

Case
Report

Inadvertently Swallowed Needle Pierced the Pulmonary Artery in an Adult

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Background: Esophageal foreign body (FB) is usually seen in children, prisoners, or patients with psychiatric disorders, most of which can be removed with endoscope.

Case Presentation: We herein report a mentally normal adult inadvertently swallowing a needle, which pierced through the esophagus into the adventitia of pulmonary artery. Computed tomography angiography confirmed its specific location, and urgently, surgical removal was performed after the endoscopic attempt. The patient recovered well and was discharged without any complication of the esophageal perforation.

Conclusion: Surgical treatment should be carried out aggressively if the esophageal FB is out of reach for endoscopic removal or if complications cannot be resolved endoscopically.

Keywords: esophageal foreign body, perforation, pulmonary artery

Introduction

Esophageal foreign body (FB) is observed usually in unintentional ingestion of children, intentional ingestion of prisoners, or patients with psychiatric disorders. The common FBs include coins, button batteries, and sharp objects like fish bones. Most ingested FBs can pass spontaneously, but the delayed may compress the esophageal wall and further cause life-threatening esophageal perforations, among which the intrathoracic

perforation has the highest mortality rate of 18%.¹⁾ Approximately 10%–20% of esophageal FBs require endoscopic removal, while less than 1% require surgery or to treat the complications.²⁾ Herein, we report a long needle inadvertently swallowed by an adult in a normal mental state, which pierced through the esophagus into the adventitia of pulmonary artery and was urgently removed by surgery.

Case Presentation

A 70-year-old male suffered suddenly from violent chest pain when he was eating fried noodles; meanwhile, a long thread was found stuck between his teeth. His wife immediately realized that he swallowed her sewing needle, which might be dropped accidentally when she made the meal. The patient was timely sent to the local hospital, where the esophageal computed tomography (CT) revealed that a long needle stuck obliquely in his esophagus indeed (**Fig. 1**). Ten hours after he swallowed the needle, he was transferred to the emergency department of our institution for further diagnosis and treatment. The otolaryngologist tried to remove the needle through the laryngoscope but failed. Then, thoracic and abdominal CT angiography was performed to clarify

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Received: July 19, 2021; Accepted: July 29, 2021

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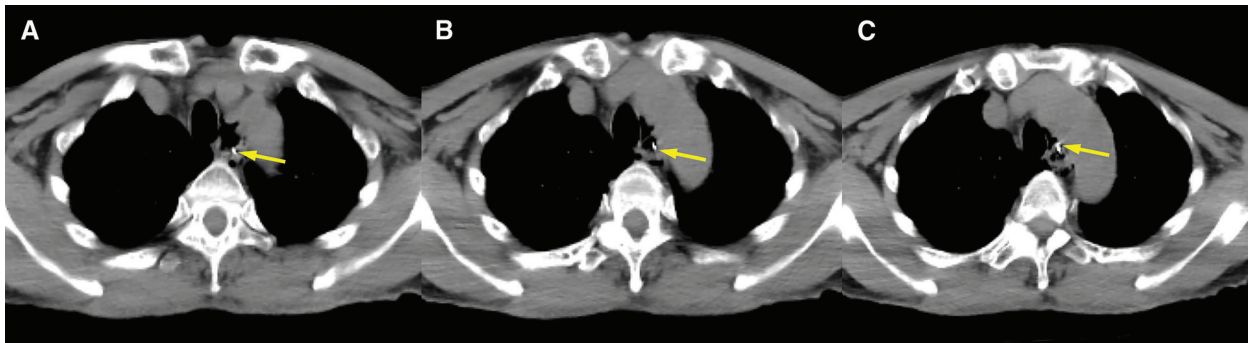


Fig. 1 CT images in the local hospital showing the needle stuck in the dilated esophagus, meanwhile contributing to mild mediastinal emphysema. (A) The needle tail (arrow) penetrated the esophageal wall toward a left posterior direction, (B) the body of the needle (arrow) was still located in the esophagus, and (C) the needle tip (arrow) pierced through the esophageal anterior wall, causing localized edema of esophageal wall.

