


Pneumopericardium secondary to oesophageal cancer presenting as myocardial infarction: a case report

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Introduction

Pneumopericardium is a clinical emergency condition that can progress to cardiac tamponade and shock. The most common aetiology of pneumopericardium is trauma. However, pneumopericardium can also result from iatrogenic causes or diseases with pericardium perforation, but these are not easily diagnosed [1]. In addition, pneumopericardium symptoms sometimes mimic those of other heart diseases. Common pneumopericardium findings include the Hamman's sign, a distinct radiolucent sac on the border of the heart on chest radiography, and ST-segment wave changes on electrocardiogram. However, these signs depend on tissue adhesion and areas of air infiltration.

Case Report

A 77-year-old man visited our emergency department after experiencing general weakness and mild fever for two days. He had been diagnosed with stage IV oesophageal squamous cell carcinoma approximately nine months prior to this episode. He underwent chemotherapy with cisplatin,

Abstract

The diagnosis of pneumopericardium can be challenging, as the symptoms are sometimes non-specific and can mimic those of other diseases. Especially, focal pneumopericardium presenting with regional ST-segment elevation on the electrocardiogram can be difficult to diagnose. Here, we present the case of a patient with pneumopericardium secondary to oesophageal cancer that was first diagnosed with community-acquired pneumonia and subsequently classified with acute coronary syndrome after an episode of cardiac arrest. The most prominent indication initially observed in this case was the history of oesophageal cancer and the presence of radiolucent areas in the heart under pleural effusion. When an unknown origin collapse develops in patients with oesophageal cancer, pneumopericardium should always be excluded, especially in cases where the cardiogenic shock is strongly suspected.

fluorouracil, and paclitaxel administration; immunotherapy with nivolumab administration; and palliative radiotherapy. Upon admission, the laboratory data showed leucocytosis, and the chest radiography findings revealed the presence of a blunt costophrenic angle. Presuming community-acquired pneumonia, the patient received empirical antibiotics. However, he experienced a cardiac arrest at approximately 90 min after admission. At 4 min after resuscitation, the patient's spontaneous circulation resumed. During this episode, an electrocardiogram showed ST elevation in leads II, III, and aVF, with a slight elevation in the troponin T level (106.7 ng/dL). However, an echocardiogram revealed a blurred image without A lines or heavy pericardial effusion.

As myocardial infarction could not be ruled out, percutaneous coronary intervention was arranged. However, angiography findings revealed that all coronary arteries were patent and suggested a potential pneumopericardium. Moreover, a second chest radiograph showed a radiolucent patch in the heart (Fig. 1). To confirm the diagnosis of pneumopericardium, computed tomography (CT) was

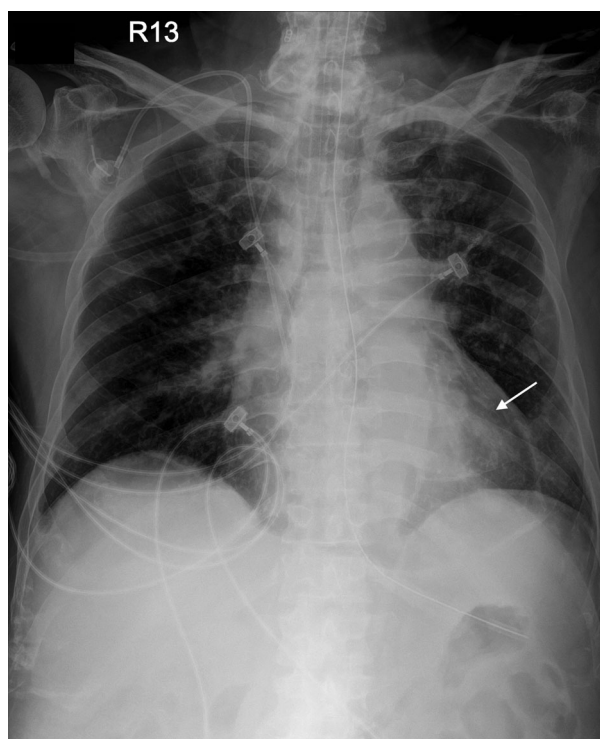


Figure 1. Radiolucent stripes can be observed along the cardiac border on plain radiographs of the chest (indicated by white arrow).

