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Case report

A Vietnamese woman with a 2-week history of cough

A 52-year-old nonsmoker Vietnamese woman without any past medical history presented at the emergency department in May 2018 for a 2-week history of cough.

It started after a virus-like upper airways infection, with runny nose, mild fever, dry then wet cough, with worsening day after day until the day of presentation, when she complained about recurrence of high fever and apparition of non-bloody diarrhoea. The patient had no other symptoms and no general status alteration. She reported no previous exposure to tuberculosis.

Physical examination showed: temperature 39.3ºC, arterial blood pressure 120/70 mmHg, cardiac frequency 100 beats per min, respiratory rate 20 breaths per min, arterial oxygen saturation measured by pulse oximetry 96% in room air, bilateral bronchial rales, and no other abnormal findings.

Blood tests showed: white blood cells 12000 cells·µL^{-1} (neutrophils 10000 cells·µL^{-1}, lymphocytes 900 cells·µL^{-1}), haemoglobin 13.9 g·dL^{-1}, platelets 256000 µL^{-1}, procalcitonin 0.733 ng·mL^{-1}, electrolytes normal, urea 3.6 mmol·L^{-1}, creatinine 76 µmol·L^{-1}.

Haemoculture, stool culture and urine culture were also sampled. The patient was unable to perform a sputum sample.

Task 1
What test would you request to assist in the diagnosis?

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Can you diagnose this case of a Vietnamese woman with a 2-week history of cough?
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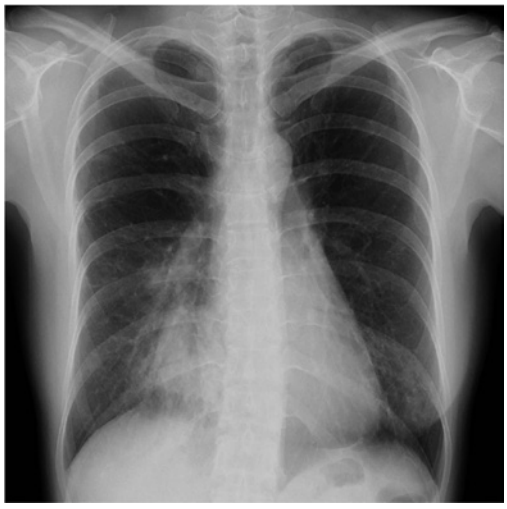

Figure 1 *Chest radiograph at initial presentation.*

Answer 1
Chest radiography.

A chest radiograph was performed (figure 1).

Task 2
What does the chest radiograph show (figure 1)? What is the most likely diagnosis at this point?

Answer 2
The chest radiograph showed alveolar opacities in the right lower and middle lobes and in the left lower lobe. There were also non-systematised opacities in the right upper lobe.

The most likely diagnosis was a community-acquired bilateral pneumonia.

A diagnosis of bilateral community-acquired pneumonia was made in the emergency department and treatment with ceftriaxone 2 $g \cdot day^{-1}$ and levofloxacin 500 mg twice daily was started, according to the Vietnamese recommendations due to a high level of bacterial resistance in our country.

The patient was then hospitalised and referred to the chest physician the following day for advice. Because of the progressive presentation and the right upper lobe infiltrates, the chest physician ordered a computed tomography (CT) scan of the thorax (figure 2).

Task 3
What does the CT scan of the thorax show (figure 2)? Which alternative diagnosis does the chest physician suspect? What further diagnostic test should be carried out?

