



Case report

Tuberculosis mimicking lung cancer



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ARTICLE INFO

Article history:

Received 28 January 2015

Received in revised form

25 June 2015

Accepted 26 June 2015

Keywords:

Lung tuberculosis

Lung cancer

ABSTRACT

Tuberculosis (TB) is well known as a diagnostic chameleon and can resemble malignancy. In thorax TB can be manifested as pulmonary infiltrates and/or mediastinal lymphadenopathy. In low incident countries with high incidence of lung cancer and varying clinical presentations, TB often gets misdiagnosed with the result of delayed treatment start and unnecessary diagnostic procedures.

Our case report presents two patients, who were referred to the Thorax diagnostic centre at the Department of Respiratory Medicine, Odense University Hospital, with presumptive diagnosis of neoplasm and had proved lung TB with no evidence of malignancy instead. In the first case diagnosis was confirmed after thoracotomy, in the second case after bronchoscopy.

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1. Introduction

Tuberculosis (TB) is well known as a diagnostic chameleon and can also resemble malignancy. In thorax TB can be manifested as pulmonary infiltrates and/or mediastinal lymphadenopathy. Since the discovery of *Mycobacterium tuberculosis* by R. Koch, world medical organisations put a big effort into different programs, trying to eliminate TB. Nevertheless it remains a major global health problem. It ranks as the second leading cause of death from an infectious disease worldwide, after the human immunodeficiency virus (HIV) [1]. The latest estimates reported 8.6 million new TB cases in 2012 and 1.3 million TB deaths (just under 1.0 million among HIV-negative people and 0.3 million HIV-associated TB deaths) [1]. In 2012 the TB incidence rate per 100,000 population in the West Europe was reported between 15 (UK) and 3.5 (Iceland). In Denmark the incidence rate was reported to be 7.4, and there were 410 TB cases per year.

Due to the reduction of TB incidence in the western countries and varying clinical presentations, resulting in unnecessary diagnostic testing and delayed treatment start.

2. Case reports

2.1. Case 1

A 48-year-old man was referred with a 2 month history of chest tightness, intermittent non-productive cough and unintended

weight loss of 3 kg in the past 2 month. He had no reported fever and had no prior medical history. He smoked around 30 cigarettes per day and had estimated 45 pack years.

Physical examination revealed no abnormalities. Routine laboratory investigations, including leukocytes (L) and C-reactive protein (CRP) presented normal values. The lung functions tests showed normal ventilation parameters with forced expiratory volume in 1 s (FEV₁) of 3.5 l (94% of the predicted value) and forced vital capacity (FVC) of 4.5 l (97% of the predicted value). The chest X-ray presented an approximately 2 cm nodular infiltrate in the left lung (Fig. 1). Computed tomography (CT) scan of the chest confirmed infiltrate in segment 6 of the left lower lobe (Fig. 2). Under the presumptive diagnosis of malignancy we ordered a whole-body 18 fluor-deoxyglucose positron emission tomography (18-FDG-PET) and CT scan. It revealed a high metabolic activity of the lesion (Fig. 3). With this imaging appearance, a provisional diagnosis of lung cancer was made. The patient underwent bronchoscopy with brush biopsies, endobronchial ultrasound transbronchial needle aspiration (EBUS –TBNA) and CT-guided lung biopsy with negative result concerning malignancy and without any diagnostically clarification. We still considered that the patient has lung cancer, so the next step was Video-assisted thoracoscopic surgery (VATS). The pathologic examination revealed no malignancy but instead caseous granulomatous inflammation. PCR for mycobacterium TB complex taken from the resected lung tissue was positive, so the diagnosis of pulmonary TB was confirmed, and the patient received standard anti-TB-therapy composed of pyrazinamide, isoniazid, ethambutol and rifampicin.

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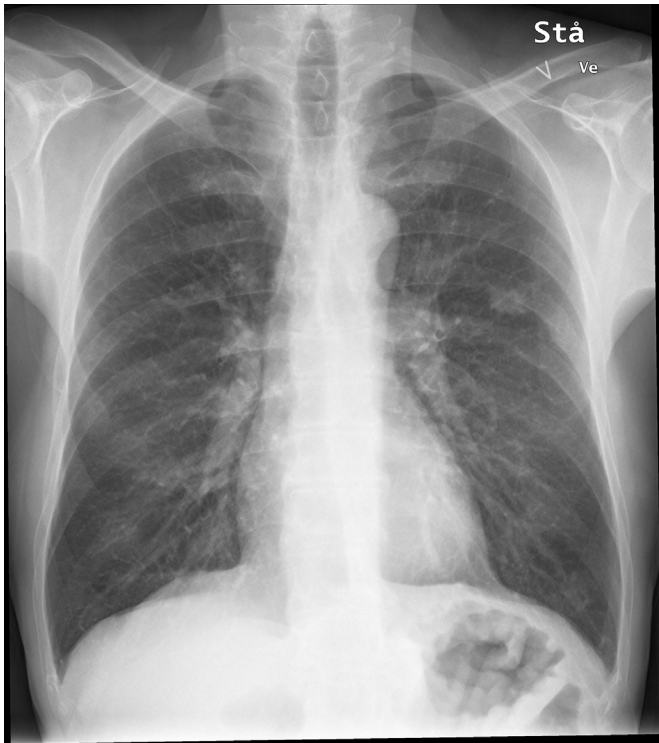


Fig. 1. Chest X-ray showing infiltrate in the left lung.

