

## Migration of a Steel Wire Leading to Cardiac Tamponade after Esophageal Perforation: A Case Report

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### Abstract

**Background:** Migration of a foreign body to tissues outside the esophagus is rare but potentially lethal condition that requires prompt recognition and management to achieve a favorable outcome.

**Case report:** we report a rare case of cardiac tamponade caused by esophageal perforation after foreign body ingestion in a 48-year-old man. Once the computed tomography (CT) demonstrated a 1.8 cm foreign body penetrating from the esophagus into the pericardium, an urgent surgery was performed. The foreign body, a steel wire, was removed and the abraded surface of left ventricle was repaired. Fortunately, the patient has recovered and is doing well at the time of this writing.

**Conclusion:** The cardiac tamponade caused by esophageal perforation represents a life-threatening emergency, and delay in diagnosis can result in a significant increase in morbidity and mortality. Thus, timely identification and appropriate treatment would have a positive on patient's outcome.

**Keywords:** Cardiac tamponade; Esophageal perforation; Foreign body ingestion

### Background

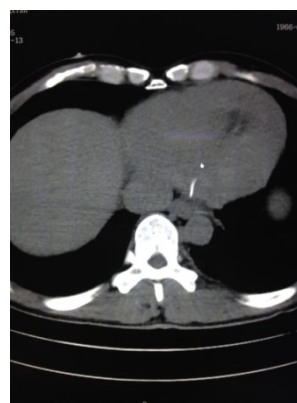
Although the ingestion of foreign bodies is not uncommon, it rarely causes severe complications. The perforation rate reported in the literature varies depending on the size and type of the foreign bodies, ranging from 0%-4%, but it represents a life-threatening emergency, and delay in diagnosis can result in a significant increase in morbidity and mortality [1]. Among accidentally swallowed foreign bodies in adults, things like bones are by far the most commonly observed objects that result in esophageal perforation, and these may occasionally lead to penetration injuries, resulting in complications, such as cardiac tamponade. In this case, the swallowed foreign body, a steel wire, caused the cardiac tamponade after penetrating from esophagus into pericardium.

### Case Report

A previously well 48-year-old man swallowed a sharp thing by accident during a fish meal. He thought that it might be a fish bone, and then tried to take solid food in an attempt to ingest it. However, it was not successful. One day later, he presented to our hospital with a history of slowly increasing retrosternal pain.

Physical examination was unremarkable on his arrival. A CT of the chest disclosed a radiodense linear foreign body that measured 1.8 cm in length, penetrating the esophagus into pericardium and a corresponding hemopericardium (Figure 1). The patient's systolic

blood pressure rapidly decreased to 79 mmHg two hours after his arrival, and an urgent median sternotomy was performed.



**Figure 1:** Computed tomography of the chest showing a radiodense linear foreign body penetrating from the esophagus into the pericardium and a corresponding hemopericardium.

During the procedure, the pericardium was found to be very tense, and the hemodynamics immediately improved after it was incised and clots removed. Afterwards, cardiopulmonary bypass was established. A steel wire was found to be perforating the esophagus and pericardium just at the left side of the posterior descending artery (Figure 2), and there was clearly identifiable abrasion of left ventricle with 3 cm in length and 0.5 cm in depth. The steel wire was removed (Figure 3),

and the abrasion of left ventricle and perforation of pericardium were repaired with 4-0 Prolene sutures. After the intraoperative radiological examination showing nothing left, the patient was sent to our Intensive Care Unit (ICU). Considering the size of esophageal perforation and the patient's age, he was managed conservatively with no oral intake, suction via a nasogastric tube and broad-spectrum antibiotics.



**Figure 2:** A steel wire penetrating the left ventricle during operation.

The esophageal perforation was resolved on the 7th postoperative day, allowing realimentation. The patient was discharged on the 10<sup>th</sup> day, without any unexpected event. One month later, he is still well with a normal diet and does not have chest pain or any other symptoms.



**Figure 3:** The steel wire after removal at sternotomy.

## Comment

Foreign body ingestion is a common occurrence in clinical practice. Approximately 80-90% of ingested foreign bodies will pass through the gastrointestinal tract spontaneously without clinical sequelae [1,2]. However, the rare complications, related to foreign body ingestion, will be required an urgent surgical procedure.

The type and location of foreign body are considered the important risk factors for complications [3]. Among accidentally swallowed

foreign bodies, bone foreign body is the most common type that results in esophageal perforation in adults [4]. The perforation rate can be as high as 15-35% when sharp foreign objects are ingested [3]. In addition, the four areas of physical narrowing of the esophagus are the most common locations where the foreign body is likely to be impacted, including the upper esophageal sphincter, the level of the aortic arch, the crossing of the main stem bronchus, and the esophagogastric junction. With regard to the perforations of the lower two thirds of esophagus that affect the pleura, pericardium, or peritoneum, the rapid surgical intervention is required to remove the foreign bodies and repair the defects. In this case, the patient accidentally swallowed a sharp steel wire during a fish meal, and it penetrated into pericardium from the middle part of esophagus which resulted in cardiac tamponade.

The mechanism of perforation is thought to be initial impact, and then a combination of local inflammation and direct pressure necrosis [5]. Early diagnosis and appropriate treatment are essential to these patients with swallowing sharp objects. The diagnosis depends on a high degree of suspicion, recognition of clinical features, and confirmation by iohexol esophagography or endoscopy and computed tomography. The urgent surgical procedure will be required for removing the foreign bodies once the endoscopy cannot be useful. However, small esophageal perforations tend to seal without sequelae, and can be managed conservatively.

## Conclusion

Patients with a longer duration of impaction, sharp foreign bodies are at higher risk for severe complications. It must be kept in mind that ingested foreign bodies can pass into the pericardium through esophagus and lead to cardiac tamponade.

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