CASE REPORT

Sarcoidosis: clinical mimicry of pulmonary embolism

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SUMMARY

Sarcoidosis can manifest with clinical signs suggestive of pulmonary embolism (PE). A 36-year-old male patient presented with a 2-day history of left-sided pleuritic chest pain and dyspnoea. He was hypoxic and tachypnoeic, and initial blood tests showed a positive plasma D-dimer. Subsequent arterial blood gas showed respiratory alkalosis with type 1 respiratory failure. He was suspected to have a PE, and CT pulmonary angiogram (CTPA) was urgently arranged. This latter investigation did not show any impairment in pulmonary arterial blood flow but revealed bilateral hilar and mediastinal lymphadenopathy suggesting sarcoidosis. Serum calcium and ACE were also elevated. The patient was treated conservatively and discharged after 2 days with out-patient endobronchial ultrasound and clinic follow-up arranged.

BACKGROUND

Sarcoidosis is a granulomatous inflammatory rare condition which can have a multiorgan involvement and whose diagnosis may represent a clinical challenge. It affects mainly women of all ethnic backgrounds with a peak incidence between the ages of 20 years and 39 years.¹ Unfortunately, it is not simple to diagnose and there are non-specific clinical signs.² During acute presentation it can manifest with clinical signs suggesting pulmonary embolism (PE). Hence, imaging as well as biochemistry studies play an important role in the diagnosis of this disease.

CASE PRESENTATION

A 36-year-old male patient presented to the accident and emergency (A&E) department with gradual onset of the left-sided pleuritic chest pain as well as shortness of breath for 2 weeks. He described the pain as being sharp, non-radiating and 5/10 in severity. Furthermore, the pain was aggravated by deep breathing and sitting up in bed.

The patient also reported having had a dry cough about 3 weeks prior to the A&E department attendance for which he had a chest X-ray (figure 1) at a different local A&E department and was treated for pneumonia with a 1 week course of oral antibiotics.

He was a plumber, otherwise fit and healthy and had never experienced this kind of chest pain before in his life. He denied any fever, haemoptysis, recent long-distance travelling, previous history of deep vein thrombosis (DVT) or PE. On further questioning, his father had DVT and had died due to myocardial infarction.

On examination, the patient was afebrile and haemodynamically stable with a heart rate of 100 bpm, a respiratory rate of 24 bpm and an

oxygen saturation of 94% on room air. Moreover, on cardiorespiratory examination, he had bibasal crepitations and no signs of congestive cardiac failure. His calves were soft and non-tender. No palpable lymphadenopathy. His Well's score for PE was 0.

His initial blood results showed polycythaemia (haemoglobin 173), troponin I level of 21, serum calcium of 2.62 mmol/L (ULN 2.6) and a positive serum D-dimer.

In view of the clinical findings and positive D-dimer, an arterial blood gas was performed and it showed respiratory alkalosis (pH 7.49, pCO₂ 4.2 kPa) with type 1 respiratory failure (pO₂ 7.4 kPa). At this time, an initial diagnosis of PE was made and a CT pulmonary angiogram (CTPA) was urgently arranged. The patient also received first treatment dose of low molecular weight heparin.

Surprisingly, CTPA revealed normal pulmonary arterial blood flow with no evidence of embolism. However, it showed bilateral hilar and mediastinal lymphadenopathy in keeping with the diagnosis of sarcoidosis (figure 2). Subsequently, serum ACE was requested and resulted to be elevated to 195 U/L [0–70 U/L].

The patient was informed about the clinical details of his diagnosis and referred to the respiratory physicians for further investigations and management plan.

INVESTIGATIONS

Arterial blood gases: pH 7.49, pCO₂ 4.2 kPa, pO₂ 7.4 kPa, HCO₃⁻ 23.8 mmol/L, BE 1.3 mmol/L.

Serum ACE: 195 U/L [0–70 U/L].

Adjusted serum calcium: 2.62 mmol/L [2.2–2.6 mmol/L].

Figure 1 Chest X-ray: bilateral prominent hila and diffuse thickening of the bronchovascular marking with reticulonodular appearance.

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To cite: Nasher O, Boldy DA. *BMJ Case Rep* Published online: [please include Day Month Year] doi:10.1136/bcr-2013-201641

Figure 2 CT pulmonary angiogram scan of the chest (lung window): bilateral hilar and mediastinal lymphadenopathy.

Chest X-ray: prominent hila bilaterally. Diffuse thickening of the bronchovascular marking with reticulonodular appearance.

CTPA: bilateral hilar lymphadenopathy, multiple mediastinal lymph nodes with the largest measuring 1.7 cm; diffuse nodular and reticular opacities throughout both lungs with interlobular septal thickening and bilateral nodular pleural thickening.

