

CASE REPORT

Pneumonia or tuberculosis? A case report in a teenage girl

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ABSTRACT

Tuberculosis (TB) is still a common infectious disease worldwide. In 2018, seven million new cases of TB were reported to the World Health Organization. The diagnosis of TB in children is difficult due to non-characteristic symptoms. A 14-year-old girl presented to a general practitioner due to coughing and general weakness for three weeks. Physical examination revealed a reduction in vesicular murmur over a significant area of the right lung, and chest X-ray showed extensive densities in the right lung. After several days of hospitalisation and antibiotic therapy for bacterial pneumonia, the girl was diagnosed with TB. A treatment plan was applied for six months. Radiological and clinical improvement was observed after the therapy. A detailed history, determining contact with the TB patient, physical examination, results of additional tests, and broad-spectrum antibiotics response are essential for diagnosis.

KEY WORDS:

children, tuberculosis, pneumonia.

INTRODUCTION

Despite the era of vaccines and antibiotics, tuberculosis (TB) is still a common health problem worldwide. In 2018, seven million new cases of TB were reported to the World Health Organization (WHO). There were 1.4 million TB deaths among people around the world in 2018 [1]. In 2018, a total of 5487 TB cases were reported in Poland, of which childhood TB (0–14 years) comprised 52 (0.9%), including only 35 new cases of pulmonary TB [2]. The diagnosis of TB in children is difficult, due to non-characteristic symptoms, often suggesting other disease entities [3]. The aim of the study is to present an unusual case of TB imitating typical pneumonia, and to draw attention to the need to include TB in the differential diagnosis of lung diseases in children.

CASE REPORT

A 14-year-old girl presented to a general practitioner due to coughing and general weakness for three weeks. Physical examination revealed a reduction in vesicular murmur over a significant area of the right lung. The girl was directed to the children's ward of the district hospital, where a chest X-ray showed extensive densities in the right lung (Fig. 1). A chest ultrasound examination showed a hypoechoic area between the fourth intercostal space and the diaphragm over the right lung. Her C-reactive protein (CRP) level was 49.9 mg/l (normal range: 0.0–5.0). The patient was treated with cefuroxime and clarithromycin. After nine days of combined antibiotic therapy, the CRP level decreased twice. She felt improvement, but the radiological and auscultatory changes continued (Fig. 2).

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FIGURE 1. Chest X-ray at admission to the hospital



FIGURE 2. Chest X-ray after 9 days of combined antibiotic therapy

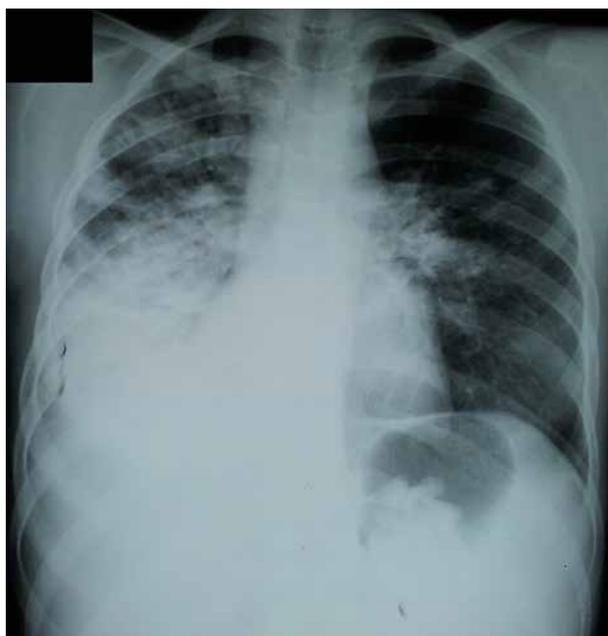


FIGURE 3. Progression of the lung changes after 10 days of extended antibiotic therapy



FIGURE 4. Chest X-ray after 2 months of anti-TB therapy

The patient was transferred to a hospital with a paediatric pulmonology ward, where the antibiotic therapy was extended. The girl received ceftriaxone and metronidazole. As a supportive treatment, a nebulisation with fenoterol and ipratropium was also implemented. Despite another 10 days of the therapy, progression of the changes was observed on chest X-ray (Fig. 3).

During the hospitalisation, despite the fact that the girl's parents denied the possibility of contact with a person with TB, diagnostics for TB were implemented – the result of interferon γ release assay (IGRA) and tuberculin sensitivity test was positive (skin infiltration of 14 mm),

a microscopic examination of sputum revealed no mycobacteria. After diagnosis, the girl was transferred to a specialised centre of lung diseases.

