

# Spontaneous pneumomediastinum in an 18-year-old woman: the importance of excluding oesophageal perforation

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## DESCRIPTION

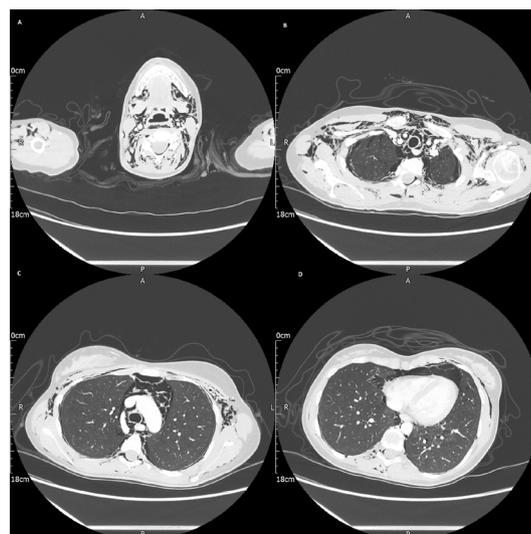
An 18-year-old woman presented to the emergency department with a 3-day history of vomiting, central abdominal pain and decreased oral intake. She described frequent episodes of bilious vomit without haematemesis. She denied previous alcohol or illicit drug use, smoking or recent travel. There was no significant medical history. On examination, the abdomen was soft, with epigastric tenderness on palpation, without guarding or peritonism. Palpation of the clavicular fossae and neck revealed extensive surgical emphysema. Her observations were stable apart from a tachycardia (heart rate 104). Her admission bloods showed a white cell count  $20.3 \times 10^9/L$  (4–11), neutrophils  $16.9 \times 10^9/L$  (2–7), CRP 8, lactate of 3.4 mmol/L and a stage 3 acute kidney injury: urea 37.6 mmol/L (2.5–7.8), creatinine 338  $\mu\text{mol/L}$  (50–90). A SARS-CoV-2 PCR swab was negative. Due to clinical suspicion of an oesophageal perforation, her care was referred to the upper gastrointestinal surgical team.

A CT scan of the neck, thorax, abdomen and pelvis ([figure 1](#)) revealed bilateral apical pneumothoraces measuring 14 mm and 10 mm in the right and left lung, respectively. It also demonstrated pneumomediastinum and surgical emphysema tracking from the base of the skull, down both arms, into the chest, abdominal wall and retroperitoneal space. The abdominal organs were reported as radiologically normal and no free gas was visualised within the intraperitoneal space.

An oesophago-gastro-duodenoscopy (OGD) was performed ([figure 2](#)) to exclude an oesophageal perforation. The OGD showed Los Angeles Grade D oesophagitis (mucosal breaks involving  $\geq 75\%$  of mucosal circumference) and oesophageal congestion, but no mucosal tear was identified. A water-soluble contrast swallow (WSCS) was requested ([video 1](#)), which did not demonstrate any evidence of a contrast leak.

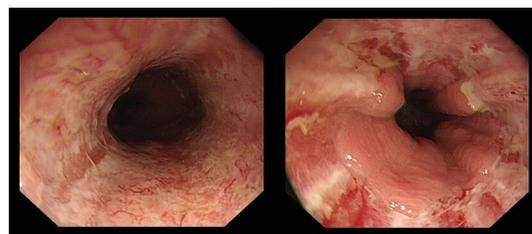
Initial management included intravenous fluids, analgesia, high dose intravenous proton pump-inhibitor therapy, broad-spectrum intravenous antibiotics and antifungals. Following the OGD and WSCS, her oral intake was slowly built up and she made a full recovery. An outpatient high-resolution CT scan was performed 6 weeks post-discharge. This revealed complete resolution of the pneumothoraces, pneumomediastinum and surgical emphysema. No underlying lung pathology was identified.

Spontaneous pneumomediastinum is rare, characterised by air leaking into the mediastinum,



**Figure 1** (A) Extensive surgical emphysema tracking from the level of the base of skull (B) bilateral pneumothoraces measuring up to 14 mm in the right lung apex, and 10 mm in the left apex (C) normal calibre and morphology of the thoracic aorta and the major branches (D) extensive pneumomediastinum.

occurring in only 0.01%–0.001% of hospital cases.<sup>1</sup> Most cases of pneumomediastinum are caused by underlying lung disease, infections, mechanical ventilation (barotrauma) or connective tissue disorders. Although rarer associations with illicit drug use, particularly intravenous drug use, the smoking of cocaine and even infection with COVID-19 have been reported.<sup>2–4</sup> An important differential to exclude in spontaneous pneumomediastinum is Boerhaave's syndrome, defined by spontaneous oesophageal perforation in the absence of an existing oesophageal pathology.<sup>2,3</sup> Boerhaave's syndrome classically presents with Mackler's triad



**Figure 2** Oesophago-gastro-duodenoscopy with Grade D oesophagitis in multiple oesophageal anatomical locations.



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**Video 1** Water soluble contrast swallow demonstrating no evidence of contrast extravasation suggesting a mucosal tear.

of severe vomiting, chest pain and subcutaneous emphysema, however, it can present in a variety of ways and often presents atypically.<sup>5</sup> Although uncommon, it warrants a high index of suspicion due to mortality rates of between 10% and 40%, and up to 60%–70% of cases in post-emetic oesophageal perforation.<sup>6,7</sup> Patients with suspected oesophageal perforations should

be extensively investigated with radiology and endoscopy with careful consideration of fluoroscopy.

### Learning points

- ▶ A comprehensive history including foreign travel, alcohol use and illicit drug use must be ascertained especially in younger patients with no history of respiratory disease.
- ▶ Spontaneous pneumomediastinum and pneumothorax should be investigated with CT and endoscopy, as well as careful consideration of fluoroscopy to exclude oesophageal perforation.
- ▶ Follow-up imaging with high-resolution CT should be considered in cases where no obvious cause has been found to identify underlying lung pathology.

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