Unusual presentation of more common disease/injury

Vomiting-induced surgical emphysema and pneumomediastinum: a self-remitting or life-threatening condition?

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Correspondence to Dr James Dyer, james.dyer@doctors.org.uk**Summary**

A previously well 18-year-old male presented with a 3-day history of vomiting, abdominal pain and increasing neck swelling. X-rays demonstrated both pneumomediastinum and cervical surgical emphysema and initial efforts were centred upon excluding Boerhaave syndrome (vomiting-induced oesophageal rupture). Upper gastrointestinal endoscopy and contrast CT scans excluded breach of the oesophagus but did, however, confirm dilated small bowel. Over the days, his condition did not improve, repeat CT demonstrated worsening small bowel dilatation and he eventually underwent laparotomy on day 5 of his admission. This revealed a high-grade obstruction in the right iliac fossa (presumably from a previous appendicectomy). Following adhesiolysis, he made a full recovery from both small bowel obstruction and surgical emphysema.

BACKGROUND

This case highlights an important diagnostic dilemma where the need to rule out one life-threatening pathology led to delayed surgical intervention of another. It also describes a clinically significant underlying cause of vomiting-induced pneumomediastinum and cervical surgical emphysema not previously reported.

Figure 1 Plain chest x-ray appearance of pneumomediastinum and surgical emphysema. Black arrow, pneumomediastinum; white arrow, surgical emphysema.

CASE PRESENTATION

A normally fit and well 18-year-old male presented to our emergency department with a 3-day history of vomiting, abdominal pain and increasing neck swelling. He had previously undergone right open inguinal hernia repair and open appendicectomy.

He was dehydrated but all observations were within normal limits. Examination revealed generalised neck swelling and extensive surgical emphysema. His abdomen was distended and tender in the right iliac fossa. Bowel sounds were absent.

Figure 2 Axial CT slice illustrating pneumomediastinum and surgical emphysema.

INVESTIGATIONS

He exhibited acute renal failure (urea 33, creatinine 198) and his inflammatory markers were significantly elevated (C reactive protein 385).

Chest x-ray revealed pneumomediastinum and significant surgical emphysema within the root of the neck, supraclavicular fossae and the chest wall bilaterally (figure 1). There was no evidence of pneumoperitoneum.

DIFFERENTIAL DIAGNOSIS

- Vomiting-induced airway injury.
- Boerhaave syndrome.

TREATMENT

A provisional diagnosis of Boerhaave syndrome was made and a CT scan with oral contrast was requested to confirm oesophageal perforation. This showed a normal oesophagus, extensive surgical emphysema and dilated small bowel loops with no obvious cause (figure 2).

A nasogastric tube was passed and the patient was fluid resuscitated, started on broad-spectrum antibiotics and observed in an intensive care unit. Over the next 24 h, he remained stable. Ear, nose and throat examination under anaesthesia ruled out any pharyngeal pathology and upper gastrointestinal endoscopy (OGD) confirmed a normal-looking oesophagus. Serial chest x-rays showed no developing pleural effusions or chest sepsis.

The patient passed no flatus during this time. His abdomen became more distended and tender. Repeat CT again showed a normal oesophagus and worsening small bowel dilatation with no clear change in calibre.

He underwent laparotomy on day 5 of his admission where a high-grade adhesional distal small bowel obstruction was found. Following adhesiolysis, he made an uneventful recovery with full resolution of the surgical emphysema. A retrospective diagnosis of vomiting-induced alveolar rupture was made.

DISCUSSION

Alveolar rupture per se is a benign, self-limiting condition where, after initial barotrauma, air is drawn into the mediastinum down a pressure gradient. From here it can spread through the fascial planes into the neck. In contrast, vomiting-induced oesophageal rupture or Boerhaave syndrome carries a 35% mortality rising to 50% after 24 h without surgical intervention. Breach of the oesophageal wall following a sudden rise in intraluminal pressure causes air

and oesophageal content to leak into the mediastinum with consequent mediastinitis and sepsis.

The varied reported causes of spontaneous pneumomediastinum include cough, vomiting, valsalva manoeuvre in pregnancy, cocaine abuse and straining at stool.^{1–5}

There exists a large overlap of symptoms accompanying the two conditions. These include retrosternal chest pain, neck discomfort, cough, sore throat, dysphagia, dysphonia and dyspnoea. Some authors have stated that patients with spontaneous or vomiting-induced pneumomediastinum are usually well in comparison with the toxic appearance of patients with Boerhaave syndrome.⁶ X-rays indicate the presence of mediastinal air but do not differentiate the source or cause. Further delineation can be accomplished by OGD, contrast CT and contrast swallow studies.^{2 3}

Learning points

- There is significant overlap in presenting features between vomiting-induced pneumomediastinum and Boerhaave syndrome.
- The presence or absence of critical illness cannot reliably differentiate between the two conditions.
- Patients presenting with pneumomediastinum and surgical emphysema as a result of vomiting, regardless of the source of the air, should have a cause sought for their vomiting as soon as possible.

Competing interests None.

Patient consent Obtained.

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