

Case Report

Spontaneous pneumothorax in miliary tuberculosis child: a case report

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Spontaneous pneumothorax is a rare but fatal complication of miliary tuberculosis. We report a 13-year-old boy presenting with shortness of breath. He was diagnosed with miliary tuberculosis with spontaneous pneumothorax, which showed significant improvement after the insertion of a thoracostomy tube and anti-tuberculosis drug therapy. [Paediatr Indones. 2022;62:364-6 DOI: <https://doi.org/10.14238/pi62.5.2022.364-6>].

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Miliary tuberculosis is a severe form of tuberculosis arising as a consequence of hematogenous and lymphogenous dissemination of *Mycobacterium tuberculosis*. Around 3-7% of all tuberculosis cases have been reported to be miliary.¹ The mortality rate of miliary tuberculosis is estimated to be 25%, but may reach 100% if left untreated.² Patients with miliary tuberculosis classically present with fever, evening rise of temperature for several weeks, anorexia, weight loss, lethargy, and cough. The symptoms can lead to severe complication such as pneumothorax, pleural effusion, respiratory distress syndrome, and acute respiratory failure. Miliary tuberculosis, as a form of advanced tuberculosis in children, is a known cause of secondary pneumothorax one of the main tuberculosis complications.³ We report a case of miliary tuberculosis with spontaneous pneumothorax.

The case

We have obtained parental informed consent to publish this case. A 13-year-old boy presented to us with a chief complaint of shortness of breath since

two days prior, which worsened when performing daily activities, and even while resting. There was no previous history of recurring shortness of breath or sneezing or coughing triggered by allergens or cold weather. He also reported a history of cough and fever since two weeks before, as well as unintentional weight loss for the past month. He had no previous contact with a known tuberculosis patient and no history of kidney, liver, or heart disease.

On physical examination, his weight was 30 kg and height was 143 centimeters, which was consistent with malnutrition. There was conjunctival pallor, nasal flaring, and chest wall retraction. Breath sounds were decreased and percussion was hyperresonant in the right lung field. In the left lung field there was decreased breath sounds and dullness on percussion. Two, non-tender, hard nodular masses, each 2 cm of diameter, were found in the cervical and right supraclavicular regions. There was also ascites, scrotal edema, and peripheral edema. Vital signs showed a blood pressure of 100/60 mmHg, a pulse rate of 130 per minute, a respiratory rate of 52 times per minute, and a temperature of 37.6°C.

Chest radiograph showed miliary tuberculosis with pneumothorax in right hemithorax and pleural effusion in left hemithorax (**Figure 1A**). Laboratory

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examination revealed a hemoglobin level of 6.1 g/dL, white blood cells of 7400/ μ L, platelets of 12,000/ μ L, reticulocytes of 3.65%, albumin level of 2.0 g/dL, blood urea nitrogen of 7 mg/dL, and a serum creatinine level of 0.5 mg/dL. Serum electrolytes revealed a sodium level of 125.4 mEq/L, potassium level of 3.5 mEq/L, and chloride level of 91.5 mEq/L. Tuberculin test was negative. The patient was diagnosed with miliary pulmonary tuberculosis, right-sided pneumothorax, left pleural effusion, tuberculous lymphadenitis, anemia, thrombocytopenia, hypoalbuminemia, and hyponatremia.

The patient's condition improved after packed red cell (PRC), thrombocyte concentrate (TC), and albumin transfusions, as well as correction of sodium level. Pneumothorax was treated with insertion of tube thoracostomy/water sealed drainage (WSD). Oral treatment comprised isonicotinic acid hydrazide (INH) 300 mg once daily, rifampicin 450 mg once daily, pyrazinamide 1000 mg once daily, ethambutol 500 mg once daily, prednisone 20 mg three times daily, and vitamin B6 10 mg once daily. The day after WSD insertion, an evaluation of the chest radiograph revealed that the right lung has begun to expand and shortness of breath has decreased (**Figure 1B**). Five days later, dyspnea has resolved and the WSD was removed. The patient was discharged two days later without dyspnea and with resolved edema and laboratory parameters. Antituberculous drugs were

planned to be given for 12 months and prednisone was continued for four weeks.

The patient's body weight and body mass index increased on each monthly follow-up. On the sixth month of treatment his height had increased to 145 cm, his weight to 37.8 kg, and his BMI to 18. An evaluation chest radiograph after six months of antituberculous drug therapy showed that the pneumothorax, pleural effusion, and signs of miliary tuberculosis were no longer present (**Figure 2**). Treatment was planned for 12 months, the patient was lost to follow-up on the seventh month.

