

An apparently healthy young man with a peculiar-looking chest radiograph

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Chest radiography is a common investigation carried out by family physicians in their day-to-day practice as an extension of the clinical examination of the chest, and it plays an important role in arriving at diagnoses. Many chest radiographs show obvious findings and are easy to interpret, but some can be rather confusing, especially if the radiographic shadowings do not conform to normal anatomic contours and the patient is essentially asymptomatic. Here we report the case of a young man whose only complaint was a persistent low-grade fever and whose chest radiograph showed a peculiar S-shaped opacity.

Case description

A 24-year-old man presented complaining of a 2-month history of persistent low-grade fever, which he noticed especially in the evenings. He was otherwise asymptomatic. There was no history of cough, breathlessness, chest pain, loss of appetite, or loss of weight. There was no relevant past medical history. Findings of his physical examination were normal. He seemed mildly febrile to the touch and his axillary temperature was 37.3°C. He was given a course of antibiotics for 10 days and asked to follow up after 3 weeks. When the patient returned 3 weeks later, he complained that the fever continued to persist despite the course of antibiotics. On physical examination, his pulse was 78 beats/min and his respiratory rate was 18 breaths/min. His oral temperature was 37.6°C. There was a dull note on percussion in the right infrascapular region. Breath sounds were diminished in the right lower zone posteriorly and in the mid-axillary region, while bronchial breath sounds were heard in the right interscapular region. The remaining findings of his examination were normal. Blood test results showed a normal leucocyte count. Test results for malaria and dengue were negative. Urinalysis findings were normal.

A chest radiograph was completed (**Figure 1**). In view of the patient's clinical signs and chest radiographic findings, his family physician believed that the patient now required a specialist's opinion and hence referred him to hospital.

Discussion

When the patient first presented he was essentially asymptomatic, except for the rise in temperature in the evenings for the past 2 months. Three weeks after his visit, even after a course of antibiotics, the fever still persisted. His chest radiograph showed a peculiar S-shaped opacity in the right hemithorax (**Figure 2**). This opacity could be pleural, parenchymal, or both. The lateral shadowing in the chest radiograph did not appear to conform to any definitive lung parenchymal contour, and therefore was likely to be a pleural shadow (blue arrows in **Figure 2**). The upper opacity was somewhat homogenous and had a lower border that was bounded by the transverse fissure (red arrows in **Figure 2**). Vascular markings were also seen within this opacity. Therefore, this was likely to be a parenchymal lesion. The trachea

KEY POINTS Owing primarily to the HIV pandemic, the incidence of pulmonary tuberculosis is increasing in both developing and developed nations. Consequently, family physicians are increasingly encountering patients with atypical manifestations of pulmonary tuberculosis. Chest radiographic findings make the diagnosis of tuberculosis easy; however, a peculiar-looking chest x-ray scan in a patient with nonspecific symptoms can pose a problem even for the most discerning family physicians. The family physician in this case report encountered an HIV-positive patient who had no specific symptoms but whose chest radiograph revealed an S-shaped opacity. This case report highlights that HIV-positive patients commonly have atypical presentations of pulmonary tuberculosis, especially if they have low immune status.

POINTS DE REPÈRE En raison principalement de la pandémie du VIH, l'incidence de la tuberculose pulmonaire augmente tant dans les pays en développement que dans les nations développées. Par conséquent, les MF voient de plus en plus de patients ayant des manifestations atypiques de la tuberculose pulmonaire. Il est plus facile de diagnostiquer la tuberculose à l'aide des résultats de radiographies thoraciques; toutefois, une radiographie des poumons d'une allure étrange chez un patient ayant des symptômes non spécifiques peut poser des problèmes même au MF le plus aguerré. Le MF dans le présent rapport de cas, a examiné un patient séropositif pour le VIH qui ne présentait pas de symptômes spécifiques mais dont la radiographie pulmonaire révélait une opacité en forme de S. Ce rapport de cas met en évidence que les patients séropositifs pour le VIH ont souvent des présentations atypiques de la tuberculose pulmonaire, surtout si leur état immunitaire est faible.

