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Case Report

Primary cavitary tuberculosis in an infant

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Abstract

In infants, tuberculosis usually progresses as hilar lymphadenopathy and parenchyma changes in lungs; associating cavitary lesions are rare. A six-month-old infant was admitted to our hospital with fever. Physical examination revealed decreased breathe sounds in the right lung. Chest radiograph showed pneumonic infiltration in the right middle lobe. The patient was hospitalized with a diagnosis of lobar pneumonia and antibiotic treatment was started. On the sixth day, because no clinical improvement was observed in the patient, computerized thorax tomography was performed. Tomography revealed multiple lymphadenopathies in the right hilar pretracheal and subcarinal region. The patient's tuberculin and acid-resistant bacteria tests were negative; however, the quantiferon test was positive. Family screening revealed active tuberculosis in the mother. Tuberculosis in infants may present with unusual clinical and radiologic findings, and primary cavitary tuberculosis can also be seen in this age group.

Keywords: Infant, tuberculosis, cavitation

Introduction

Tuberculosis (TB), a disease that has been threatening human health for long years, is an important cause of mortality in the young-middle age group and continues to be a problem in many countries of the world (1). Children below the age of 15 years and especially children below the age of five years carry great risk in terms of TB. Children get TB bacillus from adults who expel the bacillus including mainly individuals in the immediate environment. According to the World Health Organization 2012 data, 530,000 children below the age of 15 years catch TB disease annually and 74,000 children die of this disease (2).

Tuberculosis may lead to different clinical pictures according to location and age groups. In adults, TB can be recognized more easily with clinical findings and laboratory tests, whereas it is characterized by nonspecific findings in children. In addition, it is more difficult to make the diagnosis in children because the tests used in the diagnosis in adults are generally negative in children (3).

In the infancy and childhood age groups, TB is generally characterized by hilar lymphadenopathy and parenchymal changes in the lung, and accompanying cavitary lesions are rare (4). In the literature, the youngest patient who was found to have cavitary lung TB was a two-month-old patient who had received treatment for lung infection because of symptoms of fever and cough and who was found to have bronchogenic cyst in the lung in computed tomography after treatment. In this patient, the diagnosis of TB was made with observation of caseous necrosis and granuloma in the pathologic examination performed after operation (5).

In this article, we present a case of primary cavitary TB in a six-month-old infant who presented with symptoms of reduction in weight gain and fever, and was found to have lobar pneumonia. This patient is the youngest patient who was diagnosed as having primary cavitary TB with clinical and laboratory findings in the literature.

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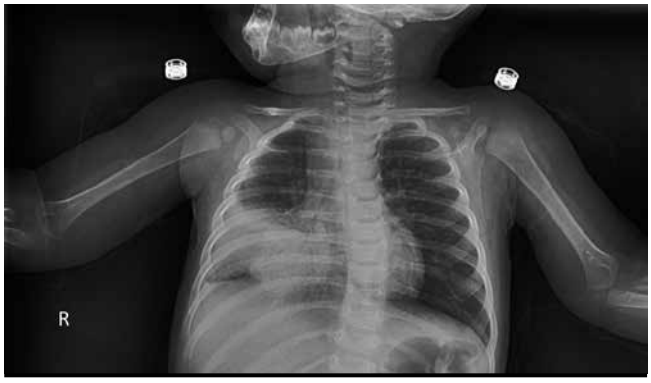