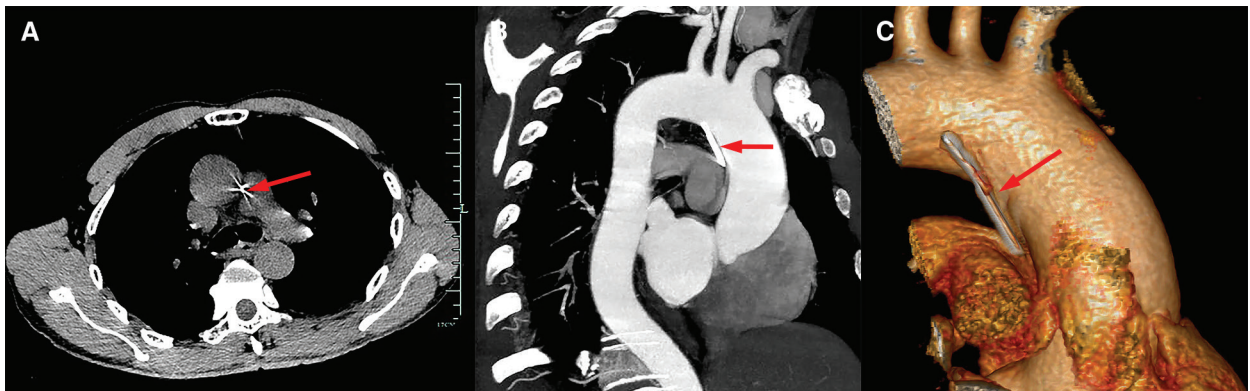


Fig. 2 (A) The needle (arrow) is presented as a starlight-like spot of high density in the CT image (B) and the three-dimensional reconstruction (C) shows a needle (arrow) obliquely penetrating through the esophagus into the adhesion area between the ascending aorta and the pulmonary artery, adjacent to the aortic arch.

the location of the needle. It showed that the whole needle entirely penetrated through the esophagus and was located at the adhesion area between the ascending aorta and the pulmonary artery, tightly close to the aortic arch (**Fig. 2**). After the multidisciplinary team discussion, including gastrointestinal physician, cardiothoracic surgeon, and anesthesiologist, emergency surgery was carried out.

The surgery was performed via a median sternotomy after the thread in the oral cavity was fixed with tapes. When the adhesion between the aortic arch and the pulmonary artery was separated about 3 cm longitudinally, the needle was found with the tip piercing into the adventitia of pulmonary artery (**Fig. 3A**). There was local arterial wall edema but no arterial trauma or hematoma. Subsequently, the needle was taken out carefully from the pulmonary arterial adventitia. The thread connected with the needle tail was cut off and the rest part was pulled out via the oral cavity, ensuring nothing residual.

The needle measured about 5 cm in length and 0.1 cm in width (**Fig. 3B**). The operative field was repeatedly flushed with dilute iodophor and saline, and the thoracic incision was closed in layers after rigorous hemostasis. The whole operation time was 85 minutes, and the patient stayed in the intensive care unit for 2 days. He had an uneventful recovery and was discharged 13 days after the surgery.

Discussion

When facing with esophageal FBs, CT is supposed to be regarded as the first choice, especially for those patients who are suspected of perforation or combination with the complications requiring surgical treatment, because the CT can not only clarify the characteristics of the FB (such as its shape, size, and location) but also detect other complications such as aortic/tracheal fistulas.³⁾