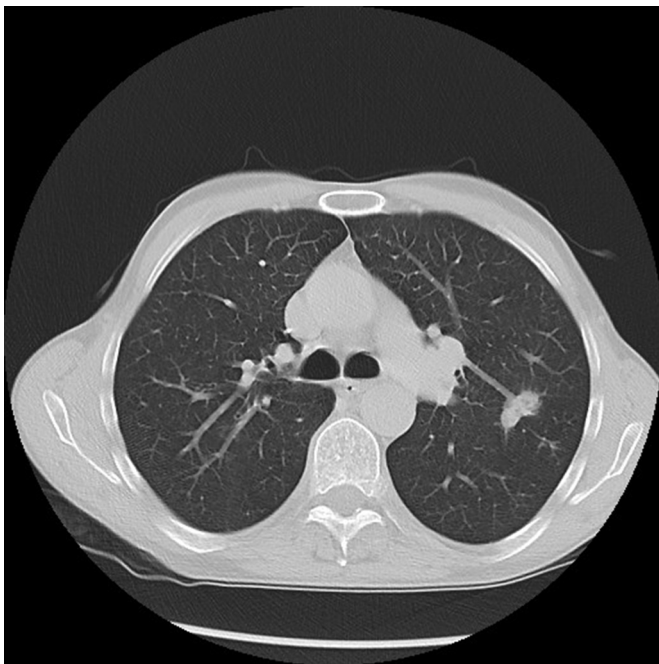


Fig. 2. CT thorax showing infiltrate in the left upper lobe.

2.2. Case 2

A 56-year-old man with a 12 month history of productive cough, thorax pain related to respiration and around 10 kg unintended weight loss was referred to our department with a presumptive diagnosis of lung cancer. He smoked up to 60 cigarettes per dag and

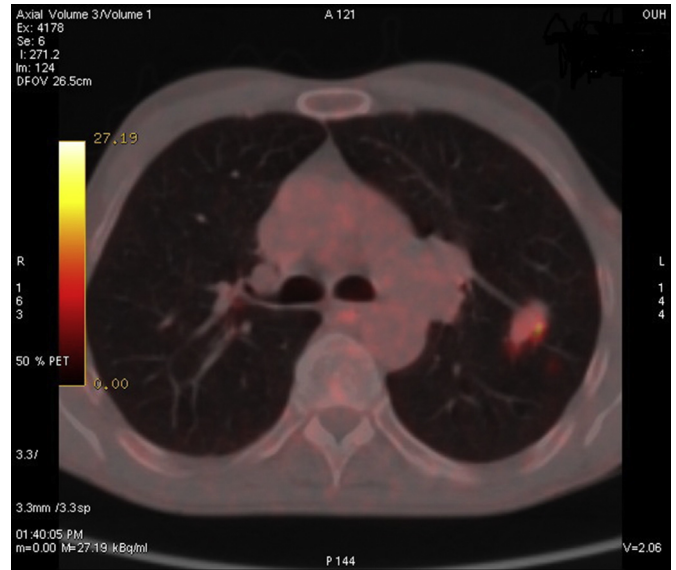


Fig. 3. 18-FDG-PET scan showing high metabolic activity.

had estimated 100 pack/years. Routine laboratory investigations, including L and CRP revealed no abnormalities. He was diagnosed with COPD and lung function tests showed FEV₁ over 2.2 l (59% of predicted value) and FVC over 3.7 l (79% of predicted value). He had a family history of lung cancer and had a history of alcohol over-consumption. Chest X-ray showed consolidation in the upper right lobe (Fig. 4) and the CT scan revealed an infiltrate with cavitations and irregular margins (Fig. 5). The patient underwent 18-FDG-PET and CT scan with the result of high metabolic activity of the lesion (Fig. 6). The next diagnostic step was bronchoscopy with brush and forceps biopsies with negative results concerning malignancy. We

