CASE REPORT

Phantom tumour of the lung in a patient with renal failure misdiagnosed as chest infection

Sarah Ali Althomali,¹ Mazen Mohammed Almalki,² Syed Atif Mohiuddin³

¹Al-hada Armed Forces Hospital, Taif, Saudi Arabia

²Department of Internal Medicine, Al-hada Armed Forces Hospital, Taif, Saudi Arabia

³Department of Nephrology—Internal Medicine, Al-hada Armed Forces Hospital, Taif, Saudi Arabia

Correspondence to

Sarah Ali Althomali, sara_ali8089@yahoo.com

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SUMMARY

Phantom or vanishing tumour of the lung is a rare finding on chest radiographs that has been reported secondary to heart failure or chronic kidney disease. It has been described as an interlobular effusion of the transverse or oblique fissure of the right lung. Although it is uncommon, it should always be considered as a differential diagnosis for a radiographic opacity of the right-middle lung zone because it can be easily mistaken for a lung mass or infiltration. We herein present a case involving a patient with chronic kidney disease and a radiographic opacity of the right-middle lung that was diagnosed as a chest infection. The patient did not respond to various antibiotics and showed a poor response to diuretics, the standard treatment for phantom tumour. However, the patient markedly improved after dialysis, and the radiographic chest opacity disappeared.

BACKGROUND

Phantom tumour of the lung is a rare but well-known chest radiograph feature recognised primarily in patients with fluid overload. It is defined as an interlobular or encysted effusion.¹ Phantom tumours are typically located in the right-middle zone of the lung,² although they have also been reported on the left side.³ The transverse fissure is more frequently involved than the oblique fissure.⁴ Phantom tumours require no special treatment other than standard treatment for pleural effusion with diuretics. Additionally, one of the most distinguishing characteristics of phantom tumours is that they tend to disappear after diuretic therapy (hence the term ‘vanishing tumour of the lung’).^{5–7}

We herein present a case involving a patient with a phantom tumour of the lung that was initially diagnosed and treated as a chest infection.

CASE PRESENTATION

A 60-year-old non-smoking male patient with diabetes mellitus, and chronic kidney disease presented to our emergency department (ED) with a 2-week history of progressive shortness of breath associated with a productive cough (minimal amount of whitish sputum). He denied any history of fever, haemoptysis, chest pain, night sweats, significant weight loss or contact with tuberculosis-infected patients. He had normal vital signs with the exception of blood pressure of 140/82 mm Hg and mild hypoxia (oxygen saturation of 86% on room air). Chest examination revealed bilaterally decreased air entry; the remainder of the physical examination was normal with the exception of

bilateral lower limb pitting oedema. The laboratory results showed normal levels of white blood cells ($6.8 \times 10^9/L$), potassium (5.8 mmol/L), urea (24 mmol/L) and creatinine (229 $\mu\text{mol/L}$). A chest radiograph revealed moderate bilateral pleural effusion and an opacification in the right-middle lung region near the transverse fissure (figure 1).

INVESTIGATIONS

The patient was admitted with a presumptive diagnosis of chest infection and was started on intravenous antibiotics (ceftriaxone and clarithromycin). His echocardiogram was normal with an ejection fraction of 65% and no evidence of diastolic dysfunction. However, his condition did not improve with the antibiotic treatment. A thoracic CT scan revealed moderate bilateral pleural effusion with an encysted area of effusion along the transverse fissure (figure 2). Sputum culture and three sets of acid-fast bacilli smears were negative. The patient remained hypoxic despite completing a 7-day course of antibiotics and furosemide (80 mg/day). Thoracentesis was then performed and revealed a transudative fluid.

TREATMENT

The patient was transferred to the intensive care unit and intubated as his condition was deteriorating. His renal function was poor (urea 39.2 mmol/L, creatinine 351 $\mu\text{mol/L}$) and he became anuric. He was started on intravenous tazocin and teicoplanin along with injectable furosemide, but his renal function was markedly worsening, and he developed pulmonary oedema with

Figure 1 An opacity of the right-middle zone.

