

Pneumopericardium as a non-small-cell lung carcinoma complication

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Abstract

Below we present a case of a young man with symptoms of progressive weakness, fever, cough, rapid decrease in body weight and the presence of a tumor in the left axillary region. The chest radiography and echocardiography revealed gas bubbles in the pericardium. The more detailed diagnostics and computed tomography of the chest showed an infiltration of the left lung cavity and a fistula among the bronchus, pleural and pericardial cavities. Further diagnostics demonstrated that the pneumopericardium (diagnosed by means of chest radiograph and echocardiography) was a complication of a primary non-small-cell lung carcinoma.

Key words: pneumopericardium, non-small-cell lung carcinoma, pneumothorax.

Introduction

Pneumopericardium is a condition in which there is an ingress of air into the pericardial cavity. It can develop in many clinical situations such as chest injuries, barotrauma in the course of ventilation with positive end-expiratory pressure, a bacterial infection with gas production in the course of air fistula between the pericardium and the trachea or bronchi, transverse colon, gaster or after esophageal surgery [1]. The coexistence of pneumopericardium and bronchopulmonary-pericardial fistula is quite a rare complication of medical interventions, injury or advanced primary lung cancer.

Below we present the case of a young man who experienced pneumopericardium as a result of non-small-cell lung carcinoma (NSCLC).

Case report

The 42-year-old patient was admitted to the Department of Internal Medicine, due to progressive weakness, rising

Streszczenie

Poniżej przedstawiamy przypadek młodego mężczyzny, który został skierowany do szpitala z następującymi objawami: postępującym osłabieniem, wyższymi temperaturami ciała, kaszlem, szybką redukcją masy ciała oraz obecnością guzka w lewej okolicy pachowej. W radiogramie klatki piersiowej i badaniu echokardiograficznym stwierdzono pęcherzyki gazu w osierdziu. Poszerzono diagnostykę, wykonano tomografię komputerową klatki piersiowej i uwidoczniło nacieki w lewej wnęce płuca, a także przetokę między jamą okolicy wnęki a oskrzelem głównym oraz jamą osierdzia. W toku dalszego leczenia wykazano, że odma osierdziowa (rozpoznana echokardiograficznie oraz radiologicznie) była powikłaniem niedrobnokomórkowego pierwotnego raka płuca.

Słowa kluczowe: odma osierdziowa, rak niedrobnokomórkowy, przetoka oskrzelowo-osierdziowa.

temperature, dry cough, weight loss (20 kg in 6 months), and the presence of a growing tumor in the left axillary region. The interview revealed smoking in the amount of 20 pack-years, and the patient's father suffering from lung cancer. The physical examination concerning significant deviations showed an erythematous nodular lesion on the skin in the left axillary region as well as dull percussion in the left subscapular area. Auscultation demonstrated decreased vesicular breath sounds and faint heart sounds. Laboratory analysis indicated moderate normocytic anemia (hemoglobin 11.1 g/dl, hematocrit 34.5%), increased aspartate aminotransferases (113 U/l) and alanine (141 U/l), alkaline phosphatase (193 U/l), γ -glutamyltranspeptidase (142 U/l), C-reactive protein (20.98 mg/l) and slightly decreased albumin (2.3 mg/dl). In the electrocardiogram, sinus rhythm was present, with heart rate of 110/min and low voltage ventricular complexes. The chest radiographic analysis revealed severe inflammatory infiltrations in the

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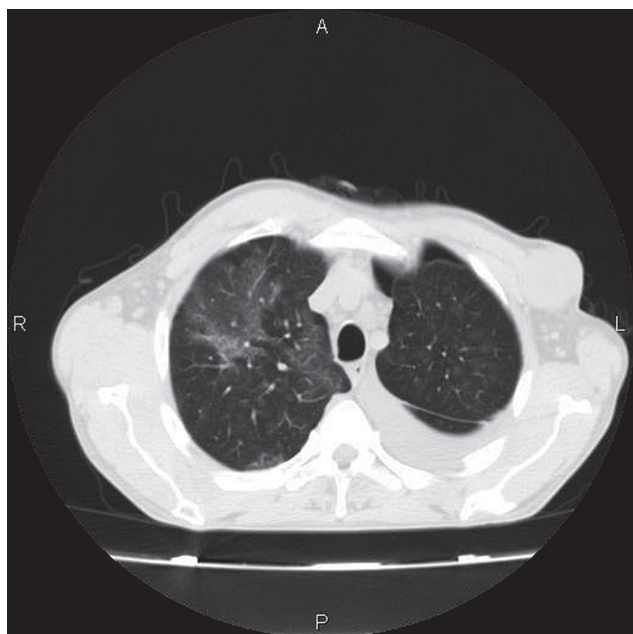


Fig. 1. Exudative pleuritis and pleuropneumonia in the left pleural cavity on computed chest tomography