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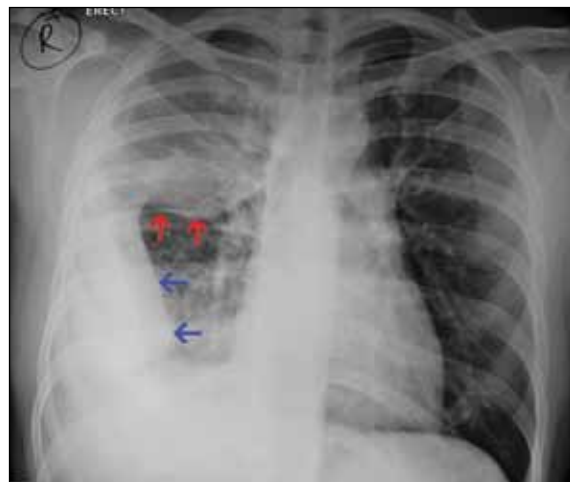
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Figure 1. Patient's chest radiograph



Figure 2. Patient's chest radiograph reveals peculiar S-shaped opacity (outlined by red and blue arrows) in the right hemithorax



appeared to be slightly shifted to the left side. Thus, this chest radiograph showed a pleuroparenchymal opacity with a slight shift of the upper mediastinum, which required further investigation.

The pleural shadow was likely to be a loculated pleural effusion with some amount of underlying pleural thickening, because it appeared grossly opaque with some blurring of the overlying rib markings, its medial border was well defined with its convexity facing inward, and there was obliteration of the right costophrenic angle. However, the possibility of a solid lesion could not be completely ruled out.

In contrast, the upper shadow appeared as a homogenous opacity suggestive of a "solidification" of the

pulmonary parenchyma, with the transverse fissure forming its lower border. Moreover, bronchial breath sounds were heard posteriorly in the same region. A consolidation is essentially defined as solidification of the lung parenchyma. Hence, this was an area of consolidation in the right upper lobe. So from the chest radiograph one could suspect that the patient had a loculated right pleural effusion with an accompanying consolidation in the right upper lobe of the lung.

Ultrasonography and high-resolution computerized tomography of the chest were completed, results of which suggested a loculated right-sided pleural effusion, with an area of consolidation in the right upper lobe. The fluid was subsequently aspirated under ultrasound guidance; 350 mL of straw-coloured fluid was aspirated, showing a lymphocytic predominance (94%). Pleural fluid interferon- γ levels were raised (4.5 IU/mL). Ziehl-Neelsen staining results of the fluid were negative for acid-fast bacilli (AFB).

A study jointly conducted in India and the United States in 2006¹ showed that tuberculous pleural effusions occur in approximately 5% of patients with mycobacterium tuberculosis infection. Moreover, the HIV pandemic has been associated with a doubling of the incidence of extrapulmonary tuberculosis, which has resulted in increased recognition of tuberculous pleural effusions even in developed nations.¹ This study also found that measurement of interferon- γ in the pleural fluid is widely accepted as the means to diagnose tuberculous pleural effusions. Other studies have also shown that elevated interferon- γ levels (> 3.7 IU/mL) in pleural effusions are very valuable in diagnosing pleural tuberculosis.² Screening of pleural fluid for AFB is known to have a low sensitivity. A study conducted in 2001 showed that of 20 samples (of proven tuberculous pleural effusions) tested, only 4 samples showed the presence of AFB on Ziehl-Neelsen staining, giving a sensitivity rate of approximately 20%.³ The patient's erythrocyte sedimentation rate in this case was 95 mm/h and the Mantoux test results showed an induration of 15x15 mm at the end of 48 hours. The patient had no expectoration and therefore sputum examination could not be performed. Sputum induction was not undertaken in this patient. A bronchoalveolar lavage (BAL) was done using normal saline at the site of the parenchymal lung involvement, namely the right upper lobe. Bronchoalveolar lavage involves the instillation of normal saline at the pathologic site through a fibre-optic bronchoscope. The fluid can remain at the site for 5 to 10 seconds and then is suctioned out through the bronchoscope. Examination of the BAL sample revealed the presence of AFB, both on smear and culture.

