

A Hazardous Foreign Body Perforating the Cervical Esophagus With Extra-Esophageal Impact

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Case report

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Abstract

Background

Esophageal perforation due to foreign body is a fatal complication when not diagnosed on time and not managed properly. Although admissions to the emergency department after foreign body ingestion are frequently observed, perforating the esophagus after ingestion of sharp-edged objects and being observed in the soft tissue in the extraesophageal area is a very rare condition.

Methods

The patient, who admitted to the emergency department with dysphagia after swallowing a sharp-pointed foreign body, was retrospectively analyzed.

Results

We present our patient who developed esophageal perforation as a result of accidentally swallowing a sharp-edged glass object which we diagnosed immediately, approached with a lateral cervical incision within 24 hours and removed from the location very close to the carotid artery in the extraesophageal area.

Conclusions

Perforating esophageal foreign bodies are urgent problems that require early diagnosis and intervention. Delayed surgery can lead to fatal consequences.

Trial Registration

This case report was retrospectively registered by Institutional Thoracic Surgery Education and Research Committee. (Number:2020-12-15/01, Date: 18/12/2020)

Introduction

Foreign bodies in the esophagus are considered a serious clinical condition, both in adults and children, due to possible complications with high mortality and morbidity (esophageal perforation, mediastinitis, fistulization, airway obstruction) [1]. The mortality rate of esophageal perforation increases especially when the treatment is delayed more than 24 hours [2]. Therefore, a fast and accurate diagnosis is essential with subsequent treatments. In addition to anamnesis and physical examination in the diagnosis of foreign body-related perforations, radiological examinations are very important to determine the localization of the foreign body and its complications. When perforations associated with sharp-edged objects are detected, it is recommended to remove the foreign body within 24 hours to prevent the development of mediastinitis or abscess.

Case

A 36-year-old female patient applied to our emergency department within a few hours after complaints of dysphagia and odynophagia developed due to ingestion of piece of glass. There was no abnormal finding in the physical examination of the patient. Anteroposterior chest radiography was normal, but in cervicothoracic computed tomography (CT), the density of the foreign body which was measured to be approximately 15 mm in length and 2.5 mm in thickness was observed in the neck at infraglottic level of C6-C7 vertebra, and in the periphery of the defined foreign body, air-compatible millimetric densities were detected between the muscle plans and fasciae (Fig. 1). Esophagogastroduodenoscopy showed a 1-1.5 cm lacerated area below the upper esophageal sphincter, but no foreign body was observed. Exploration with a lateral cervical approach was applied to the patient within 24 hours and a 1.5 cm long "C" shaped sharp-edged and pointed glass material with an extra-esophageal impact in the paravertebral area of the medial carotid artery was detected and removed (Fig. 2). A drainage catheter was placed to drain where the foreign body was removed and the patient was extubated and taken to the intensive care unit. Oral intake of the patient, whose nutritional support was given parenterally for 7 days, was stopped in the meanwhile. On the postoperative 7th day, the patient was given methylene blue, and as a result of no efflux from the neck drain, drainage was terminated and oral intake was reestablished. In the patient whose upper endoscopy was repeated on the postoperative 10th day, esophagus was observed intact and hence the patient was discharged, but after 20 days and for the next 3 months, controlled microfistulization developed from the incision area. This condition was treated with conservative methods and the fistula tract was closed. Routine controls of our patient continue at the postoperative 8th month free of any problems.

Discussion

Although foreign body ingestion is common among the admissions made to the emergency departments, esophageal perforation due to foreign body ingestion is rarely seen. Foreign body-related perforations, one of the rare causes of esophageal perforation, constitute 7–14% of all esophageal perforations [1].

Foreign body ingestion is more common in children between 6 months and 3 years of age and in certain adult risk groups such as prisoners, alcoholics, edentulous adults, and psychiatric patients, whereas accidental ingestion of foreign bodies is rarely encountered in normal adult individuals outside the risk groups [2]. Among the foreign bodies accidentally ingested, there can be a wide variety of objects that can astonish clinicians. In childhood, metallic coins, and in adulthood, organic foreign bodies such as meat, bone and teeth are encountered more frequently. In our case, the 36-year-old patient, who is not in any of the specified risk groups, accidentally ingested the foreign body together with liquid beverage as a result of broken glass piece falling into liquid content in a bottle.