Discussion

Miliary tuberculosis occurs due to hematogenous spread of primary infection in patients who have poor defense mechanisms due to malnutrition, chronic disease, or immunosuppressive drug therapy.⁴ In this study, the patient was found to have malnutrition. It is possible that there is an association between nutritional status and miliary tuberculosis in children. Nutrient deprivation may have a detrimental effect on Th1 cells, which act as an important component in the cell-mediated immune system defense against miliary tuberculosis.^{3,5}

Spontaneous pneumothorax is a well-known complication of tuberculosis, even though it is rare

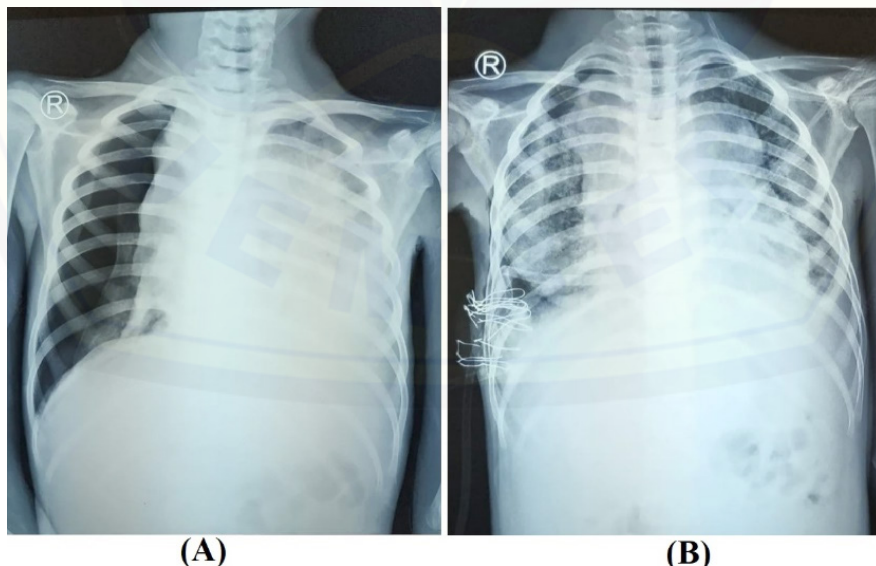


Figure 1. Chest X-ray posteroanterior view (A) on admission showed a right-side pneumothorax, with right lung collapse and left pleural effusion. (B) after insertion of tube thoracostomy showed the right lung expansion with miliary mottling (miliary tuberculosis)

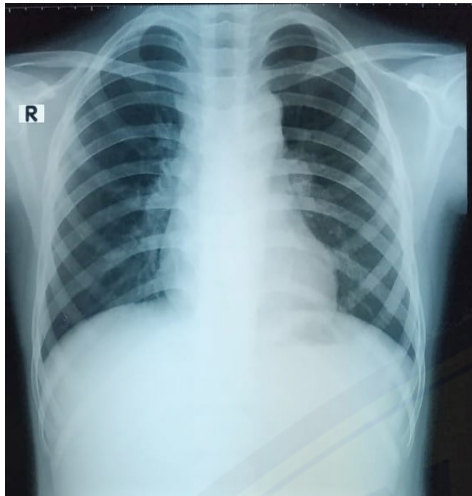


Figure 2. Treatment result. Chest X-ray posteroanterior view after anti-tuberculosis drug treatment for

in patients with miliary tuberculosis.⁶ Spontaneous pneumothorax can be classified as primary or secondary. Primary spontaneous pneumothorax occurs in healthy people in the absence of previous lung disease, whereas secondary spontaneous pneumothorax is a complication of lung disease. Secondary spontaneous pneumothorax in this case can worsen lung function, whereas miliary tuberculosis can complicate the management of pneumothorax.⁷ The symptoms of spontaneous pneumothorax are tightness and chest pain on the side of the pneumothorax. Physical examination shows cyanosis, hypotension, hyperresonant percussion, and decreased breath sounds and vocal fremitus. These symptoms were present in our patient. In patients with miliary tuberculosis, pneumothorax can be missed due to radiologic findings resembling miliary tuberculosis without pneumothorax. The initial management of pneumothorax in miliary tuberculosis is tube thoracostomy and immediate administration of antituberculous drugs.⁴ This disease has a high mortality rate, so early diagnosis and immediate treatment with antituberculous drugs can save lives. The response to antituberculous drugs is good.^{3,8}

The antituberculous treatment given to this patient was in accordance with *World Health Organization* (WHO) recommendations that new patients diagnosed with miliary tuberculosis be given anti-tuberculosis drugs for six months. However, if severe complications are present which can cause disability and death, treatment should be continued

for nine to 12 months. In our case, loss to follow-up occurred after six months of treatment. In developing countries, loss to follow-up frequently occurs due to economic constraints, drug side effects, low education level, cultural factors, and habits of patients and their families. A large number of tuberculosis patients also drop out of treatment due to drug toxicity.¹⁰ For these reasons, countries with low economic resources need tuberculosis control programs such as directly observed treatment, short-course (DOTS) in order to reduce the occurrence of drug resistance, therapeutic failure, or disease recurrence.⁹

Conflict of interest

None declared.

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