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The bleeding into the emphysematosus bulla imitating lung tumor
Krwawienie do pęcherza rozedmowego imitujące guz płuca

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Abstract
Bleeding into the lung parenchyma is a rare phenomenon that usually occurs as a result of chest trauma, other causes are anticoagulant therapy, and infections. The following case presents a patient admitted to the hospital due to haemoptysis, which was a symptom of bleeding into the emphysematosus bulla caused by anticoagulation therapy.
The decisive diagnostic examination was chest magnetic resonance. This imaging method allows the precise differentiation of tissues. Using modern imaging techniques can often dispense with invasive diagnostic methods.

Key words: lung tumor, emphysematosus bulla, hematoma, magnetic resonance imaging

Introduction
A round opacification on chest X-ray in a patient with chronic obstructive pulmonary disease (COPD) raises suspicion of a neoplasm.
Differential diagnosis should include primary lung tumours, metastases, inflammatory processes like tuberculosis or abscess related to other infections, pneumatocele, lung infarction, encapsulated pleural fluid, congenital abnormalities, changes in the course of interstitial diseases like Wegener’s granulomatosis, or sarcoidosis.

Below we report a case of a patient referred to the hospital in Rudka, Poland with haemoptysis and suspicion of lung cancer on the basis of chest imaging.

Case report
A sixty-five-year-old man, a retired locksmith, on disability pension at the time of presentation, ex-smoker for 10 years, with severe chronic obstructive pulmonary disease (COPD) was admitted to the hospital urgently due to intensive breathlessness, cough, and haemoptysis.
The patient was treated for bacteriologically confirmed pulmonary tuberculosis in 1987. He underwent spontaneous right and left sided pneumothoraces in 1991, 1994, and 1999, for which he had been treated with suction drainage in the surgical departments. In 2004 he was hospitalized in Rudka Hospital due to pulmonary embolism, and since then he had been treated...
with acenocumarol and seen on a regular basis by a chest physician.

On admission to the hospital the patient was in serious general condition, complaining of shortness of breath on minimal exertion and cough with haemoptysis. Physical examination revealed a barrel chest, vesicular resonance and breathing sounds, prolonged expiration time and bilateral rhonchi, and crackles.

His heart rate was regular at 80 bpm and blood pressure was 140/80 mm Hg. There were no abnormalities in the full blood count or biochemical analyses. The international normalized ratio (INR) and prothrombin ratio were abnormal: 6.16 and 14%, respectively. Chest X-ray revealed round lesion in the peripheral region of the lower zone of the right lung, measuring 35 × 50 mm, emphysema, features of chronic bronchitis, pulmonary fibrosis with bronchiectasis in the upper right zone, and small parenchymal opacifications, most likely inflammatory in nature, in the lower zone of the left lung (fig. 1). Bronchoscopy showed a rusty secretion in the bronchi of the right lung. No other abnormalities were present. The bronchial secretion was taken for cultures and cytological examination. Sputum sample and bronchial washings were negative for acid-fast bacilli.

Spirometry indicated airway obstruction of severe degree: FEV1 (forced expiratory volume in one second) — 1.13 L (32% of predicted value), VC (vital capacity) — 4.11 L (87% of predicted value), and FEV1%VC — 27.48 (36% of predicted value). Capillary blood gases examination showed: oxygen partial pressure — 60.9 mm Hg, carbon dioxide partial pressure — 36.2 mm Hg, saturation — 92.2%.

Sputum and bronchial lavage cultures showed growth of Streptococcus spp. and Neisseria spp. Cytological examination revealed the presence of granulocytes and macrophages. Next, contrast enhanced computer tomography of the chest was performed. The scan showed advanced emphysema with large thin-walled bullae in the peripheral areas of the lungs; the largest ones at the base of lower right lobe, with fluid levels in them visible — likely infected. Besides that, fibrotic upper right lobe, bronchiectasis, and focal lesion 40 × 35 mm in the 9th segment of the right lung were seen.

