

# ACQFJ\_1\_Plagiarism\_Check

## Sources Overview

7%

OVERALL SIMILARITY

|   |                                                                                                                                                       |     |
|---|-------------------------------------------------------------------------------------------------------------------------------------------------------|-----|
| 1 | www.wjgnet.com<br>INTERNET                                                                                                                            | 1%  |
| 2 | journals.lww.com<br>INTERNET                                                                                                                          | 1%  |
| 3 | repositories.cdlib.org<br>INTERNET                                                                                                                    | <1% |
| 4 | Xue-Qing Zhong, Guo-Xiong Li. "Successful management of life-threatening aortoesophageal fistula: A case report and review of the lit..."<br>CROSSREF | <1% |
| 5 | Daming Jiang, Yi Lu, Yigong Zhang, Zhanglong Hu, Haifeng Cheng. "Aortic penetration due to a fish bone: a case report", Journal of Car...<br>CROSSREF | <1% |
| 6 | shmabstracts.org<br>INTERNET                                                                                                                          | <1% |
| 7 | Jin-Wen Liao, Wen-Xiu Long, Wen-Li Shen. "PRIMARY AORTOESOPHAGEAL FISTULA DUE TO ESOPHAGEAL FOREIGN BODY: A CASE R..."<br>CROSSREF                    | <1% |
| 8 | Yu Qing Liu. "Radiology of Aortoarteritis", Radiologic Clinics of North America, 1985<br>CROSSREF                                                     | <1% |

### Excluded search repositories:

- None

### Excluded from document:

- Bibliography
- Quotes

### Excluded sources:

- None

### Excluded preprints

- None

1 Vascular Covered Stent and Video-Assisted Thoracoscopic Surgery for

2 <sup>7</sup> Aortoesophageal Fistula Caused by Esophageal Fishbone: A Case Report

3

4

#### **Abstract:**

**Background** Aorto-esophageal fistula (AEF) is a rare condition characterized by communication between the aorta and esophagus. AEF caused by an esophageal foreign body is even rarer, and there is currently no recommended standard treatment protocol. We report a case of delayed aortic rupture after the endoscopic removal of a fish bone, which was successfully treated with a combined approach of vascular stenting and thoracic surgery.

**Case presentation** A 33-year-old male presented to the hospital after experiencing chest discomfort for three days following the accidental ingestion of a fish bone. Under endoscopic guidance, the fish bone was successfully removed, and the patient was subsequently admitted for medical therapy. On the fourth postoperative day, the patient suddenly developed hematemesis and chest computed tomography angiography revealed the presence of an AEF. This necessitated urgent intervention, so thoracic surgery was performed and a vascular-covered stent was placed. Following the surgical procedure, the patient received active medical treatment, recovered well, and was successfully discharged from the hospital.

**Conclusions** In patients with esophageal perforation caused by foreign bodies, hospitalization is advised for observation, computed tomography angiography examination, early use of antibiotics, and careful assessment of aortic damage. Thoracic endovascular aortic repair and esophageal rupture repair may have benefits for treatment of AEF.

27 **2** **Keywords** Aorto-esophageal fistula, esophagus, foreign body, thoracic aortic  
28 injury, Endovascular treatment

29

30

### 31 **Background:**

32 It is very common for patients to seek medical attention from emergency  
33 departments for foreign esophageal bodies such as fish bones and their  
34 associated complications.<sup>[1]</sup> Most esophageal foreign bodies can pass through the  
35 digestive tract spontaneously, whereas certain objects can be successfully  
36 removed using techniques such as flexible or rigid endoscopy.<sup>[2]</sup> However, the  
37 occurrence of AEF due to esophageal foreign bodies is extremely rare,<sup>[3]</sup> and its  
38 management poses significant challenges. Currently, there are no unified  
39 principles or guidelines for handling such cases, and the prognosis of patients with  
40 AEF is generally poor. Thoracic endovascular aortic repair (TEVAR) is considered  
41 an effective method for controlling bleeding in patients with AEF. However,  
42 patients who undergo TEVAR alone historically have a higher risk of postoperative  
43 rebleeding and mediastinitis, and a poor long-term prognosis.<sup>[4]</sup> **1** Here, we present  
44 our successful experience managing a patient with delayed aortic rupture and AEF  
45 by combining TEVAR with a multidisciplinary treatment approach.

### 46 **3** **Case Presentation**

47 A 33-year-old male presented to the emergency department of our hospital  
48 on September 23, 2021, complaining of poststernal pain that had persisted for

49 three days after the ingestion of a fish bone. The patient presented with a fever,  
50 with a maximum temperature of 37.6°C, and exhibited no dysphagia,  
51 hematemesis, hematochezia, melena, or other symptoms.