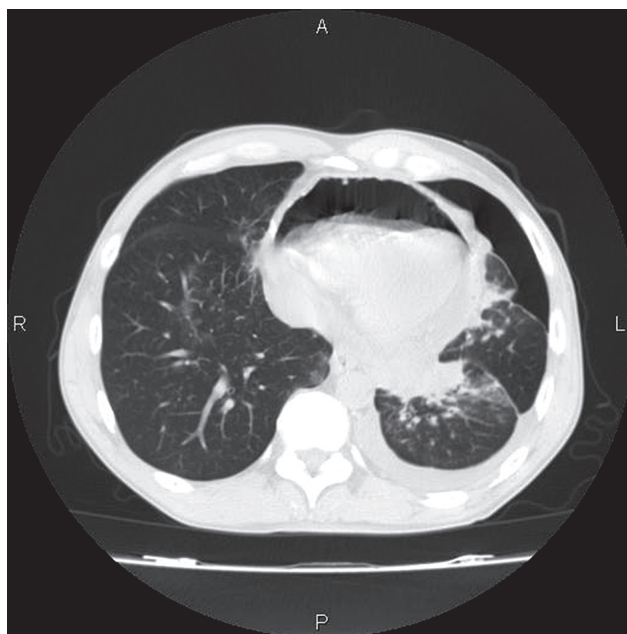


Fig. 2. Tumor of the left pulmonary hilum and the pneumopericardium on the computed chest tomography

area of the right pulmonary hilum, with the presence of fluid and gas in the pericardium, with an enlarged space between the parietal and visceral pericardium of about 15 mm. There was a 20 mm layer of fluid measured in point of care (POC) echocardiography behind the left ventricle and 10 mm of fluid behind the right ventricle with the presence of gas bubbles. The computed tomography (CT) chest scan demonstrated a subcarinal tumor of 80 mm in the left cavity, with an extensive air cavity, communicating with the left main bronchus and pericardial cavity, with a wide bronchial fistula (Figs. 1, 2). The pericardium was thickened and presented an uneven, nodular outline. Pneumopericardium with the gas layer thickness of 20 mm and accompanying left-sided pneumothorax were indicated. The left suprarenal gland revealed a tumor of 15 mm diameter, and in the chest soft tissues in the left axillary line there was a tumor with a diameter of 40 mm; both tumors were suspected of metastatic etiology. In the following echocardiography heart cavities were not enlarged, left ventricular contractility was normal with the ejection fraction of 55%, and there were no valvular changes. Doppler flow analysis was not possible due to a number of artifacts and the presence of gas bubbles in the pericardium. After thoracic surgical consultation, the patient was transferred to the Department of Thoracic Surgery and Transplantation of the Pomeranian Medical University in Szczecin, Szczecin-Zdunowo Hospital. A drain was inserted into the left pleural cavity, then the following chest radiography revealed that the left lung was expanded, and an increase of the amount of gas and fluid in the pericardium was observed, but without symptoms of air leakage. The tumor was removed from the skin of the left axillary area and subjected to histopathological examination. In subsequent days the patient's condition was stable, without dyspnea. There was no flow from drains or

air leak. On the fourth day of stay in the Department of Thoracic Surgery a bronchoscopy analysis was performed, and it demonstrated an exophytic change to the medial wall of the left main bronchus approximately 1 cm from the carina. Samples were collected for histopathological analysis. Then left videothoroscopic fenestration of the pericardium was performed. During treatment, there was a rapid rise of hemodynamic disorders, probably as a result of the completion of the pericardium with air because of positive-pressure ventilation, so urgent minithoracotomy was performed above the 6th left rib and pericardium was decompressed of air and fluid. After stabilizing the patient's condition a 20 × 30 mm hole to the front of the phrenic nerve was cut in the pericardium. The follow-up examination revealed recurrence of pneumopericardium. The drainage under ultrasound control failed. During the following days of stay, a gradual reduction of drained fluid was observed. On the 6th postoperative day, there was no air leak, and the drain was removed. Histopathological examination of the skin tumor revealed an infiltration of squamous cell carcinoma, and in the bronchus invasive squamous cell carcinoma was found. After oncological consultation the patient was disqualified from chemotherapy, due to histopathological abscessus-like form and fistula. The patient was discharged with recommendations for further palliative treatment. In case of increase in the severity of pain or hemoptysis, another consultation with consideration of radiotherapy treatment was recommended.

Discussion

Pneumopericardium is a fairly rare disease, most often resulting from iatrogenic causes, thoracocentesis complication, sternal puncture during needle bone aspiration biopsy or after tracheal damage due to malintubation. In

rare cases it is due to pericarditis caused by microorganisms producing gas [2], trauma, or creation of a fistula between the pericardium and an organ containing air (bronchi, pleura, gastrointestinal tract). The literature describes only a few cases in which pneumopericardium was a complication of primary lung cancer [3, 4]. Its presence can be determined by performing radiographs (including lateral projection to prove that the air is inside the pericardium), chest CT, and heart ultrasonography. It is difficult to prove the presence of air in the pericardium by echocardiography, because the ultrasound waves penetrate air poorly. In such a situation, it is necessary to carry out chest CT to detect air in the pericardium and possible additional diseases that may be causing pneumopericardium [5]. The procedure is dependent on the etiology, clinical symptoms and condition of the patient. In the present case the tumor could not have been radically removed because of its infiltration of the mediastinum, and therefore palliative treatment was applied, consisting of pericardium fenestration and pleural drainage. This allowed the air to access the pericardial pleural cavity, then the pleural cavity, from which the air was sucked out by the pleural drain.

After a few days following the cessation of the air leak, the pleural drain was removed. In other cases of inoperable lung cancer, there is a possibility of treatment of broncho-pericardial fistula by bronchus stent implantation, but there must be proper anatomical conditions. In case of iatrogenic, traumatic or neoplastic etiology, surgery is the treatment of choice [3].

Disclosure

Authors report no conflict of interest.

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