Radiologists could not exclude neoplastic aetiology of the described lesion. There was no thromboembolic material in the pulmonary arteries. The biopsy of the lesion was done under USG guidance. However, a sample for microscopic examination was not obtained. The procedure was complicated by pneumothorax requiring a drain insertion. Lung expansion was achieved (fig. 2, 3).
At that point the decision was made to perform contrast enhanced magnetic resonance imaging (MRI) before continuing with the invasive diagnostic process. The study showed a $32 \times 33 \times 47$ mm, hyperintense, not enhancing in T2 weighted scans, lesion with smooth contours in the right lower lobe. In T1 weighted scans of medium signal intensity, hyperintense rim characteristic for haemoglobin metabolites was described (fig. 4–6).

The performed investigations indicated the presence of haematoma formed in the emphysematous bulla, so surgical intervention was not undertaken. Antibiotics, mucolytics, bronchodilators, and positioning drainage were applied. This led to an improvement in the patient’s condition and regression of dyspnoea and haemoptysis. The anticoagulant was stopped. The patient was discharged for further follow up in an outpatient setting.

**Discussion**

Bleedings into lung parenchyma are usually caused by chest trauma, which happens especially in young men. In such cases the blood extravasation is a result of rupture or thrombosis of a bronchial artery branch, which leads to necrosis of the fragment of the lung and bleeding into the area supplied by the collateral vessels [1]. Another cause of bleeding into lung parenchyma is a complication of treatment with an anticoagulant [1–3].

In some of patients, bleedings are related to bullous emphysema. Haemorrhage into emphysematous bullae can be caused by an infection that leads to necrosis of blood vessels [2]. Routine chest imaging shows intrapulmonary haematoma as consolidations or round lesions [1–4]. A round lesion in chest X-ray of the patient presenting to hospital with haemoptysis required, most of all, exclusion of neoplastic disease. In addition, the patient was a cigarette smoker, used to work in a polluted environment, and had COPD [5]. Lung cancer had to be included in the differential diagnosis.

The results of the performed studies, including the picture of the airway tree seen at bronchoscopy and cytological examination of bronchial secretion, prompted the investigation to be broadened.

In the reported case, haemorrhage to the emphysematous bulla was caused by anticoagulant overdose and probably coexisting infection of the respiratory tract.

The crucial point in the investigation that also allowed the patient to be saved from thoracotomy was performing an MRI study. It showed a hype-
rinent rim in T1-weighted scans, which is characteristic for underwent haemorrhage.

Magnetic resonance is the most dynamically developing and universal technique of imaging, mostly due to the physical potentialities of the method. It has the ability of specific imaging of individual tissues by obtaining specific signals from various chemical compounds containing hydrogen and the possibility of imaging the proton density. No other imaging technique allows for such precise differentiation of tissues on the basis of the content of lipids and proteins or for identification of haematoma in various stages of haemolysis [6]. There has been significant progress in MR imaging during recent years, resulting in wide diagnostic possibilities [7].

Bleeding into an emphysematous bulla is a rare phenomenon. There is a case of haematoma in emphysematous bulla in Polish bibliography from recent years, published by Chabowski et al. [8]. In that paper the case of a patient admitted to the Department of Thoracic Surgery of the National Tuberculosis and Lung Diseases Institute for a round lesion in the lower right lobe in chest X-ray was described.

In chest CT scan numerous emphysematous bullae of the upper and middle right lobes were revealed. Inside one of them, a mass 35 × 28 mm was seen. Bronchoscopy did not show any pathology.

Alpha1-antitrypsin serum concentration was normal. Due to the presence of a very big bulla (that itself was an indication for surgery) and the necessity of verification of the lesion’s aetiology, the patient underwent right sided thoracotomy.

The emphysematous bulla, together with a mass 3 cm in diameter inside it, was removed from the upper lobe. On histopathological examination it appeared to be a fragment of pulmonary parenchyma with emphysematous changes and the presence of numerous cysts with organized haematoma inside.

Bacteriological studies, including mycobacterial and mycological studies, of the removed tissue were performed. The cultures were negative [8]. Chest MR imaging was not performed in that case due to technical aspects.

As was mentioned before, bleeding into an emphysematous bulla is not a common phenomenon. We decided to present this case to show the potentialities and necessity of using different available chest imaging methods. This helps in making a diagnosis without turning to more invasive procedures.

Conflict of interest statement

The authors have no conflict of interest to declare.

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