52 <sup>1</sup>A routine blood analysis showed a white blood cell (WBC) count of  
53  $13.57 \times 10^9 / L$ . Emergency chest computed tomography angiography showed  
54 an oblique, strip-like, slightly high-density shadow in the middle segment of the  
55 esophagus (about the level of the thoracic 5-6 vertebrae), with a length of  
56 approximately 2.8 cm. Both ends of the foreign body had broken through the  
57 esophageal wall, with the front end reaching below the tracheal carina, about 0.5  
58 cm from the right main pulmonary artery, and the back end about 0.1-0.2 cm  
59 from the thoracic aorta wall. There were multiple small air bubbles around the  
60 local esophagus, and no definite signs of contrast agent leakage were observed.  
61 This suggested foreign body perforation, with the back end close to the thoracic  
62 aorta (**Fig. 1**).

63 The patient underwent endoscopic extraction of the esophageal foreign body  
64 and insertion of a gastric tube under general anesthesia on September 24, 2021,  
65 at dawn. The linear foreign body was found deeply embedded in the esophageal  
66 wall 30 cm from the incisors, with deep ulcers formed on the right anterior and  
67 left posterior walls of the esophagus. The bottom of the ulcers were not detectable,  
68 and the foreign body was easily removed using forceps (**Fig. 2**). Postoperatively,  
69 the patient was hospitalized for observation and symptomatic treatment. On  
70 September 29, 2021, at 01:20, the patient suddenly vomited approximately 1000

71 ml of bloody fluid with blood clots; his blood pressure dropped significantly, and  
72 tracheal intubation, fluid resuscitation, blood transfusion, and other measures to  
73 stabilize vital signs were immediately administered. An emergency chest CT  
74 contrast scan indicated esophageal perforation and partial rupture of the adjacent  
75 thoracic aorta. After relevant examinations confirmed that the patient had an  
76 esophageal-aortic fistula with massive hemorrhage, experts from multiple  
77 disciplines, including thoracic surgery, cardiac surgery, gastroenterology, and  
78 anesthesiology, collaborated closely to heal the patient. First, the cardiac surgeon  
79 performed endovascular repair of the aorta using a minimally invasive  
80 interventional technique. During the operation, a vascular stent-graft (HT2020-  
81 080-1500, Microport™) was placed in the lower segment of the descending aorta,  
82 and another vascular stent-graft (ETEW2424C82EE, Medtronic™) was placed in  
83 the upper segment of the descending aorta. After releasing the stent, no  
84 opacification of the aortic prominence or contrast extravasation was observed.

85 Subsequently, mediastinal abscess removal and esophageal rupture repair via  
86 the right thoracic under VATS was performed using video-assisted thoracoscopic  
87 surgery. During surgery, a small amount of pale yellow pleural fluid was observed  
88 in the thorax, and a large number of blood clots were observed in the gap  
89 between the esophagus and aorta at the level of the carina, with a severe  
90 inflammatory response and dense adhesion of the surrounding soft tissues. A 1.5  
91 cm break was observed on the posterior wall of the esophagus, with the  
92 esophageal mucosa exposed. The adventitia of the anterior wall of the aorta

93 adjacent to the esophageal break was absent, and was suspected to be an aortic  
94 break. The esophageal rupture was sutured layer-by-layer with a 3-0 absorbable  
95 thread, and the azygos vein and connective tissue were sutured to the spaces  
96 around the esophagus and aorta to protect the aorta.

97 After surgery, the patient was administered anti-infection treatment  
98 (intravenous injection of piperacillin sodium tazobactam sodium for 3 weeks),  
99 jejunofeeding, and nasogastric decompression for 3 weeks, and was closely  
100 monitored for any recurrence of bleeding and fever. During this period,  
101 gastroscopy did not reveal any new bleeding at the site of the esophageal break  
102 (**Fig. 3**). Chest CT angiography (CTA) showed that the swelling at the esophageal  
103 break site had significantly improved (**Fig. 4**).

104 The patient began a liquid diet on postoperative day 12 and was discharged on  
105 day 29. <sup>1</sup> The patient was confirmed symptom-free and alive at a one year follow-  
106 up after discharge.

## 107 Discussion and Conclusions

108 AEF refers to <sup>2</sup> communication between the aorta and esophagus caused by  
109 esophageal or aortic lesions, which are common in aortic-related diseases. <sup>5</sup> AEF  
110 caused by an esophageal foreign body is very rare.<sup>[6]</sup> Due to differences in  
111 dietary structure and customs, esophageal foreign bodies in adults can vary  
112 from fish bones, pig bones, chicken bones or dentures.<sup>[7]</sup> The unique structure of  
113 fish bones makes them easy to pierce the surrounding structures of the  
114 esophagus and cause AEF. The typical symptoms of AEF are the Chiari triad,

