

A woman with a cough not responding to routine antibiotics

Commentary by

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What diagnoses should be considered in this patient, whose respiratory symptoms have failed to respond to routine antibiotic therapy? How should she now be investigated and managed?

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CASE SCENARIO

Jiesi, a 27-year-old woman from China, presented with a cough that had been troubling her for the past fortnight. She is studying accountancy at a private college in the centre of Sydney and she lives with her husband and 18-month-old daughter. One week before presenting, she noticed shortness of breath and then developed right-sided chest pain. She was taking no regular medications and she is a nonsmoker.

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Figure. Chest x-ray taken after the patient failed to respond to one week's treatment with routine antibiotics (amoxicillin and roxithromycin).

The patient's temperature was 38.6°C, so she was prescribed antibiotics (amoxicillin and roxithromycin) for suspected community-acquired pneumonia (CAP).

After a week of treatment there was no change in her condition so a chest x-ray was performed (Figure).

Why has Jiesi not improved on the prescribed antibiotics?

COMMENTARY

The antibiotic combination of a β -lactam (amoxicillin) and a macrolide (roxithromycin or clarithromycin) is recommended treatment for CAP.¹ The fact that this patient has not responded to this treatment suggests that she does not have CAP. The chest x-ray reveals a right-sided pleural effusion, which explains her chest pain.

Differential diagnosis

The following diagnoses should be considered in this case.

- **Para-pneumonic effusion.** Patients with CAP may have an effusion that develops in the pleural cavity adjacent to the area of pneumonic consolidation. However, the fact that Jiesi has not responded to the antibiotics makes this diagnosis less likely.
- **Malignant effusion.** This can occur as a secondary manifestation of a primary cancer in the lung or elsewhere, such as the breast. A malignant pleural effusion can also be

due to mesothelioma, which is a primary malignancy of the pleura. Mesothelioma is particularly related to previous asbestos exposure. Jiesi had no history of asbestos exposure, so this diagnosis is unlikely. Malignant pleural effusions are more likely in older patients.

- **Tuberculous pleural effusion.** The patient has come from a country that has a high prevalence of tuberculosis (TB), so this diagnosis should be investigated further. There are numerous clinical presentations of TB, including lymph node enlargement, respiratory symptoms with radiological pulmonary infiltrates or nodules, pleural effusions or asymptomatic radiological pulmonary lesions. Non-pulmonary presentations can occur and are considerably less common – these include renal disease, bone involvement and meningitis in children and in adults who are immunocompromised.

Appropriate investigations

For a patient with suspected TB, sputum culture for *Mycobacterium tuberculosis* may establish the diagnosis. The diagnostic yield may not be high so other investigations will probably be required. Blood tests to check total white cell counts, which are raised in infection, and general markers of inflammation, such as C-reactive protein, may be helpful.

Pleural fluid analysis is an appropriate investigation. The patient will require referral to a hospital or to an imaging centre so that a sample of pleural fluid can be obtained under ultrasound control. The fluid should be analysed for pathogenic organisms, malignant cells and biochemical indices to determine whether it is an inflammatory exudate or a transudate. For some patients with pleural tuberculosis, pleural fluid analysis may be negative and so pleural biopsies may be required to make the diagnosis.

Clinical course

Culture of Jiesi's sputum specimens did not yield any pathogens. The pleural fluid was initially tested with polymerase chain reaction (PCR) for TB, which gave a positive result. Microscopy of the pleural fluid did not reveal any acid-fast bacilli but cultures

grew *M. tuberculosis* after two weeks.

The patient commenced standard treatment for *M. tuberculosis* infection, which consists of four drugs (isoniazid, rifampicin, ethambutol and pyrazinamide) for two months. TB can be a presenting manifestation of HIV infection, so a blood test for HIV was performed (negative result).

Once the sensitivity of the infecting organism was established from the laboratory assays, the patient continued treatment on two drugs (isoniazid and rifampicin) because the *M. tuberculosis* isolate was fully sensitive. She requires treatment for a minimum of six months and she will need monitoring for possible adverse effects of the medications. It will also be necessary to screen her close contacts – this includes her young daughter, who may require isoniazid preventive therapy.² This contact tracing will be undertaken by the designated staff under the auspices of the State Health Department.

SUMMARY

The possibility of TB should be considered in patients from countries that have a high prevalence of the disease, especially in patients who present with respiratory symptoms. Appropriate investigations should be arranged. The sooner a diagnosis is made the better, because appropriate treatment can be initiated earlier and contact tracing can be undertaken promptly. Delayed diagnosis means a greater risk of contacts of the patient being infected.

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