80–90% of foreign bodies ingested can pass the gastrointestinal system spontaneously in 3 to 7 days without causing any complications [1]. However, complications requiring endoscopic or surgical treatment can be observed in 10–20% of the cases. Some foreign bodies in the esophagus cause

mucosal ulceration, inflammation and even infections, leading to esophageal perforation and other complications. In the literature "hazardous foreign bodies" are defined as, 1) foreign bodies with sharp edges that can easily penetrate the esophageal wall and cause deep cervical infection, mediastinitis or damage major vessels, resulting in massive bleeding; 2) foreign bodies with large and irregular edges that can compress the esophageal wall, leading to ischemia, edema, erosion, and ulcers; and 3) foreign bodies that may stay in the esophagus for a long time and cause local soft tissue edema [3]. Serious complications with high mortality, such as esophageal perforation, respiratory tract obstruction, tracheoesophageal fistula, vascular injuries (eg, aortoesophageal fistula), retropharyngeal abscess, mediastinitis, pericarditis or vocal cord paralysis may develop as a result of ingestion of such foreign bodies [4]. Morbidity and mortality are relatively high, especially in the case of esophageal perforation. With the addition of intrathoracic infections developing as secondary to these conditions, mortality rates increase up to 50% [4]. Conditions of delayed treatment, thoracic or abdominal rupture, and underlying esophageal disease are also poor prognostic factors [5]. In our case, the sharp and pointed foreign body had perforated the esophagus and become impacted in a localization very close to the carotid sheath.

The location of ingested foreign bodies in the esophagus differs according to age groups. While the most common impact location in children is at the level of the cricopharyngus muscle (the narrowest part of the esophagus), approximately 68% of obstructions in adults occur in the distal esophagus due to pathological abnormalities. Localization for perforations in the esophagus usually depends on the cause of injury. Esophageal perforations resulting from foreign bodies generally occur in the proximal third [1, 2]. In our case, perforation developed in the upper esophagus in the infraglottic area.

Diagnosis of esophageal foreign bodies by physical examination is difficult. Besides anamnesis and physical examination, radiological examinations are very important to determine the localization of the foreign body and the complications it causes. Endoscopy is the gold standard in that sense. Symptoms may vary depending on the shape, structure, impact location of the ingested body, age of the patient and the complication caused. Although dysphagia and odynophagia are the most frequently reported symptoms, patient presentation varies [1]. Symptoms typically develop within minutes to hours. Especially in accidentally ingested foreign bodies, most adults and older children can provide the history of the foreign bodies ingestion. Foreign bodies in the upper esophagus are more accurately localized by the patient. Other symptoms include chest pain, vomiting, hypersalivation, hiccups, retrosternal fullness, inadequate digestive function, and a persistent foreign body sensation [1, 2]. If patients report painful ingestion (odynophagia), this may indicate more serious problems such as esophageal laceration or perforation. Our patient had symptoms of odynophagia and foreign body sensation in the upper esophagus.

Ingested foreign bodies can become stuck in the esophagus and cause mucosal inflammation, ulceration in the chronic process, and thereby, esophageal perforation through penetrating effect in the acute period. As a result, serious infections such as mediastinitis, deep cervical abscess and empyema may develop [4]. The cervical abscess surrounding the esophagus is one of the most serious complications of esophageal foreign bodies, and it is of utmost importance to know the exposure time of the foreign body

and support it with ancillary imaging tests. Plain radiographs (neck and chest x-ray radiographs) are a very important diagnostic tool especially in determining the location of the foreign body [6]. Esophageal barium swallow tests should not be used in these cases, since the penetration of contrast into the abscess cavity in periesophageal abscesses causes foreign body effects in the cervical or mediastinal areas to further complicate the existing infection [3]. Endoscopy is the most accurate method to examine the esophageal foreign body and to assess esophageal damage. CT scans have a high sensitivity to detect foreign bodies, and can be used to verify and localize foreign bodies and to assess possible damage to adjacent structures in complications such as perforation [6]. Materials such as food, plastic, wood and aluminum are not radio-opaque, so materials of this nature are not seen on routine radiography. Bones and glass may or may not be visible on x-ray graphy. If nothing is seen on routine radiography, but foreign body is suspected, then endoscopy or CT scan should be performed for a definitive diagnosis [6]. In our case, the localization of the sharp glass piece, which could not be seen on x-ray graphy, was determined by neck CT, and esophagus perforation by endoscopy, and a foreign body-induced esophagus perforation was diagnosed.