115 including chest pain, hematemesis, and subsequent massive upper  
116 gastrointestinal bleeding.<sup>[8]</sup> If a thrombus forms in the fistula, it may temporarily  
117 stop bleeding; however, persistent inflammation, fragile granulation tissue, and  
118 high pressure in the aorta interfere with the healing process.<sup>[9]</sup> At this time,  
119 performing esophagoscopy may cause unstable thrombus detachment and  
120 catastrophic bleeding.<sup>[10]</sup> When a patient has a clear history and typical  
121 manifestations, CTA is the preferred method of treatment.<sup>[11]</sup> After CTA showed  
122 the aorta was not damaged, the foreign body was removed under general  
123 anesthesia. Although severe esophageal rupture was found on endoscopy, there  
124 were no symptoms such as bleeding; therefore, the patient only received  
125 treatment of fasting, gastrointestinal decompression, and anti-infection  
126 treatment. Under such circumstances, the patient developed a delayed AEF  
127 during hospitalization, which is rare.<sup>[12]</sup>

128 The treatment of AEF is challenging. Successful treatment was first  
129 documented in 1980, 160 years after the first reported case of AEF.<sup>[13]</sup> No  
130 standard treatment protocol for AEF has been established yet. Current treatment  
131 methods primarily include antibiotics and acid suppression, which have poor  
132 efficacy and high mortality rate.<sup>[14]</sup> Aortic replacement and TEVAR may be  
133 effective for AEF; however, the optimal treatment process remains controversial.  
134 Some studies have shown that patients who undergo TEVAR or aortic  
135 replacement alone may have a poor long-term prognosis due to complications

136 such as infection, local inflammatory reactions, necrosis, and recurrent  
137 bleeding.<sup>[15]</sup>

138 The prognosis of patients who have undergone esophageal reconstruction  
139 surgery is better than that of patients with esophageal stents.<sup>[16]</sup> However, there  
140 are still recent reports of good prognoses in patients with esophageal stents  
141 placed after TEVAR.<sup>[17]</sup> Today, whether TEVAR is considered a complete aortic  
142 replacement remains controversial, and it is unclear whether and when thoracic  
143 surgery is required.<sup>[5]</sup> Current studies are often based on retrospective analyses  
144 and case reports, which may be limitations. Due to the rarity of the disease,  
145 there are no multicenter, large-sample studies comparing the prognosis of  
146 patients following different treatment methods, which could be improved upon  
147 in the future.

148 <sup>5</sup> AEF caused by an esophageal foreign body is essentially an infection in which  
149 the sterile mediastinum and aorta are contaminated by substances from the  
150 gastrointestinal tract.<sup>[18]</sup> The surrounding inflammation induces weakening and  
151 fragility of the aortic wall, which in this case may have caused the delayed AEF.  
152 Several days after eating fish bones, the patient presented with fever and  
153 elevated white blood cell count, at which point the inflammation had  
154 advanced,<sup>[19]</sup> but CTA did not show significant damage or rupture of the aorta.  
155 Although the formation of ulcers were observed after the fish bone was  
156 removed under endoscopy, neither endoscopic treatment nor thoracoscopic  
157 exploration was performed. Once foreign bodies in the esophagus cause local

158 abscesses and mediastinitis, conservative treatment alone (antibiotics, placement  
159 of gastric tubes, etc.) may not prevent the infection from invading the aortic wall,  
160 and may result in delayed aortic rupture. The only effective method to prevent  
161 delayed AEF may be performing thoracoscopic exploration to remove the  
162 abscess, repair or excise the perforated esophagus, and strengthen the  
163 esophagus and aorta with tissue fascia immediately after esophageal ulcer  
164 formation was found.<sup>[20]</sup> After the onset of delayed AEF, active thoracoscopic  
165 esophageal surgery and clearance of the thoracic abscess may have been  
166 necessary.

167       Although the patient survived the AEF, there were some limitations to this case.  
168 Due to the rapid AEF process, we did not have enough time to develop a well-  
169 prepared plan. It may be dangerous to perform TEVAR, considering the possibility  
170 of infection invasion, and that aortic replacement is not performed at a later stage.  
171 Studies have shown that infected fistulas of the aorta may lead to infection of the  
172 coated stent and cause serious complications. A variety of broad-spectrum  
173 antibiotics should be used in the early stages of the disease to improve survival  
174 rates.<sup>[18]</sup> Therefore, the progression of infection after early emergency hemostasis  
175 should be closely evaluated, and aortic replacement surgery should be actively  
176 performed when necessary to prevent stent infection and other serious  
177 consequences.

178       In conclusion, patients with suspected AEF resulting from an esophageal  
179 foreign body should be hospitalized for observation, undergo CTA examination,

180 and be given early antibiotics and prompt assessment of the involvement of the  
181 mediastinum and aorta. Once AEF occurs, emergency TEVAR combined with  
182 thoracoscopic surgery can rapidly control its progression.