CASE REPORT

'A problematic plum pit in the piping': a case of traumatic oesophageal perforation

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SUMMARY

A 75-year-old man presented to accident and emergency having swallowed a plum pit. He initially experienced sharp neck pain, which was mild at presentation. He was otherwise haemodynamically stable and was able to subsequently eat a sandwich without consequence.

He was referred to the ear, nose and throat senior house officer (SHO), who reviewed the soft tissue radiograph, which appeared normal. The patient displayed no concerning clinical signs and was well; however, his pain persisted. Examination revealed a localised area of surgical emphysema on the left side of the neck. Retrospective review of the soft tissue radiograph showed a small region of subcutaneous free air. An urgent CT scan confirmed a pneumomediastinum indicative of an oesophageal perforation. The patient was admitted for observation, and was managed conservatively without surgical intervention. He was weaned onto sterile fluid and progressed to a solid diet. He was discharged from hospital with no long-term sequelae.

BACKGROUND

Foreign body ingestion is a common presentation to the accident and emergency department (A&E), most typically in children. Over 80% of cases can be expected to self-resolve without any intervention. Oesophageal perforation and subsequent mediastinitis form a rare but life-threatening complication of foreign body ingestion. This is not to be confused with the most common cause of non-iatrogenic oesophageal perforation, Boerhaave syndrome. It was first described in 1724, by Herman Boerhaave, after having performed an autopsy on Baron Jan Gerrit van Wassenae—an admiral of the Dutch grand fleet, who had reported of severe chest pain after vomiting.¹ If evidence of oesophageal perforation and mediastinitis are present, it must be rapidly diagnosed and treated to avoid the high associated mortality and morbidity rates. Patients with these complications tend to be very unwell, and their globally poor clinical picture would raise the index of clinical suspicion. We present a case in which a patient displayed subtle clinical signs of surgical emphysema within the neck, which were detected by adhering to first principles of performing a thorough clinical examination, the patient was subsequently diagnosed with a pneumomediastinum and potentially catastrophic complications were avoided.

CASE PRESENTATION

A 75-year-old man presented to A&E, reporting left-sided throat pain that had started after he

accidentally ingested a plum stone that day. He had no significant medical history.

The patient was reviewed by an experienced nurse practitioner in the minor injuries department. The examination was thought to be unremarkable, with no evidence of drooling, retrosternal chest pain, regurgitation or respiratory distress; the patient was haemodynamically stable.

The patient was able to swallow saliva without difficulty and progressed to eating a sandwich while he was in the department. The soft tissue radiograph of the neck was reviewed by the practitioner and thought to be unremarkable (figure 1).

In view of the patient's on-going pain, he was discussed with the on-call ear, nose and throat (ENT) SHO, who reviewed the patient. The on-call SHO agreed that the radiograph had appeared normal prior to seeing the patient. A history was taken followed by a full ENT examination. While reassuring the patient that the plum stone had passed, and had likely caused irritation to the oesophagus, the examination revealed a very small, subtle area of surgical emphysema at level three of the neck.

INVESTIGATIONS

After initial triage, baseline investigations were carried out as well as a lateral soft tissue radiograph

Figure 1 Lateral soft tissue radiograph of the neck. There is prevertebral surgical emphysema from C4 to C7.

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of the neck. Flexible nasoendoscopy was unremarkable and showed a normal tongue base, vocal cords, vallecula and epiglottis. The soft tissue radiograph was reviewed again post clinical examination and revealed small regions of free air within the subcutaneous tissue. This prompted a second opinion from the on-call radiologist, who felt the area on the radiograph and its clinical context were enough to warrant a CT of the neck/thorax with oral and intravenous contrast. The CT showed a pneumomediastinum around the proximal oesophagus tracking superiorly into the prevertebral space, around the left lobe of the thyroid, beneath the sternocleidomastoid and into the retropharyngeal and left parapharyngeal space (figures 2 and 3). The CT did not reveal any evidence of an overt oesophageal perforation. Arterial blood gas was normal as were all other baseline investigations.

DIFFERENTIAL DIAGNOSIS

Given the acute history of pain after ingestion of a plum stone, the differential diagnoses are relatively few. The main pathology to exclude, and certainly the most severe, would be an oesophageal perforation (with or without concurrent mediastinitis), which would account for both the pain as well as the key clinical finding—surgical emphysema. The other diagnoses to consider are an oesophageal foreign body resulting in impaction (which this patient was unlikely to have as he was able to eat and drink without consequence) and an oesophageal abrasion. Screening questions for a malignant process should be covered in the review of systems to ensure that this has not perpetuated the acute presentation.

Other complications of foreign body ingestion depend on the site of impaction, and these include ulcer formation, aorto-oesophageal/tracheo-oesophageal fistula formation, obstruction and, potentially, peritonitis.

TREATMENT

The patient was managed conservatively—he was admitted immediately and started on broad spectrum intravenous antibiotics to cover for mediastinitis as per hospital guidance. He was kept nil by mouth in the first instance. After discussion with the on call consultant, he was initially started on small quantities of sterile water.

OUTCOME AND FOLLOW-UP

With non-surgical measures, the pain improved, the surgical emphysema regressed and the patient did not develop mediastinitis. He was slowly weaned from being nil by mouth, to a sterile fluid-based diet and then a soft diet. When he was able to

Figure 2 Axial CT scan of the neck and chest with oral contrast showing evidence of pneumomediastinum tracking into the prevertebral space.