Bronchoscopy revealed no pathological changes, but the cytologic examination of bronchoalveolar lavage fluid showed noticeable inflammation. *Mycobacterium tuberculosis* complex growth was confirmed in culture. A four-drug treatment plan (isoniazid, rifampicin, ethambutol, pyrazinamide) was applied for two months. Isoniazid and rifampicin were maintained for another four months. Regression of lung changes and general condition improvement was observed after the therapy (Figs. 4 and 5). The

girl gained weight, tolerated physical exercise well, and attended physical education classes. As a result of widening the diagnosis, the girl's father was diagnosed with active TB and treated for six months.

DISCUSSION

About 1.7 billion people are estimated to have a latent TB infection. However, only 5-10% of this group will develop TB disease during their lifetime [1]. Latent TB is associated with an enhanced cytotoxic response, which is mostly mediated by CD16 molecule and natural killer cells (NK cells), and continuous inflammation [4]. The aetiological factor of the diseases is a mycobacterium belonging to the *Mycobacterium tuberculosis* complex group. The infection is transmitted via the droplet route, and children are most often infected by adult family members [5]. After inhalation of mycobacteria to alveoli, nonspecific immune mechanisms can completely eliminate the bacteria, or the infection might develop to the primary complex, known as Ghon's complex, which is usually located in either the lower part of the upper lobe or the upper part of the lower lobe. It can also be located subpleurally. Mycobacteria can get into the nearest lymph nodes with lymphatic vessels, and then through the bloodstream to other organs [3, 5]. In the presented case, the primary lesion was not found, and the disease had taken the form of typical pneumonia with nonspecific clinical features.

Tuberculosis might manifest in an unusual way and imitate other lung disease entities. Mascarenhas *et al.* [6] reported an unusual case of a giant tuberculoma in an adolescent. A 13-year-old girl had in her chest a large cystic lesion that was initially treated as a hydatid cyst. After confirming the TB diagnosis, the lesion was excisable, and the girl was treated with anti-TB agents for nine months, and the overall effect of the therapy was positive. In some cases, pulmonary TB lesions can develop from primary enlarged lymph nodes. Mirchandani *et al.* [7] described a case of hilar and paratracheal lymph nodes that enlarged and started lobar pneumonia with consolidations and atelectasis. Tuberculosis can also take the form of necrotising pneumonia (NP) with lung parenchymal destruction, pleural effusion, and cystic lung lesions. Jacobs *et al.* [8] analysed a case series of necrotising pneumonia in children in South Africa. Eight (25%) patients out of 32 had *M. tuberculosis*-associated NP. There was no difference in the clinical presentation of NP caused by *M. tuberculosis* and other bacteria.

In the discussed case, the girl manifested non-characteristic symptoms: coughing and general weakness for three weeks, but attention was drawn by the fact that these symptoms were inadequate for the radiological changes. Clinical presentation, elevated inflammatory markers, and chest X-ray changes suggested a diagnosis



FIGURE 5. Chest X-ray at the end of the anti-TB therapy (after 6 months)

of pneumonia and resulted in the implementation of typical first-line treatment. Persistence of auscultatory and radiological changes, despite the modification of antibiotic therapy and subjective improvement felt by the patient, prompted doctors to suspect pulmonary TB. The implementation of a standard four-drug treatment for two months then a two-drug therapy for four months, resulted in complete regression of the lesions.

Diagnosis of TB in children is very difficult, especially when it comes to microbiological confirmation. Early morning gastric lavage is the preferred sample for the diagnosis of pulmonary TB in children younger than six years. In older children, it is recommended that a sputum sample be obtained [9]. Sometimes definitive bacteriological confirmation of the disease might not be possible because of the difficulties with proper collection of the material for analysis; hence, a thorough history, determining exposure to the TB patient, physical examination, results of interferon γ release assay and tuberculin sensitivity test, imaging, such as chest X-ray and high-resolution computed tomography (HRCT), and broad-spectrum antibiotics response are very important for making the correct diagnosis [5, 10].

CONCLUSIONS

Tuberculosis should be considered in the differential diagnosis of respiratory diseases in children. This, seemingly forgotten disease often becomes a real challenge for doctors. A detailed history, determining contact with TB patients, physical examination, results of IGRA and tuberculin sensitivity test, imaging, and broad-spectrum antibiotics response are essential for a correct diagnosis.

DISCLOSURE

The authors declare no conflict of interest.

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