The treatment option depends on many factors such as the patient's age, clinical condition, size and sharpness of the foreign body, anatomical localization, elapsed time, size of the perforation, whether fistula developed between it and the nearby tissue, and the physician's experience [4]. It is recommended to remove the foreign body within 24 hours to minimize the risk of developing mediastinitis or abscesses, especially when perforations due to sharp-edged objects are detected [1, 5]. Although there is no gold standard for the treatment of esophageal perforation, the etiology, impact location, perforation time and presence of sepsis have been accepted as the main prognostic factors after surgical treatment [3]. Primary closure may be an adequate treatment option when esophageal perforation is observed within 24 hours, since the risk of fistula formation and complications development in nearby tissues in perforation due to a sharp object increases after 24 hours [2]. In cases of cervical abscess, which is one of the most serious complications of esophageal foreign bodies, effective drainage should be provided as soon as possible by approaching with a lateral cervical incision [3]. In cases with complicated cervical abscesses, foreign bodies localized in the upper esophagus can be detected and removed by approaching the anterior border of the sternocleidomastoid muscle (scm), and its closure can be achieved by detecting the fistula or perforation area [3]. Since the major blood vessels and nerves in the neck are located deep within the sternocleidomastoid, an anterior approach can prevent intraoperative vascular and nerve injuries.

Although the primary treatment for esophageal perforation is surgical, conservative approaches involving endoscopic treatments can be applied in selected cases. Esophageal stents are a technically-applicable and easy approach in managing esophageal perforations, but stent displacement (up to 34%) is their major disadvantage [5]. Another approach is to use endoclips for minimal defects. In our case, the foreign body was localized adjacent to the carotid artery in the infraglottic area. The left lateral cervical incision was applied to the patient to remove the lesion and to evaluate the existing perforation, and with the approach from the anterior border of the scm muscle, the removal of the lesion and control of the perforation through the lateral wall were achieved.

Conclusion

Rapid and accurate diagnosis is very important to prevent complications with high mortality when perforation of foreign body-induced esophagus is suspected. After the diagnosis is made, especially if the suspected foreign body is a sharp-edged, pointed object, it should be removed within 24 hours to prevent the development of mediastinitis and reduce the risk of mortality, and the perforation area should be closed.

Abbreviations

CT: Computed tomography

SCM: Sternocleidomastoid Muscle

Declarations

Trial registration: Since this study includes the result of an emergency surgery on a human participant, it was registered by Thoracic Surgery Clinic Administration. (Register Number : **72300690-000-50004**)

Ethics approval and consent to participate: Since it was not an experimental or prospective study, ethical approval was not obtained for the case report.

Consent for publication: Consent for publication was obtained from the patient to use the information.

Availability of data and material: Please contact author for data requests.

Competing interests: There is no financial or non-financial conflict of interest.

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Figures

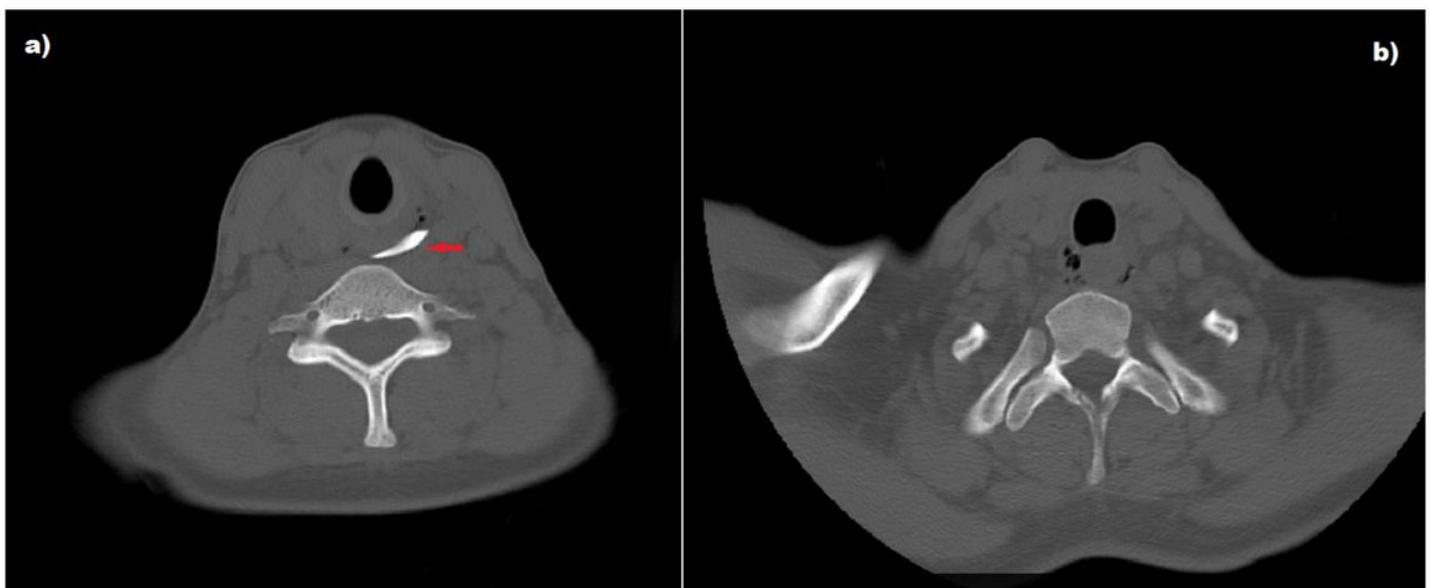


Figure 1

a: CT image of a sharp-edged foreign body that perforates the esophagus and settles into the extraesophageal area. b: Small hypodensities compatible with air around the foreign body, between the muscle planes and deep neck fasciae.