Figure 3 Coronal CT scan of the neck and chest with oral contrast. There is visible pneumomediastinum around the proximal oesophagus with surgical emphysema tracking superiorly into the prevertebral space, around the left lobe of thyroid, beneath the left sternocleidomastoid and into the retropharyngeal and left parapharyngeal spaces. There is no clear defect in or leak of oral contrast from the oesophagus.

manage a soft diet safely, he was discharged for subsequent follow-up in the outpatient department with a barium swallow.

DISCUSSION

Oesophageal perforation is a serious injury and carries a high mortality rate; this is compounded by any delay in clinical diagnosis. Oesophageal perforation can broadly be divided into both, iatrogenic and non-iatrogenic causes. Iatrogenic causes account for the vast majority, approximated to be as high as 65–70%, of cases. Of the non-iatrogenic causes, foreign body ingestion is the second most common (after Boerhaave syndrome). The most common foreign bodies ingested include fish/chicken bones, coins and artificial teeth/dentures.

Common regions of impaction are those where there is physiological narrowing of the oesophagus. These include:

1. The upper oesophageal sphincter
2. The level of the aortic arch
3. The diaphragmatic hiatus

In addition, the presence of functional or structural abnormalities such as webs, strictures, diverticula, achalasia and tumours will predispose to foreign body impaction.

Distinction between a patient presenting with impaction secondary to ingestion of a foreign body and a perforation is clinically paramount, as the approach and subsequent treatment vary significantly. Clinically, an acutely unwell patient with fevers and significant surgical or mediastinal emphysema would raise suspicion of perforation. Pain alone is not indicative of a perforation, and would be present with spasm and traumatic mucosal abrasions caused by passage of the foreign body. However, clinical suspicion of a perforation should be high and prompt a thorough examination.

Early diagnosis of oesophageal perforation has been shown to reduce the rate of complication and mortality significantly, a delay of 24 h can result in the rate of mortality doubling. Investigation of a patient presenting with the aforementioned features would include all normal baseline investigations, coupled with a lateral neck and chest radiograph, which may display surgical emphysema, pleural effusions, widening of the

mediastinum, hydropneumothorax, or free air under the diaphragm (erect film). Diagnostic features on a radiograph may not be immediate, and may take several hours to become evident.

Various radiological techniques can be used to aid the diagnosis of oesophageal perforation. Contrast oesophagography remains the initial diagnostic tool of an oesophageal perforation in a stable patient. Gastrografin, a water soluble agent, is advocated in the first instance as it is rapidly absorbed, however, there remains controversy regarding the sensitivity depending on the level of the perforation. A negative scan does not exclude the presence of a perforation, and a barium study may be used to further delineate a perforation in more detail, however, use of barium poses a risk of initiating an inflammatory response within the mediastinum/pleural cavity. Fluoroscopy and CT with use of oral contrast are other recognised techniques. CT is of particular use when perforations are difficult to locate or diagnose, or when contrast oesophagography cannot be performed.²

CT with oral 5% gastrografin (100 mL) and intravenous contrast was used in this case as the foreign body had passed the oesophagus causing signs of oesophageal perforation in the form of surgical emphysema. It was deemed that CT was a better modality to delineate the perforation and extent with more precision, and to eliminate any potential causes of surgical emphysema resulting from chest pathology, or underlying malignant process.

Each patient should be assessed and managed on an individual basis, management is dependent on the aetiology, location/size of the oesophageal perforation, the time lapsed to diagnosis and whether the perforation is contained within the mediastinum or free. Oesophageal perforations can rapidly contaminate the mediastinum. The rupture may immediately extend into the pleural cavity and subsequently cause chemical mediastinitis. Bacterial invasion follows causing a high level of morbidity and mortality. The general principles of conservative management of oesophageal perforation included:

1. Avoidance of oral intake in the initial phase
2. Parenteral nutrition
3. Broad spectrum antibiotics
4. Drainage of collection/fluid

Radiologically/endoscopic-guided nasogastric tube insertion is indicated to decompress the stomach and should remain in situ until there is evidence of a reduction in the size of the perforation.

Although no randomised clinical trials exist for antibiotic use in oesophageal perforation, empirical antibiotics covering anaerobes, Gram-negative and Gram-positive aerobes should be started when the initial diagnosis is suspected. Controversially, although the patient displayed no evidence of clinical sepsis, antibiotic therapy was initiated, this is generally accepted due to the high morbidity and mortality associated with delayed diagnosis and subsequent treatment, which is repeatedly highlighted in the literature.³

If conservative management fails, or if the perforation is deemed to be significant from the initial work-up, surgical and endoscopic repair can both be considered.

Learning points

- In patients presenting with acute throat pain after swallowing a foreign body, careful and diligent clinical examination is paramount—the surgical emphysema here was the key finding, and because it was so subtle it was initially missed.
- Clinical correlation of imaging is very important—only after a careful ear, nose and throat examination was the suspicious area on the lateral neck X-ray noted.
- Listen to experienced staff—the nurse practitioner felt ‘something was wrong’, hence her referral; ensure that you take the time to see a patient if a colleague is concerned.

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