CASE REPORT

Normal chest X-ray should not mislead

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SUMMARY

A lung ultrasound (US) can be routinely performed at the bedside by a trained intensive care unit physician and may provide accurate information about a lung's status that has diagnostic and therapeutic relevance. Oesophageal perforations are rare, and due to the rarity of this type of perforation and its non-specific presentation, the diagnosis and treatment are delayed, leading to a high mortality rate. We present a 70-year-old woman with a postoesophagoscopy perforated oesophagus. Lung US detected pneumothorax and mild pleural effusion that were not present on the postoperative chest X-ray. The early detection of the perforation led to a good outcome.

BACKGROUND

Oesophageal perforations and specially ones with traumatic aetiology are rare.¹ Owing to a non-specific presentation and rarity of this condition, the diagnosis and management of perforations are delayed in more than 50% of patients.² The high mortality rate is directly associated with the delay in diagnosis.³ Lung ultrasound (US) is a standard technique in the detection of postprocedural pneumothorax⁴ and is a useful tool for making an early diagnosis, detecting complications and performing procedures. Lung US has contributed to the early detection of the perforated oesophagus and has hence helped the patient.

CASE PRESENTATION

A 70-year-old woman presented as an ear, nose and throat (ENT) outpatient with a 3-day history of a foreign-body sensation in the mid-oesophagus after eating chicken meat, with suspicion of chicken bone impaction. An indirect laryngoscopy was normal. The patient's medical and drug histories were unremarkable as well as no history of allergies. There were no historical features suggestive of prior caustic injury, upper gastrointestinal malignancy, peptic ulcer disease or oesophagitis. The ENT surgeon decided on rigid oesophagoscopy.

Immediately prior to endoscopy (60 min after arrival), the patient was found to be afebrile, and the oxygen saturation was 100% while the patient was breathing ambient air. Also, the blood pressure and heart rate were normal. On physical examination, sialorrhea was evident with absent respiratory, cardiovascular and abdominal abnormal findings. Laboratory tests showed a normal haemoglobin/haematocrite, platelet number and coagulation profile.

The patient was placed under general anaesthesia, and her trachea was intubated. A hard

oesophagoscope was gently introduced, advanced to 20 cm from the incisors, and used to determine the oesophagus was normal. In the recovery room, the patient awoke from sedation with a left-sided chest pain radiating to the back, which increased with breathing. Her chest X-ray, serial ECG and cardiac enzyme levels were normal. An echocardiography was also normal. Using the same echocardiography phased array 5 MHz probe, as the probe's flat and smaller footprint can be suited for imaging between the ribs, chest US was performed. A 5 MHz convex probe was also used for US examination since this conveys a basic image of the lung pleura, of eventual pleural effusion and the background of the lung parenchyma. At the anterior left mid-clavicular line, the US showed a lung point with absence of lung sliding (figure 1), the lung pulse and mild left pleural effusion, raising the possibility of oesophageal perforation. A CT scan of the thorax with oral water-soluble contrast was immediately obtained, showed a crescent of air-density contiguous to the left border of the lower third oesophagus, with the escape of oral contrast from the lower third oesophagus to the left posterior pleural space and a contrast-fluid level. Left hydropneumothorax was also noted (figure 2).

The patient was transferred to the intensive care unit (ICU). Intravenous, fluids and broad-spectrum

Figure 1 The lung point (arrow). To the left of the arrow, the probe is facing the pneumothorax during expiration, with abolished lung sliding and visible straight lines. To the right of the arrow, after inspiration, the lung has slightly increased its volume and the lung itself is now facing the probe.

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Figure 2 A CT scan of the thorax with oral water-soluble contrast showing the left hydropneumothorax.

antibiotics were initiated, and chest tube was inserted. The oesophageal tear was closed surgically. Postoperatively, the patient managed her lung collapse with chest physiotherapy. She was kept *nil per os* for 7 days, and the nasogastric tube was removed on day 7. The patient was discharged home on day 8 postoperatively. A follow-up CT scan with contrast that was performed 7 days postevent failed to demonstrate any oesophageal dissection or extravasation of contrast that would suggest perforation.

OUTCOME AND FOLLOW-UP

A follow-up CT scan with contrast that was performed 7 days postevent failed to demonstrate any oesophageal dissection or extravasation of contrast that would suggest perforation.

DISCUSSION

Traumatic perforation of the oesophagus is usually caused by instrumentation, foreign-body trauma or so-called spontaneous rupture.⁵ Of these, perforation during oesophagoscopy is the most common. The rigid metal oesophagoscope and the instruments used for oesophageal dilation are the principal causes of damage.⁵ The relatively recent fibre-optic endoscopes, although characterised by a much-reduced incidence of perforation, do not allow direct visual oesophageal dilation. There is little doubt that the likelihood of instrumental perforation is greater when the endoscopist lacks experience, yet most perforations in any large series have been performed by experienced endoscopists.⁵

Missing a diagnosis of pneumothorax in emergency rooms and ICUs by chest radiography has been reported in many cases.⁶ In a prospective observational study done on patients with trauma, missing pneumothorax was reported in 76% of seriously injured patients when radiography was left to the emergency team for interpretation.⁷ The diagnostic accuracy of chest radiography can be impaired when it is performed in the anteroposterior projection in a supine position or immediately after central vein cannulation or thoracentesis.

Lung US is a real time and helpful tool for the diagnosis of pneumothorax. The absence of lung sliding and the detection of a lung point are the diagnostic findings associated with pneumothorax. Lung sliding, a dynamic sign arising from the pleural line, indicates that the visceral pleura slides against the parietal

pleura during expiration and inspiration. The lung point is the sonographic demonstration of the point on the chest wall where the pleural layers adhere again, when the collapsed lung is or is not in contact, respectively, with the chest wall. Normal lung sliding rules out pneumothorax. The detection of a lung point confirms the presence of pneumothorax.⁸ The utility of lung US in diagnosing suspected pneumothorax is well documented for patients with trauma and dyspnoea in the emergency department.⁹ A prospective observational study suggested that US is a standard technique to detect pneumothorax after central vein cannulation and can minimise time consumption and radiation.⁴

Unfortunately, the overall mortality rate of oesophageal perforation continues to be high, ranging from 5% to 63%.¹⁰ The early diagnosis of a perforated oesophagus improved mortality in our patient. This outcome has been achieved by the early detection of pneumothorax after invasive procedures in symptomatic patients. In conclusion, the bedside US provides an immediately available, non-invasive tool for a prompt diagnosis for a vast array of life-threatening conditions. Patient care will hopefully be improved due to a rapid and concrete diagnosis of possible underlying pathophysiology to guide a swift initiation of therapy as more intensive care physicians embrace point-of-care US.

Learning points

- ▶ Missing a diagnosis of pneumothorax in emergency rooms and intensive care units by chest radiography has been reported in many cases.
- ▶ Lung ultrasound (US) is an important tool in the detection of postprocedural pneumothorax.
- ▶ Point-of-care US should be embraced by the intensive care and emergency physicians.

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