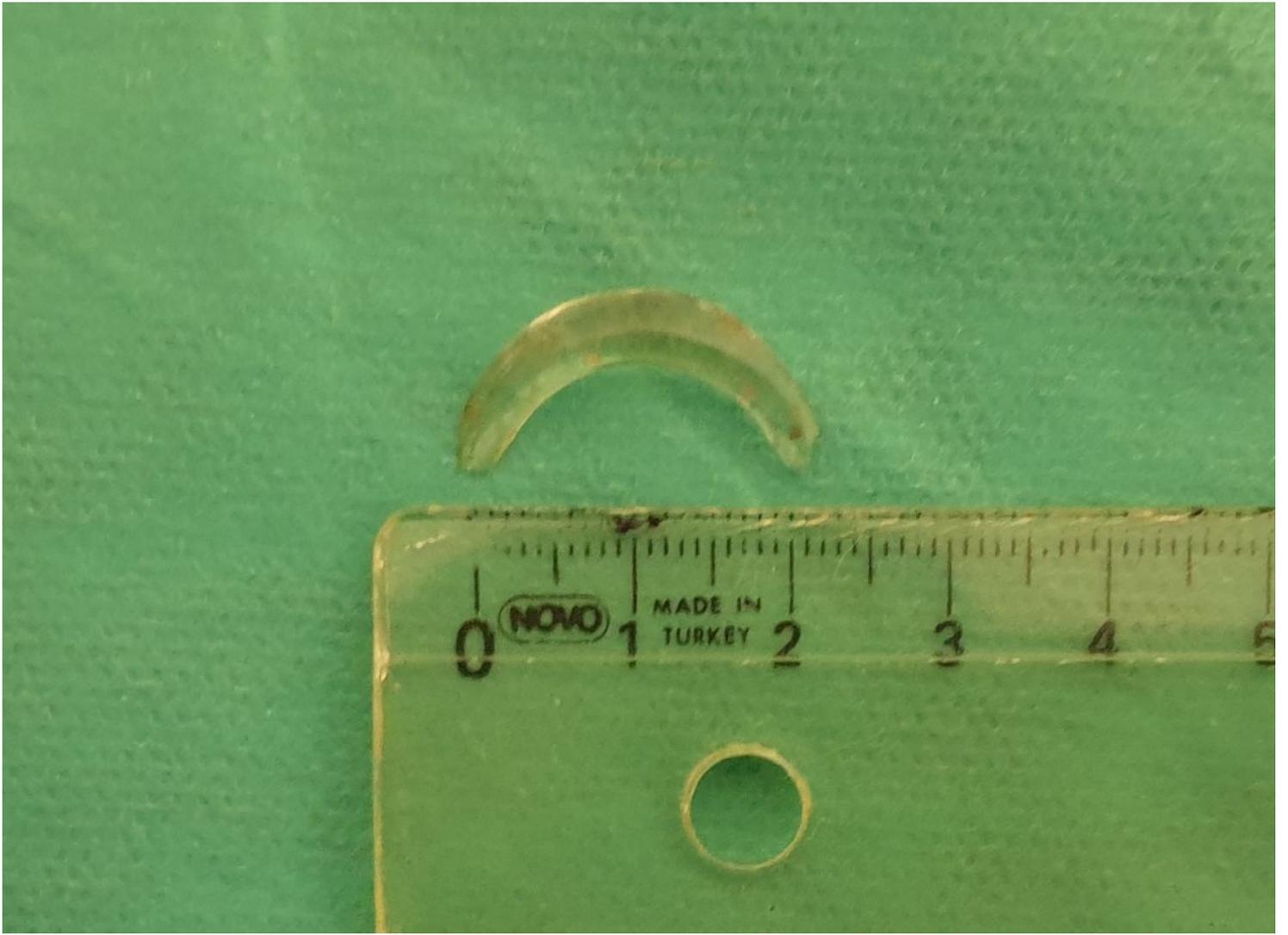


Figure 2

Image of a crescent-shaped double-edged foreign body.