], and the right subclavian artery [46].

The clinical presentation of an arterio-esophageal fistula resembles that of an AEF, as Chiari triad of symptoms, and the history of foreign body ingestion. Aortography is used for diagnosis when an arterio-esophageal fistula is strongly suspected, but the use of aortography depends on local expertise. CTA can clarify the fact of vascular injury and with contrast extravasation from the artery into the esophagus can be highly suggestive in offering a rapid and definite method for diagnosing a fistula, showing esophageal perforation, a foreign body, a mediastinal abscess [47].

Before the development of adequate endovascular treatment, an arterio-esophageal fistula required extensive surgery with thoracotomy, aortic graft placement, esophageal surgery and mediastinal drainage. Especially in an infected environment, there was a very high mortality and morbidity due to adhesions and indolent sepsis [44].

Most surviving arterio-esophageal fistula cases found in more recent literature were treated with a minimally invasive endovascular stent graft as a bridge to more definitive treatment or a single-stage treatment [44, 46, 47].

Penetrating aorto-esophageal injury is an even rare complication of esophageal FBs. With the literature review (**Table 4**), we found four cases (including our case), which all complained of odynophagia and retrosternal pain, and only one patient complained of a single episode of hematemesis. CT and CTA can show details with the foreign body, the lesions of the aorta and the relationship between the lesions and the foreign body. Three cases alive were all managed with the combination of endoscopy and simultaneous endovascular stent graft of the aorta, and one case with delayed endovascular stent graft was died as a result. This entity is unique because there had been significant esophageal and aortic penetration injury due to migration and retention of a foreign body without any signs of inflammation or fistula formation [17]. We think timely diagnosis and aggressive treatment contribute to none symp-

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Table 4. Cases with penetrating aorto-esophageal injury due to an esophageal foreign body

First Author	Year	Gender/ Age (year)	Foreign body	Diagnostic interval (day)	Treatment	Outcome
Macchi V [50]	2008	M/48	Fish bone	9	Open surgery	Died
Hanif MZ [17]	2013	M/63	Chicken bone	50	Endovascular stent graft	Survived surgery with unmentioned follow-up
Ding X [11]	2015	M/55	Fish bone	5	Endovascular stent graft	Survived surgery with unmentioned follow-up
Case 3 (present study)	2016	M/46	Fish bone	2	Endovascular stent graft	Uneventful 23 months

tom of inflammation or fistula formation, and the therapeutic approach of endovascular stent graft is suitable, minimally invasive, and effective intervention in restoring the integrity of the aorta for patients with this complication.

To our knowledge, we report the first case of aortic intramural hematoma due to an esophageal foreign body. Aortic intramural hematoma is an acute aortic syndrome characterized by bleeding into the media of the aortic wall without intimal disruption or the classic flap formation [51]. It requires emergency diagnosis and treatment. The most common symptom of the hematoma is an acute chest pain. The condition is most commonly diagnosed under emergency conditions with CTA [52]. The initiating event leading to the formation of aortic intramural hematoma remains unknown, while hypertension and atherosclerosis play a major role in most patients. Our patient had no history of hypertension, cardiogenic disease, and atherosclerosis. The most probable event may be the trauma caused by the foreign body. The strategies for therapeutic management are not fully established because its natural history is variable and still poorly understood. In some cases there is partial or complete regression of the hematoma under medical treatment, but most progress to dissection, aneurysmal dilatation or aortic rupture [53]. As our patient needed to retrieve the foreign body next, and this operation may cause further damage to the aorta, we chose the therapeutic approach of endovascular stent graft and had good prognosis.

Our potential AEF case used the endovascular stent repair as the first and definitive treatment and had good result. The endovascular stent graft can be an aggressive procedure in selective patients. Before the endoscopic strategy, it is essential to take preventive measure to protect the aorta, which can avoid catastrophic complications. Cases had been reported with ingested esophageal foreign body,

which was endoscopically removed with no preventive measure, and the patients eventually led to an esophageal fistula and the aortic pseudoaneurysm [9, 15, 34]. The endovascular stent graft is not a durable treatment in the absence of continuous contamination. Long-term follow-up shows that if necrotic tissue and infected lesion can be removed, the endovascular stent graft can be used as a definitive treatment to treat an aortic fistula [1]. Yet the reasonability of this aggressive procedure needs extensive clinical and imaging follow-up and further prospective studies with larger numbers of patients.

However, there are limitations for this approach. First, the durability of this technique. The debate is always on endovascular stent graft as a bridging procedure or a definitive treatment in the literature. Authors who considered endovascular stent graft as a palliative treatment considered the endovascular stent repair alone leaves the esophageal defects untreated, and leads to formidable challenges as rupture of the AEF, persistent mediastinitis caused by esophageal perforation and endograft infection. The endovascular stent repair may be one of the strategies for the staged treatment of AEF for rapid control of bleeding and hemodynamic stabilization that concomitant esophageal resection and mediastinal debridement is performed, then aortic graft replacement and delayed esophageal reconstruction are performed, so far as the patient's physical condition permits [27, 39]. Because of lack of long-term data, adaptation of stent graft is doubted. Second, this technique cannot be popularized because of lack of expertise and availability of appropriate endoprosthesis. The stent must be placed with fistula coverage and without movement or endoleak. Lai et al reported one case experienced twice unsuccessful aorta endovascular stents and eventually had underwent open surgery for the aortic repair and reconstruction of digestive tract [3]. Venara et al reported one case could not use

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endovascular procedure because it presents no rather short endoprosthesis [38].

Conclusion

We emphasize on the timely diagnosis of retained esophageal foreign bodies, especially with dangerous vascular complications, which can minimize the morbidity and mortality. CT is a useful tool for earlier diagnosis of vascular complications caused by ingested esophageal foreign bodies. CTA is more sensitive for the early diagnosis, and can clearly show the lesions of the aorta and the relationship between the lesions and the foreign body. The treatment of esophageal foreign body with dangerous vascular complications should be in time and aggressive and needs to be highly individualized according to the extent of inflammation and injury. We suggest the endovascular stent-grafting technique should be used in patient with ingested esophageal foreign body with dangerous vascular complications.

Disclosure of conflict of interest

None.

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