Consent was obtained and HIV testing was done using the Western blot method. Test results were positive for HIV-1. The patient was unaware of his HIV status before this test.

A definitive diagnosis of pulmonary tuberculosis is possible when live AFB are detected in various body

fluids, most notably sputum or BAL. However, clinical symptoms such as low-grade fever, cough, hemoptysis, and loss of weight and appetite, and a positive history of contact with a tuberculosis patient accompanied by investigative findings such as a highly suggestive chest radiograph showing apical lung infiltrates, positive Mantoux test results (>10x10-mm induration), raised erythrocyte sedimentation rate (usually >80 mm at the end of 1 hour), and raised interferon- γ levels (in blood or pleural fluid) greatly increase the likelihood of tuberculosis in the patient and help to arrive at a clinical diagnosis while awaiting results of further investigations. Inducing sputum is a noninvasive procedure that has a good diagnostic yield in many patients. In Brazil, a study recruiting 207 patients showed that AFB smear and mycobacterial culture results from specimens obtained by sputum induction and BAL were in agreement in 97% (202 of 207) and 90% (186 of 207) of cases, respectively.⁴

Pleural biopsies are also known to give a good diagnostic yield (up to 80%) in cases of pulmonary tuberculosis, and thus should be considered in suspected cases of tuberculosis with extensive pleural involvement. Positive pleural biopsy results would show the presence of caseating giant cell granulomas and culture of the specimen would reveal the presence of live AFB.

In a study by Ahmad and Shameem,⁵ 130 consecutive patients with tuberculosis who were co-infected with HIV-1 showed that pleural effusion (14% of patients) was a common extra-pulmonary manifestation of tuberculosis in these patients. Also, atypical radiologic features were noted to be more common in patients with severe immunodeficiency.^{5,6}

Case resolution

The patient in our case was treated with antituberculous drugs for 9 months. A 4-drug regimen consisting of ethambutol, isoniazid, rifampicin, and pyrazinamide was administered for a period of 3 months, followed by rifampicin and isoniazid for the next 6 months. Antiretroviral therapy using 3 drugs (2 nucleoside analogues and 1 protease inhibitor) was also instituted. The patient responded to the medication; his fever subsided; and the chest radiograph taken after completion of antituberculosis treatment showed good clearing. Contact tracing was undertaken, and his family members were also screened for the presence of tuberculous infection. He was unmarried. The patient received counseling for his HIV-positive status and was educated about high-risk behaviour patterns involved in the spread of this disease.

Conclusion

With the rising incidence of pulmonary tuberculosis the world over (as a result of the HIV pandemic), it must be realized that patients with pulmonary tuberculosis might be essentially asymptomatic when they first present to their doctors. Also, chest radiographs might not reveal the typical features expected in a case of pulmonary tuberculosis. Atypical clinical and radiologic manifestations of pulmonary tuberculosis are especially common in HIV-positive patients who have severe immunosuppression (very low CD3 and CD4 counts and a low CD4:CD8 ratio).^{5,6} In their study of 130 patients with tuberculosis who were co-infected with HIV-1, Ahmad and Shameem⁵ found that fever was the most common clinical manifestation (in 89% of such cases) and that atypical radiologic manifestations including mid- and lower-zone lung involvement were also seen in a substantial number of these patients (37%). They concluded that pulmonary tuberculosis with atypical features was a common manifestation in these patients. Therefore, a high index of suspicion (of pulmonary tuberculosis) on the part of the family physician is vital to the early diagnosis and consequent successful management of such patients, as these patients usually first seek advice from their general practitioners, who in turn later refer them to specialists.

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Competing interests

None declared

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