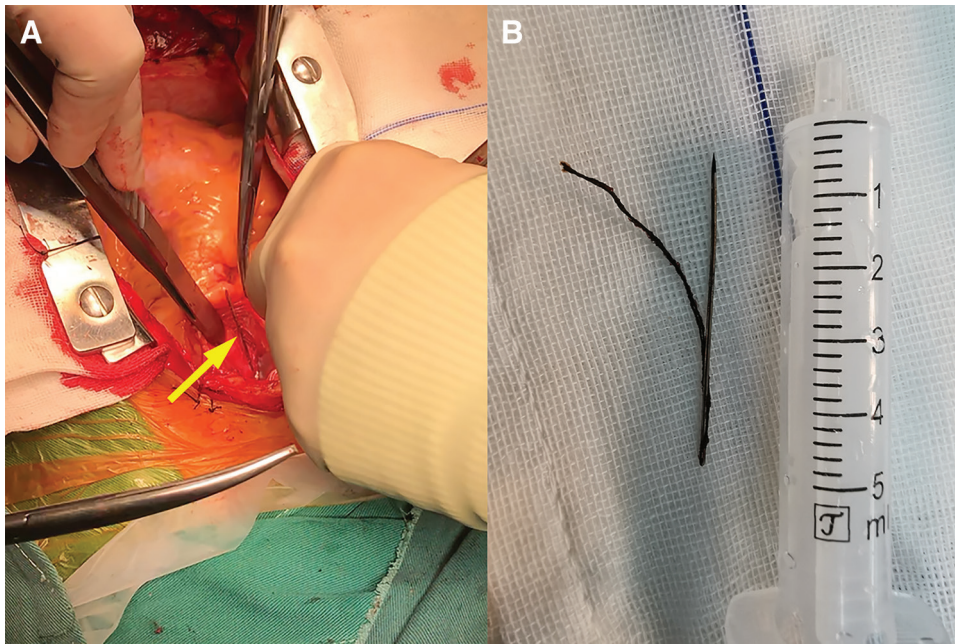


Fig. 3 (A) shows that the needle (arrow) was found intraoperatively with tail up and tip down, and the tip pierced into the adventitia of pulmonary artery. (B) shows that the needle was approximately 5 cm in length, with scattered iron rust spots.

Urgent (within 24 hours) endoscopic intervention is recommended if the FB does not cause complete esophageal obstruction. As for sharp-pointed objects, like needles in this case, the endoscopic intervention should be carried out preferably within 2 hours.³⁾ However, surgical treatment is preferred if it is out of reach for endoscopic removal or if complications cannot be resolved endoscopically.

In this case, the needle, delaying in the body for more than 10 hours, entirely penetrated the esophagus with a part of thread and pierced into the pulmonary artery in an acute angle, tightly adjacent to the ascending aorta and aortic arch. Thus, it was likely to pierce into the pulmonary artery deeper or pierce into the ascending aorta during the process of pulling out the residual thread with a gastrointestinal endoscope in a non-direct vision of the needle. Additionally, given that the high risk of complications (e.g. severe mediastinitis) of endoscopic removal, the urgent surgery seemed to be a better choice in such a complex situation.

Surgical approaches are affected by the location of FB and complications. Jiang et al.⁴⁾ reported a case of a fishbone penetrating the esophagus wall 30 cm from the incisor into the descending aorta, so they placed the patient in a right lateral position and performed a left posterolateral thoracotomy through the fifth intercostal space to gain access to repair the esophagus and aorta. Similarly, Zeng et al.⁵⁾ applied a right anterior-lateral

thoracotomy via the fifth intercostal space yet to execute lesion removal and mediastinal debridement after thoracic endovascular aortic repair. Conventionally, a left thoracotomy would be performed, but in this case, it is likely to fail to remove the needle and may even cause heavy bleeding for its uncommon location—piercing into the pulmonary artery, meanwhile adjacent to the ascending aorta and aortic arch. The patient was extremely lucky that the sharp needle only pierced into the adventitia of pulmonary artery but didn't penetrate into the aorta or pulmonary artery with needle sliding and esophageal peristalsis. To a certain extent, it benefited from the fact that the patient bit the end of the thread in time after discovering the abnormality, which restricted its further movement and further damage. Thanks to the timely operation, the needle was removed in a short time and the perforation was very small, which would be generally self-healing via gastrointestinal tract nutritional support and reasonable antibiotic treatment. Additionally, primary esophageal repair was not recommended in this condition due to inducing esophageal stricture.

Conclusion

In conclusion, this case illustrated an uncommon and extremely thrilling situation of esophageal FB in an adult. Aggressive surgical treatment should be performed

when meeting with complex esophageal FBs, which cannot be handled properly with endoscope.

Disclosure Statement

All authors have no conflicts of interest to declare.

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