Double esophageal perforation by ingested foreign body: Endoscopic and surgical approach. A case report.

I. Ugenti, R. Digennaro, G. Martines*, O. Caputi Lambreghi

Department of Emergency and Organ Trasplantation, University of Bari, Italy

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ABSTRACT

INTRODUCTION: Esophageal perforation in adults is most frequently caused by ingested foreign bodies. They can migrate through the esophageal wall, damaging the nearby organs such as the aorta or the trachea, with fatal outcome. After the diagnosis, the viable treatments for extracting the foreign body and repairing the perforation are several. The appropriate treatment, may be endoscopic, surgical or combined, depending on the level of the perforation, on the co-morbidities of the patient and on the available resources.

PRESENTATION OF CASE: This paper describes a case of a 68 years old patient with a double EP caused by a meat-bone that perforated the thoracic esophageal wall, approaching the aorta on the left side and the azygos vein on the right side.

DISCUSSION: Because of the double transfixion and the position near the aorta and the azygos, it was not possible to remove safely the bone during the endoscopy. The management required a combined endoscopic and surgical approach. This way it was possible to detect easily the location of the perforation, to remove safely the foreign body, to repair the perforation both from the outside and from the inside, and to place the nasogastric tube under direct vision.

CONCLUSION: Even when the type of esophageal perforation requires surgical treatment, the simultaneous use of endoscopy proved to be an advantage in order to extract the foreign body safely, to perform a double repair of the perforation and to place the nasogastric tube under direct vision.

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1. Introduction

Esophageal perforation (EP) is a rare and potentially life-threatening event with an 20% survival rate [1]. The first mention of esophageal perforation was made by Hermann Boerhaave in 1724, who reported a spontaneous rupture after repeated vomiting in post-mortem evidence in the Grand Admiral of the Dutch fleet [2]. Two hundred years later, in 1947, Barrett and Olson made the first attempts at surgical repair of a EP [3–4]. Since then, various approaches have been discussed, but its treatment is still challenging as there is still no agreed management algorithm.

Esophageal perforation can happen due to a number of different causes. It may be iatrogenic (most frequently), spontaneous or caused by trauma, tumors or foreign bodies. Ingested foreign bodies are responsible for 80% of cervical perforations1 and for 9–35% of all esophageal perforations [5]. In adult patients, the foreign bodies most commonly involved are dental prostheses and meat or fish bones. Usually, the foreign body hits the esophageal wall at the level of the narrow portion of the esophagus. Prolonged contact can lead to extraluminal migration of the foreign body which can perforate nearby organs, such as the trachea or the aorta, often with fatal consequences [6] or it can cause infection which spreads easily as the esophagus is surrounded by loose stromal connective tissue.

Making a diagnosis of thoracic EP is difficult because the symptoms may simulate other disorders, like myocardial infarction, aortic dissection, spontaneous pneumothorax or pulmonary disease. The most common early symptoms and signs are: vomiting (84%), thoracic pain (79%), dyspnea (53%), epigastric pain (47%) and dysphagia (21%). This atypical clinical presentation explains why, in 60% of cases, diagnosis takes longer than 24 h [7].

Usually diagnosis requires radiologic and endoscopic examination. Conventional radiology and contrast radiology can show pneumothorax, pneumoperitoneum, pneumomediastinum, subcutaneous emphysema and occasionally may also highlight a foreign body. A CT scan can help confirm the diagnosis. For the detection of EP, the sensitivity of the endoscopy is nearly 100%, and its specificity is 83%, but it is not always recommended because the air insufflation can cause enlarge the perforation [8]. Nevertheless, endoscopy is the only exam that can be diagnostic and therapeutic at the same time, enabling the extraction of the foreign body.

Once the foreign body has been indentified, there are several possible therapeutic strategies for its extraction, ranging from endoscopy to surgery including traditional thoracotomy and video-

* Corresponding author at: Department of Emergency and Organ Trasplantation, University of Bari, Piazza G. Cesare, 11 70124 Bari, Italy.
E-mail address: gerrymartines@virgilio.it (G. Martines).