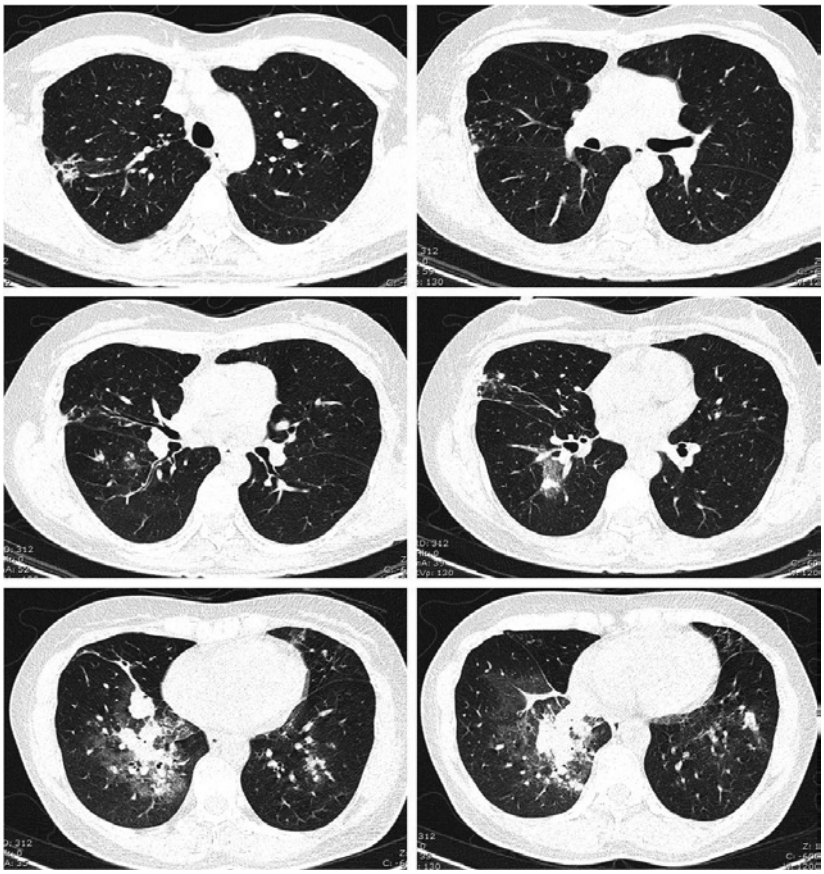

Figure 2 *CT scan of the thorax at initial presentation.*

Answer 3
The CT scan of the thorax showed fibroreticular opacities in the right upper lobe, middle lobe and apical part of the right lower lobe. In addition, there were also alveolar opacities in the right and left lower lobes.

Pulmonary tuberculosis should be considered, and sputum samples should be collected for further testing.

The patient refused to give any sputum samples but agreed to have a bronchoscopy. The bronchoscopy showed pus coming from both lower lobes and no other abnormalities.

Antibiotics (ceftriaxone and levofloxacin) were continued for 7 days.

The patient's clinical condition improved dramatically, with regression of fever after 2 days and reduction of cough.

Blood tests showed regression of the inflammatory status with decreased white blood cells to 7000 cells·µL^{-1} (neutrophils 4300 cells·µL^{-1}, lymphocytes 1900 cells·µL^{-1}) and procalcitonin to 0.1 ng·mL^{-1} after 7 days of antibiotics.

Bronchial aspirates were negative for bacteriology, mycology, acid-fast bacilli (AFB) staining and nucleic acid amplification testing for *Mycobacterium tuberculosis*.

Additional bacteriological results were negative (stool culture, haemoculture and urine culture). Serology for hepatitis B and C and HIV were negative.

The patient was discharged home with a follow-up appointment 1-week later but did not attend the consultation.

In July 2018, the culture for mycobacteria came back positive for *M. tuberculosis* sensitive to first line treatment. The patient had a follow-up appointment. She had no complaints, especially no cough, no fever or general status alteration. Physical examination was normal. Blood tests were normal for total blood cell count, electrolytes, creatinine, uric acid and hepatic liver function, but erythrocyte sedimentation rate was elevated to 52 mm·h^{-1}. A CT scan of the thorax was performed (figure 3).

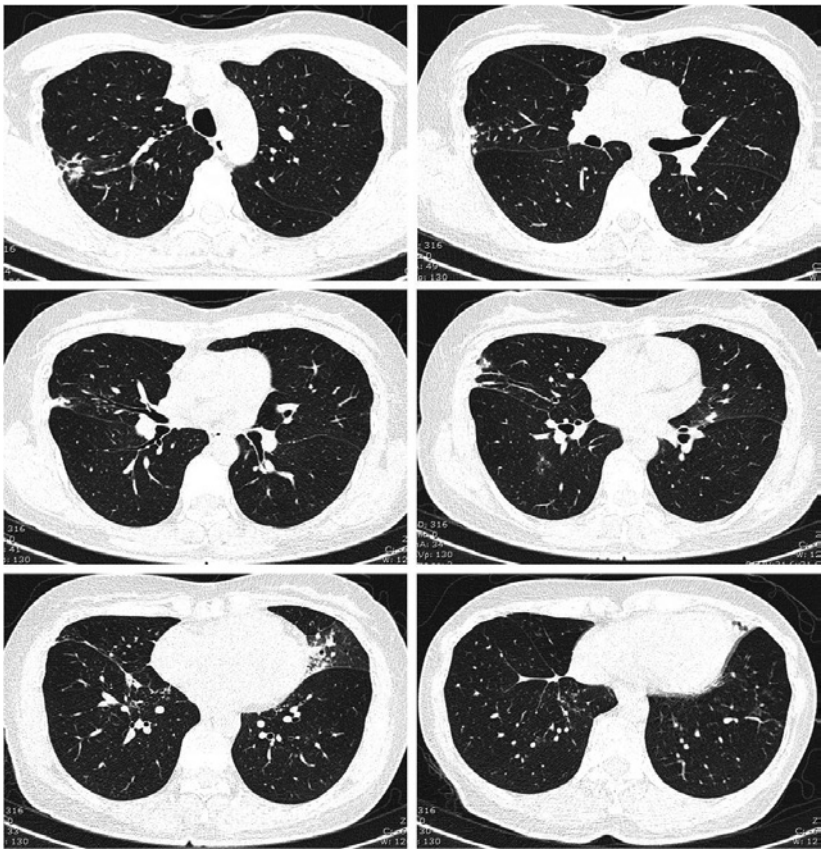

Figure 3 *CT scan of the thorax 2 months after initial presentation.*

Task 4
What does this CT scan of the thorax show (figure 3)? What was the final diagnosis? Which treatment would you have started?