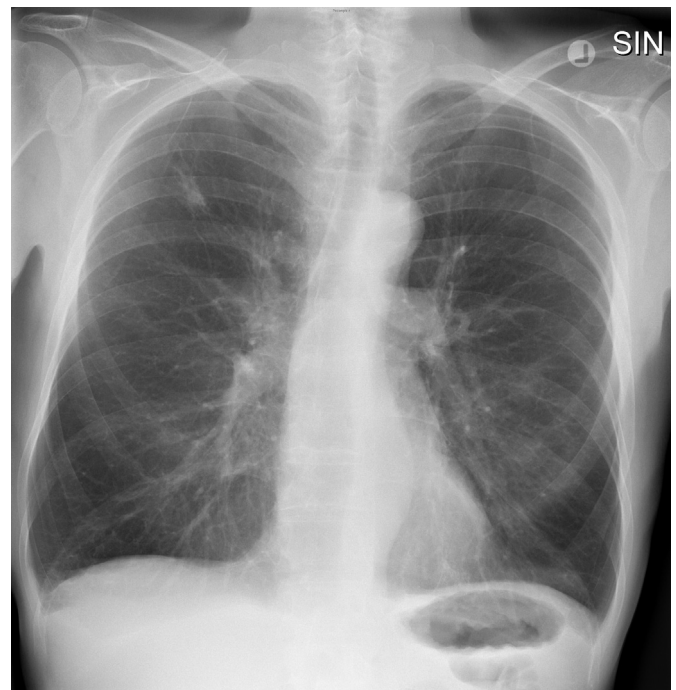


Fig. 4. Chest X-ray showing infiltrate in the right lung.



Fig. 5. CT thorax showing infiltrate in the right upper lobe.

also sent bronchial wash samples to microbiological diagnostic with negative results concerning bacteria, fungi, legionella, mycoplasma, chlamidia, negative direct microscopy and PCR for mycobacterium TB complex. Only cultivation of the bronchial wash provided the diagnosis by documented growth of the mycobacterium TB. The patient was started on standard anti-TB-therapy.

3. Discussion

TB and lung cancer have been confused and misdiagnosed for centuries [2]. There is especially in countries with low TB incidence diagnostic challenges with risk of diagnosis getting missed. Radiological features suggestive of lung cancer, like consolidations with irregular margins and thick-walled cavities, showing high metabolic activity on the 18-FDG-PET and CT-imaging are also typical for lung tuberculosis. Differentiation according to the radiological findings can not be provided. The diagnosis has to be confirmed by pathological and microbiological tests.

Prytz et al. reported about 91 patients with presumptive diagnosis of lung cancer, who underwent thoracotomy, but proved to have pulmonary TB [2].

Pitlik et al. reported about 26 cases out of more than 70.000 patients, who were referred to the Texas cancer centre, USA during the 10 year period (1973–1982), with presumptive diagnosis of neoplasm and had bacteriological proved TB with no evidence of malignancy [3]. Classic symptoms, connected to TB, like fever,

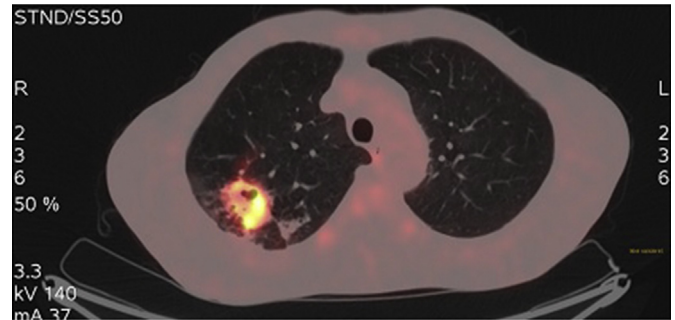


Fig. 6. 18-FDG-PET scan showing high metabolic activity.

haemoptysis and weight loss were uncommon [3]. The most common abnormalities on chest radiography were multilobar infiltration, upper lobes infiltrates and pleural effusion [3]. The most common form was pulmonary TB followed by lymphadenitis [3]. Laboratory abnormalities were unusual [3].

Rolston et al. conducted a retrospective analysis, covering a 3-year period, of patients with presumed lung cancer, who turned out to have pulmonary infection instead. Of the 2908 patients who underwent a diagnostic evaluation, 2713 (93%) were documented as having either a primary or a metastatic pulmonary lesion; 11 patients (0.4%) had a benign process; 37 patients (1.3%) had a documented infection; and 147 patients (5.0%) had nonspecific findings or other pulmonary diseases. Fungal infections accounted for 46%, mycobacteria for 27%, bacteria for 22%, and parasitic lesions for 5% of these infections [4].

In conclusion, differentiating of lung TB from neoplasm, according to the clinical and radiological findings can be challenging. Both diseases present parenchymal infiltrates with high metabolic activity on the 18-FDG-PET scanning and can have similar symptoms. On the other hand, the diagnosis of pulmonary TB can be established with relative simple microbiological tests (direct microscopy, PCR for mycobacterium complex and cultivation). Interferon gamma release assays for TB detect sensitization to *M. tuberculosis*, but on the other hand cannot differentiate between active and latent TB. Considering TB as one of the differential diagnosis of PET positive lung infiltrate, would help to avoid unnecessary diagnostic procedures, resulting in reduction of complications rates and costs of the diagnostic workup.

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