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assisted thoracoscopic surgery (VATS) [9], and for the repair of the perforation (endoprosthesis, endoscopic clipping or gluing, surgical suture and/or reinforcement flaps, drainage, esophagectomy). The choice of an appropriate treatment depends on the type of perforation, the performance status of the patient and the availability of resources.

1.1. Presentation of the case study

A 68-year-old female, with no co-morbidity except for arterial hypertension, was admitted to the general surgery department after observation in the emergency room, with a diagnosis of an ingested foreign body.

She was voluntarily discharged from another hospital, where she underwent chest and abdominal computed tomography and esophageal endoscopy. She was complaining of a persistent sore throat and dysphagia for 7 days, but she did not link symptoms to anything she had eaten. The physical examination showed only fever, and inflammatory findings of blood exams: WBC 14,090/mm³.

The CT scan revealed a 4 cm linear shadow suggestive of bone in the middle part of the thoracic esophagus, passing through the whole lateral wall, approaching the aorta on the left side and the azygos vein on the right. Furthermore, a contrast medium extravasation was visible on the left side (Fig. 1).

An esophageal endoscopy confirmed the presence and the position of the foreign body (Fig. 2).

Because of its double transfixion and position next to the aorta and the azygos, it was not possible to safely remove the bone during endoscopy.

After a consultation between the general surgeons of the department (where endoscopy is available) and the throat and heart surgeons, we decided for a double approach, endoscopic and surgical intervention.

A right thoracotomy at the fifth intercostal area was performed. An esophageal endoscopy was started immediately. Under endoscopic control, the esophagus and the azygos vein were easily isolated at the level of the ingested body, which was subsequently extracted.

The extraction of the bone (Fig. 3) left two fissures on the esophageal wall. The right edge of the perforation was repaired by suture in a single layer, a reinforcement flap using intercostal mus-cle, and it was then covered with fibrin glue (Tiseel®). In addition, an endoscopic clipping of the mucosa was performed (Fig. 4). The contralateral fissure was intentionally left open with the purpose of draining and enabling secondary closing. After cleaning the pleural cavity with betadine solution, the operation was completed by inserting 2 drains: one on the left side (near the suture line) and one on the right (near the fissure). A nasogastric tube was also placed, guided by the endoscopy, near the suture line. The three drains and the endoluminal tube were sealed under water.

The patient remained fasting and was treated with TPN (total parenteral nutrition) and with antibiotics. After the negative results in radiology on the 15th day in hospital, the drains were removed. A week later, the patient had a persistent temperature and was
submitted for a CT scan which showed left pleural effusion. Subsequently, a new pleural drain was positioned. The results of an esophogram ten days later showed no leak. Oral ingestion was resumed and the pleural drain was removed.

2. Discussion

Perforations of the intrathoracic esophagus by foreign body ingestion could cause mediastinum infections, resulting in multi-organ failure and sepsis. The clinical outcome is poor, often burdened by several serious complications. Various treatment options, including surgical and nonsurgical management, could be advocated.

Therapeutic strategies depend on the cause of the perforation, the timing of intervention after the perforation, and the patient’s co-morbidities [10]. Whatever the treatment, the aim remains to prevent any further contamination with the perforation, to cure the infection, with debridement and drainage, to remove the obstruction, to close the perforation and to establish nutritional support [11].

In our case we decided a combined endoscopic and surgical approach was most suitable, due to the foreign body’s positioning. A crucial factor in this decision was the proximity of the major vessels, the aorta and the aygos vein, which meant a high risk of injury during the endoscopic maneuver.