performed, which showed air in the pericardial space and oesophageal perforation (Fig. 2, Video S1). In the CT room, an episode of shock and a second cardiac arrest occurred. An emergency sub-xiphoid pericardial-pleural window was created to correct the underlying pneumopericardium by drainage using video-assisted thoracic surgery under general anaesthesia. Approximately 100 mL of pericardial effusion, with air and pus, was obtained. The central venous pressure decreased to normal levels after pericardial-pleural window creation. Because of the need for intermittent cardiac compression and unstable vital signs, an oesophageal stent was not inserted. After the surgery, refractory acidosis with multiple organ failure progressed. The patient died the day after admission.

Discussion

Pneumopericardium is a rare complication of oesophageal cancer; however, other malignancies in the thorax, including lung cancer and lymphoma, can also lead to pneumopericardium. The clinical presentation of pneumopericardium resulting from malignancy ranges from cough, fever, and dyspnoea, to shock and cardiac arrest [2]. Radiolucent stripes along the cardiac border on plain radiograph of the chest have been observed in previous reports of



Figure 2. The presence of air in the pericardial space (indicated by white arrow) on a computed tomography scan supported the diagnosis of pneumopericardium.

pneumopericardium. Additional indicators include signs of pericarditis, such as ST-segment wave changes and distant heart sounds [3].

In our case, pneumopericardium was complicated by localized pericarditis, which was limited to the inferior part of the heart. Thus, radiolucent stripes along the cardiac border were not distinct on the patient's initial plain chest radiograph. In addition, the left hemidiaphragm sign required an upright lateral chest radiograph, which is not routinely conducted in the emergency department when pneumopericardium is not suspected. Consequently, a diagnosis of pneumopericardium was considered only after the angiography was performed, and it was subsequently confirmed by chest radiography and CT. A previous study described the case of a patient with pneumopericardium that mimicked acute coronary syndrome, which was only suspected after performing emergent coronary angiography [4]. Although air embolism-related cardiogenic shock, which was related to type 2 myocardial infarction, could not be totally excluded, the main reason for the sudden collapse might have been related to an obstructive shock according to the right heart collapse in CT imaging and the operation findings. In our case, pneumopericardium first presented as community-acquired pneumonia. The most prominent hints in this case might have been the history of oesophageal cancer and the presence of radiolucent areas in the heart under pleural effusion.

Treatment of a tension pneumopericardium requires a sub-xiphoid pericardial window for drainage, repair of the underlying injury, and the use of temporary endoscopic oesophageal stents to seal oesophageal leakage [5]. Our patient underwent a sub-xiphoid pericardial-pleural window for drainage without an oesophageal stent because of

intermittent cardiac compression. In cases of patients in stable condition, an oesophageal stent should be placed. As the oesophageal perforation resulted in localized purulent pericarditis, the remaining lesion of the oesophagus allowed the oral pathogen to progress to a systemic infection. The mortality rate for patients with oesophago-pericardial fistula and pneumopyopericardium is significantly high [1].

In conclusion, the most prominent indication initially observed in this case was the history of oesophageal cancer and the presence of radiolucent areas in the heart under pleural effusion. When an unknown origin collapse develops in patients with oesophageal cancer, pneumopericardium should always be excluded, especially in cases where the cardiogenic shock is strongly suspected.

Disclosure Statement

Written informed consent was obtained for publication of this case report and accompanying images.

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Author Contribution Statement

All authors performed the conception or design of the work, and the acquisition, analysis, or interpretation of data for the work. Pei-Hsing Chen and Yu-Shan Shih

wrote a draft and revised this manuscript. All authors approved the final version of the manuscript to be published.

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Supporting information

Additional Supporting Information may be found in the online version of this article at the publisher's web-site: <http://onlinelibrary.wiley.com/doi//supinfo>.

Video S1. Computed tomography revealed air in the pericardial space with collapsed right atrium.