Case report - Esophagus
Barotraumatic oesophageal perforation with bilateral tension pneumothorax

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Abstract
Barotraumatic oesophageal perforation with bilateral tension pneumothorax is extremely rare and this is a first case reported in the literature. The possibility of the oesophageal perforation due to high-pressure gas flow should be kept in mind and the standard of diagnosis is oesophagography.

Keywords: Barotrauma; Oesophageal perforation; Tension pneumothorax; Oesophagography

1. Introduction
Bilateral tension pneumothorax induced by barotrauma with lung injury and oesophageal perforation has never been reported in the literature. In this case, bilateral tension pneumothorax was noted by the first chest X-ray at a local hospital; however, oesophageal perforation was diagnosed after a series of studies, including upper gastrointestinal (UGI) endoscopy, chest computed tomography and fluoroscopic oesophagography. Radical surgical intervention was performed for securing the successful outcome. This case recovered satisfactorily after the surgical intervention and the whole clinical course is very educational.

2. Case report
A 29-year-old male was robust in the past working in a nitrogen gas refilling factory. An accident of high-pressure nitrogen gas leak happened suddenly and injured him when he was talking to his colleague. Shortness of breath, chest tightness and cold sweating developed immediately. Vital signs by paramedics at the scene showed a detectable pulse over radial artery, tachycardia and tachypnea as a respiratory rate 35 breaths/min. He was brought to the nearest local hospital and pulse oximeter 90–92% and the Glasgow Coma Scale score were recorded at triage. Chest roentgenography was done (Fig. 1). Bilateral tension pneumothorax was diagnosed and bilateral chest tubes were inserted immediately after needle decompression and gushes of air were noted. No fluid was noted in the chest tubes at that time.

Subsequently, he was referred to an emergency medical center for further care. Pulse oximeter showed 98% at triage and under the impression of bilateral traumatic pneumothorax and lung contusion, he was admitted to the surgical intensive care unit for further care.

Two days later, his condition deteriorated and several episodes of high fever were noted. He was intubated and mechanically ventilated due to hypoxemia. Since turbid discharge with strong odor was noted from the left chest tube, computerized tomography of chest (CCT) was done on the sixth admission day and showed an empyema in the left pleural cavity. Oesophago-gastroscopy (OGS) was examined and showed negative. Empirical antibiotics were given and his condition ameliorated slightly, so that the endotracheal and right chest tubes were removed. OGS was repeated again and still showed negative. However, a strong impression of oesophageal perforation urged a fluoroscopic oesophagography with contrast medium swallowing on the seventh day. It revealed urografin leakage over the upper segment of the oesophagus into left pleural cavity (Fig. 2).

Emergency surgical interventions were done, including proximal diversion of oesophagus by the T-tube drainage, proximal and distal oesophageal exclusion by 3-0 chromic catgut ligations, two tube-thoracostomy drainages, gastrostomy for gastric secretion drainage and feeding jejunostomy for nutrition.

After the operation, his condition improved gradually. All the tubes were removed one by one and the oesophageal exclusion by catgut ligations was released by oesophageal dilation probing. He was discharged in stable condition three weeks later.

3. Discussion
Oesophageal perforations were reported with iatrogenic or some other reasons frequently, however, rare by baro-
traumas, except for a few cases by bottled high-pressure beverages [1–5]. According to our literature review, this case was the first victim who was bluntly injured by barotrauma and developed bilateral tension pneumothorax and oesophageal perforation simultaneously. Because of the rareness, the diagnosis of oesophageal injury was delayed for seven days and severe consequences developed.

Diagnostic difficulties of oesophageal perforation by blunt or barotraumas have been emphasized and this case showed the limitations of CCT and OGS like other articles [6, 7]. CCT failed to differentiate the aetiology of empyema and the OGS missed the injury site, even though it was performed by an experienced physician. We concluded that the optimal tool for the diagnosis of the oesophageal perforation is the fluoroscopic oesophagography.

Delayed diagnosis of oesophageal perforations is recognized with a high mortality rate (16–75%) and morbidity rate (35–66%) and as a challenge for the surgeons even where several options of the treatments were developed [7–10]. Therapeutic strategies include antibiotics, surgical debridement and repair. For some cases with delayed diagnoses, surgical repair was very difficult. The surgical strategy we applied here was followed by a very successful consequence because this management allowed low-pressure, isolated and adequately drained environment for an injured oesophagus to heal. The result was promising.

References