Endobronchial ultrasound (EBUS) lymph node biopsy: non-caseating granuloma with background of lymphocytes.

Bronchoalveolar lavage (BAL) fluid microscopy: no organism seen.

BAL fluid culture (including *Mycobacterium tuberculosis*): no growth.

DIFFERENTIAL DIAGNOSIS

Differential diagnoses of hilar adenopathy include sarcoidosis, lymphoma, tuberculosis, silicosis and primary or secondary neoplastic diseases.

In this case, tuberculosis was not considered as there was neither history of travelling to areas with high incidence of tuberculosis nor having been in contact with individuals affected by the disease. In addition, the microscopic analysis of the BAL did not show acid-fast bacilli and fluid culture was negative for *Mycobacterium tuberculosis*. Furthermore, silicosis was unlikely in this case due to his occupation not involving exposure to silica.

Hilar shadow on chest X-ray could also represent a neoplastic mass either primary or metastatic. However, considering the age, family history and clinical as well as laboratory findings the above diagnosis was thought to be of much lesser likelihood and ultimately it was excluded by the EBUS lymph node biopsy.

Another differential diagnosis which could be considered in this case is pulmonary lymphoma which can occur in 15–40% of patients affected by Hodgkin's disease.³ Moreover, it can appear as single, multiple or cavitated lesions.⁴ For this reason, a diagnostic lymph node biopsy was required to exclude pulmonary lymphoma.

Finally, having ruled out PE, the presence of bilateral hilar adenopathy on chest X-ray and CTPA, accompanied by raised serum ACE and calcium level, led to the final diagnosis of sarcoidosis which was then confirmed with EBUS lymph node biopsy.

TREATMENT

The patient was treated conservatively with analgesia and oxygen therapy while in-patient.

OUTCOME AND FOLLOW-UP

The patient's symptoms improved and he was discharged on day 2 of his hospital admission. It was then arranged for him to

undergo EBUS at Nottingham City Hospital with follow-up at the respiratory out-patient clinic.

DISCUSSION

Sarcoidosis is a systemic inflammatory granulomatous condition of which the aetiology is still unknown. It can affect any individual regardless of race or age, although it seems to affect more predominantly females.² The clinical presentation can be very variable although the majority of patients (90%) that manifest symptoms have intrathoracic involvement. In addition, up to 30% of patients usually have a spontaneous resolution without any treatment.⁵ The diagnosis of sarcoidosis is usually supported by clinical and radiological findings combined with histopathology results and it normally requires the involvement of two organs although the presence of bilateral hilar lymphadenopathy on a chest X-ray is indicative of a second organ involvement.² Furthermore, serum ACE lacks sensitivity and specificity for the diagnosis of sarcoidosis and should be used as a supportive rather than first-line investigation.²

Sarcoidosis can sometimes mimic the acute presentation of PE.⁶ There have been case reports of patients who presented with acute respiratory symptoms as well as ventilation-perfusion mismatch and positive D-dimer studies suggesting PE despite the fact that subsequent investigations demonstrated pulmonary sarcoidosis.^{6–8} Moreover, D-dimer studies are very sensitive for venous thromboembolism but lack specificity as they can be raised in other diseases.¹⁰

In several studies, plasma or BAL fluid D-dimer resulted to be positive and related to sarcoidosis.^{9–11} In addition, it has been reported that abnormal expression of procoagulant and plasminogen activator activities could promote a procoagulant effect leading to vascular thrombosis.¹²

The treatment of sarcoidosis remains as an area of controversy. Not every patient diagnosed with the disease requires medical therapy, even when there is intrathoracic involvement, unless the patient is symptomatic.¹³ Corticosteroids are the first-line treatment for symptomatic patients and they are normally given for a defined period of time until remission. Furthermore, other new non-steroidal drugs, such as cytotoxic as well as anti-microbial agents and cytokine modulators have also been used to treat sarcoidosis.¹⁴

Learning points

- ▶ Clinical manifestation of pulmonary sarcoidosis can mimic acute presentation of pulmonary embolism.
- ▶ Pulmonary angiography should be performed in patients presenting with acute positive findings suggesting pulmonary embolism.
- ▶ Plasma D-dimer is often positive in patients with sarcoidosis and it correlates with the disease activity.
- ▶ Serum ACE is a supportive rather than first-line investigation for sarcoidosis.

Contributors ON drafted the manuscript multiple times to improve the content along with DAB who approved the final version. Both the authors have contributed towards the manuscript.

Competing interests None.

Patient consent Obtained.

Provenance and peer review Not commissioned; externally peer reviewed.

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