The choice of a combined endoscopic and surgical approach granted several advantages. During the surgical procedure, the esophageal endoscopy allowed for an easy isolation of the perforation and a guided extraction of the bone, avoiding the risk of moving it towards the aorta. Furthermore, it allowed the surgeons to perform a double repair with a reinforced suture using a muscle flap along with a glue injection from the outside, and endoscopic clipping of the mucosal perforation from the inside. Finally, under endoscopic guide, a nasogastric tube was placed at the level of the damaged area. In the present case, the repeated indwelling drainage helped us to control the infection.

3. Conclusion

The present report demonstrates that endoscopy, even when surgery is mandatory, can support surgery with many advantages:

- Easy isolation of the perforation, double repair with external suture and clipping of the mucosa and video-assisted positioning of the nasogastric tube at the level of the damaged area.

Conflict of interest

No conflict of interest.

Funding

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Ethical approval

Case reports do not usually qualify as “research” requiring approval from ethics boards designed to protect humans involved in clinical research.

Consent

Written informed consent was obtained from the patient for publication of this case report and accompanying images. A copy of the written consent is available for review by the Editor-in-Chief of this journal on request.

Author contribution

Ugenti Ippazio: case report design.
Digennaro Rosa: writing the paper.
Martines Gennaro data collection and writing paper.
Caputi lambrenghi Onofrio: Supervisor.

Guarantor

Martines Gennaro and Ugenti Ippazio.

References

[1] C.J. Brinster, S. Singhal, L. Lee, M.B. Marshall, L.R. Kaiser, J.C. Kucharzuk, Evolving options in the management of esophageal perforation, Ann. Thorac. Surg. 77 (4) (2004) 1475–1483.
[2] V.J. Derbes, R.E. Mitchell Jr., Hermann Boerhaave’s Atroctis, nec descripti prius, morbi historia, the first translation of the classic case report of rupture of the esophagus, with annotations, Bull. Med. Libr. Assoc. 43 (2) (1955) 217–240.
[3] N.R. Barrett, R.H. Franklin, Concerning the unfavourable late results of certain operations performed in the treatment of cardiopuis, Br. J. Surg. 37 (146) (2015) 194–202.
[4] A. Olson, O.T. Clagett, Spontaneous rupture of the esophagus. Report of a case with immediate diagnosis and successful surgical repair, Postgrad. Med. 2 (1947) 417–419.
[5] M. Chirica, A. Champault, X. Dray, L. Sulpice, N. Munoz-Bongrand, E. Sarfati, P. Cattan, Esophageal perforations, J.Visc. Surg. 147 (June 3) (2010) e117–e128, http://dx.doi.org/10.1016/j.viscsurg.2010.08.003. Epub 2010 Sep 15.
[6] A. Champault, P. Cattan, Aortic rupture due to a swallowed medical needle, J. Chir. (Paris) 146 (4) (2009) 442–443.
[7] E.A. Griffiths, N. Yap, J. Poulter, M.T. Hendrickse, M. Khurshid, Thirty-four cases of esophageal perforation: the experience of a district general hospital in the UK, Dis. Esophagus 22 (7) (2009) 616–625.
[8] H. Horwitz, B. Krevsky, R.F. Buckman Jr., R.S. Fisher, M.A. Dabezies, Endoscopic management of penetrating esophageal injuries, Am. J. Gastroenterol. 88 (8) (1993) 1249–1253.
[9] Y. Wei, L. Chen, Y. Wang, D. Yu, J. Peng, J. Xu, Proposed management protocol for ingested esophageal foreign body and aortoesophageal fistula: a single-center experience, Int. J. Clin. Exp. Med. 8 (January 1)(2015) 607–615.
[10] A. Udelnow, M. Huber-Lang, M. Juchems, K. Trager, D. Henne-Bruns, P. Wurl, How to treat esophageal perforations when determinants and predictors of mortality are considered, World J. Surg. 33 (4) (2009) 787–796.
[11] S.C. Schmidt, S. Strauch, T. Rosch, et al., Management of esophageal perforations, Surg. Endosc. 24 (11) (2010) 2809–2813.