Answer 4

The CT scan of thorax showed a nearly complete regression of the bilateral lower lobe alveolar opacities but the persistence of opacities in the right upper lobe, middle lobe and apical part of the right lower lobe and the apparition a new infiltrate of in the lingula.

The final diagnosis was tuberculosis mimicking a pneumonia, in an immunocompetent patient, in a country with a high prevalence of tuberculosis.

Treatment with isoniazid, rifampicin, ethambutol and pyrazinamide was started for 2 months, followed by 4 months of isoniazid and rifampicin.

Discussion

Concomitant pulmonary tuberculosis and community-acquired pneumonia, or pulmonary tuberculosis mimicking a community-acquired pneumonia, are not uncommon in countries with a high prevalence of tuberculosis, even in immunocompetent adult patients [1, 2].

It is often very difficult to distinguish between the two diseases. However, ruling out pulmonary tuberculosis is very important. Missing this diagnosis results in the risk of transmission and outbreaks, especially in healthcare settings, because the common isolation measures to avoid propagation of *M. tuberculosis* will not be undertaken. Furthermore, it leads to delayed treatment, so the patient may develop a more severe tuberculosis disease. Finally, the use of empirical antibiotics such as fluoroquinolones for community-acquired pneumonia could decrease the yield of diagnostic tests for *M. tuberculosis* or lead to emergence of resistant tuberculosis.

The following features have been reported as potentially indicative of *M. tuberculosis* as a cause of acute pneumonia in an immunocompetent adult patient [1–7]:

- On clinical examination, an older age, a longer duration of symptoms, a history of night sweats, weight loss or haemoptysis, or prior exposure to a person with active pulmonary tuberculosis;
- On CT scan of the thorax, an upper lobe involvement, some cavitation, a miliary pattern, or an absence of air bronchogram; and
- On blood tests, a lower total white blood cell count, neutrophil–lymphocyte count ratio, procalcitonin, C-reactive protein or erythrocyte sedimentation rate.

In our patient, it is not clear whether this was a concomitant tuberculosis and community-acquired pneumonia or if all the symptoms and CT findings could be explained by tuberculosis with partial improvement after fluoroquinolone treatment.

The main argument in favour of community-acquired pneumonia is the disappearance of the left and right lower lobe consolidation on the CT scan of the thorax performed 2 months after presentation. The bronchial aspiration performed during bronchoscopy was negative for standard bacteriology; however, this examination was performed after 24 h of antibiotic treatment, which could have invalidated the samples.

However, our patient presented many clues to encourage the physician to look for pulmonary tuberculosis: a 2-week duration of symptoms, an upper lobe involvement, the absence of air bronchogram and a lower neutrophil–lymphocyte count ratio without severely increased white blood cells and procalcitonin despite a severe bilateral pneumonia on the CT scan of the thorax. The AFB smear was negative; however, the patient only had samples taken during the bronchoscopy, because she was unable to perform sputum exam and she refused gastric aspiration. Nucleic acid amplification testing for *M. tuberculosis* was negative but the sensitivity of this test drops to 70% in the case of a negative AFB smear [8]. The gold-standard diagnosis tool for pulmonary tuberculosis remains the conventional culture techniques, which proved our patient had tuberculosis, evolving with apparition of new lesions on the lingular lobe 2 months after the treatment of the acute community-acquired pneumonia.

Fluoroquinolones, especially levofloxacin and moxifloxacin, are not only effective for the treatment of community-acquired pneumonia but can also improve tuberculosis and have therefore been found to delay its diagnosis and treatment [9]. Resistance may occur in cases with previous use of fluoroquinolones in one patient with concomitant pulmonary tuberculosis and pneumonia. However, the use of fluoroquinolones as recommended for 5–10 days empirical antibiotic treatment for community-acquired pneumonia in an area with a high prevalence of tuberculosis was shown to be appropriate in a 2014 review by Grossman *et al*. [10]. In our patient, drug susceptibility testing showed no fluoroquinolones resistance in the isolated *M. tuberculosis*.

Conclusion

Pulmonary tuberculosis should be suspected in immunocompetent patients if they have some atypical features on clinical examination, the CT scan of the chest and/or blood tests, especially if they come from or if they live in an area with a high prevalence of tuberculosis.

Early diagnosis of pulmonary tuberculosis helps: to avoid its propagation by ensuring adequate isolation precautions, not to delay its treatment, and not to prescribe any antibiotics, which can lead to onset of mycobacterial resistances or delay of diagnosis and appropriate treatment of tuberculosis.

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Conflict of interest

None declared.

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