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Figure 2 A chest CT scan showing an encysted effusion along the course of the transverse fissure.

no response to diuretics. The patient underwent three sessions of haemodialysis with ultrafiltration; his condition subsequently improved, and the intravenous antibiotics were discontinued.

OUTCOME AND FOLLOW-UP

For the next 2 weeks, the patient underwent seven sessions of haemodialysis with ultrafiltration. His condition markedly improved, and a thoracic radiograph at the time of discharge showed complete resolution of the opacity in the right-middle lung zone (figure 3A).

One year later, the patient presented again to our emergency department with cough and dyspnoea. He admitted that he had not been adherent to the medications. A chest radiograph showed left pleural effusion with the same opacity at the same site in the right-middle lung zone near the transverse fissure (figure 3B). The patient was treated with injectable furosemide with good response and discharged home.

DISCUSSION

Phantom tumour of the lung is a distinctive type of pleural effusion where fluids accumulate in the lung fissures; commonly the transverse fissure of the right lung. This collection gives a radiographic appearance of a round opacity that is similar to the appearance a mass or infiltration on chest radiograph.¹

Phantom tumour of the lung mostly is secondary to heart failure, as first described by Stewart in 1928,⁸ but it has also been reported in patients with renal failure, hepatic failure, pneumonia and tuberculosis. To the best of our knowledge, this is the first case reported for a patient who developed phantom tumour of the lung secondary to chronic renal disease in a relatively early stage (stage 4 chronic kidney disease, with estimated-glomerular filtration rate of '27.0 mL/min/1.73 m³').

This patient's chest radiograph at the time of admission showed an opacity in the right-middle zone of the lung. The opacity was interpreted as an infiltration, and the patient was diagnosed with a chest infection. Although the patient did not show the typical picture of chest infection, elderly patients especially those with chronic diseases that weaken the immune system do not present with the full inflammatory response and infections should always be suspected.

The diagnosis of a phantom tumour of the lung rather than an infiltration is supported by the fact that the patient's condition did not respond to antibiotics, that progressive

Figure 3 (A) Postdialysis normal chest X-ray. (B) Reappearance of the right-middle zone opacity after 1 year.

improvement was seen with haemodialysis and ultrafiltration, and that postdialysis resolution of the right-middle lung opacity occurred. The recurrence of the same radiographic finding at the same site in the right-middle lung zone at the second visit is also consistent with this diagnosis. Although infection can cause the development of loculated pleural effusion or loculated empyema, this was excluded in the present case by the negative thoracentesis results.

This case is important because although phantom tumour of the lung is easy to treat, its diagnosis is challenging. Recognition of a phantom tumour on a chest radiograph is of utmost importance because it can be easily misdiagnosed as a mass or infiltration, which may subject the patient to unnecessary diagnostic procedures or empirical treatment with antibiotics.¹ Our patient underwent aggressive antibiotic therapy for a presumed chest infection. A case of unresponsive pneumonia and an alternative diagnosis of phantom tumour were considered. No specific investigative techniques exist for confirmation of phantom

tumour of the lung other than a marked response to diuretic therapy, which our patient received but to which he did not respond. However, he responded well to haemodialysis, which corrected his fluid overload.

Physicians should always consider a phantom tumour as a possible cause of a lung opacity on a chest radiograph in a patient with fluid overload; the presence of pleural effusion makes the diagnosis easier. Empirical antibiotic therapy should not be initiated before the patient has been confirmed to be unresponsive to diuretic therapy or in the presence of signs of systemic inflammatory response syndrome.

Learning points

- ▶ Phantom tumour of the lung should always be considered in patients with fluid overload and a right-middle lung opacity on chest radiographs.
- ▶ Early recognition of phantom tumours of the lung can spare the patient and the treating physician unnecessary investigation and treatment.
- ▶ Phantom tumours require no special treatment, and once recognised, it can be treated as pleural effusion (ie, by correction of the underlying condition).

Almost all reported cases of phantom tumours involved patients with congestive heart failure, and the patients responded well to diuretic therapy. However, resistance to furosemide is a recognised problem in patients with chronic renal disease. In such situations, a more effective treatment of phantom tumour is haemodialysis, as in our case.

Competing interests None.

Patient consent Obtained.

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