Figure 1. Pneumonic infiltration in the right middle lobe on lung radiography

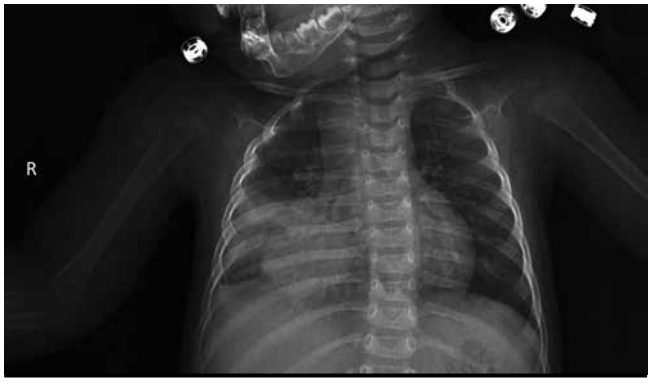

Figure 2. Follow-up lung radiography of the patient

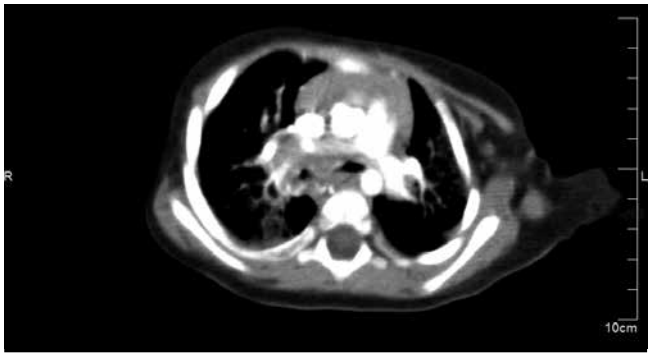

Figure 3. Computed tomography images of the patient's chest

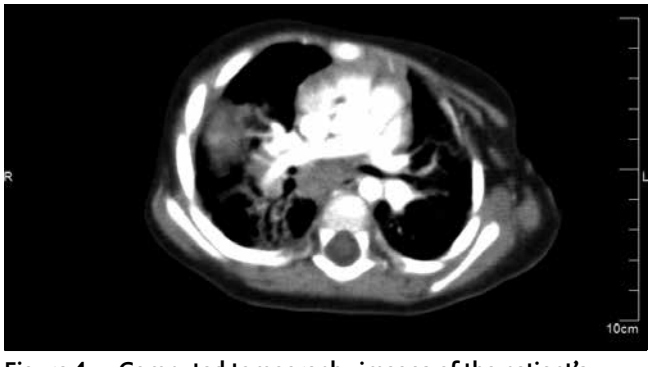

Figure 4. Computed tomography images of the patient's chest

Case

A six-month-old female patient presented to our hospital with symptoms of fever and restlessness. In her history, it was learned that she presented to another hospital with the same symptoms; urinary tract infection was found in the investigations performed and intramuscular ceftriaxon treatment was given, but she presented to our hospital because her fever and restlessness continued. The physical examination was as follows: body weight: 6.5 kg (3-10 percentile), height: 65 cm (10-25 percentile), head circumference: 42 cm (10-25 percentile), body temperature: 36.5°C, respiratory rate: 36/min, heart rate: 104/min, oxygen saturation: 96%. On examination of the respiratory system, respiratory sounds were reduced in the right lung. Examinations of the other systems were found to be normal. Her mother stated that there was no pathology in her personal and familial history. Her laboratory tests were as follows: white blood cell count (WBC): 25 700/mm^3, hemoglobin (Hb): 9 g/dL, hematocrit (Hct): 27.2%, mean platelet volume (MPV): 720,000/mm^3; erythrocyte sedimentation rate (ESR): 75 mm/hour; C-reactive protein (CRP): 3mg/dL. Biochemical tests revealed that her liver and renal function tests were normal; complete urinalysis was found to be normal and urinary culture remained sterile. Pneumonic infiltration was found in the right middle lobe on lung radiography (Figure 1). The patient was hospitalized with a diagnosis of lobar pneumonia and oral claritromycine treatment was added to ceftriaxon treatment, which had been initiated in another center.

The patient had no fever after the 48th hour of hospitalization, and WBC was found as 12 600/mm^3, ESR was 54 mm/h, and CRP was 1.1 mg/dL on the sixth day of treatment. On the sixth day of hospitalization, lung radography was obtained because reduction in the respiratory sound in the right lung continued on physical examination and it was found that the infiltration in the right middle lobe continued (Figure 2). A tuberculin test (TT) was performed because the lung infection did not improve and it was planned to search for acid-resistant bacterium (ARB) in fasting gastric aspirate. Her familial history was interrogated again; it was learned that her grandmother and aunt had a previous history of active TB and they received treatment for one year. When the patient's history of growth and development was interrogated again, the mother stated that her growth had paused and restlessness started in the last two years.

On chest ultrasonography (USG), air bronchograms were found in the right middle lobe, and pneumonic consoli-

dation, hilar lymphadenopathies (LAP) on the right side and suspicious calcifications in the LAPs were observed. Chest computed tomography (CT) was performed with a prediagnosis of TB: multiple LAPs in the pretracheal, pre and subcarinal, and right hilar regions (conglomerated appearance in places); air bronchograms leading to complete air loss in the posterior segment of the upper lobe and in the middle lobe in the right lung with ectasic bronchial structures in the basal segment in the middle lobe; increased density compatible with collapse-consolidation with cavitation and increased ground-glass density in were found both upper lobes and in the posterior segment of the lower lobe in the left lung (Figure 3, 4). On abdominal US, a few cystic LAPs were found in the hepatoduodenal ligament and multiple LAPs were found in the inframesacolic ligament.

The patient had TB vaccine scar and TT was interpreted to be negative. Acid-resistant bacterium was found to be negative on fasting gastric aspirate, which was obtained three times. However, the quantiferon test was found to be positive. On family screening, ARB was found to be (+++) in sputum, a cavitary lesion was found on lung radiography and a diagnosis of active TB was made in the mother.

The patient was diagnosed as having primary cavitary TB. The patient was referred to the Divison of Pediatric Infectious Diseases and quadruple antituberculosis treatment was initiated (isoniasid, rifampicin, pyrazinamide, ethambutol). The mother was referred to receive treatment.

Written informed consent was obtained from the parents of the patient who participated in this study.

Discussion

Approximately one-third of the world population is infected with TB, which is a preventable and treatable disease (3). Its incidence is gradually increasing in children, especially in developing countries (6). Tuberculosis bacillus, which generally involves the lung, may also lead to morbidity in all organs and tissues. The bacillus may remain dormant in many infected children and adults. Infection develops clinically in 5-15% of children who encounter TB bacillus for the first time. Primary TB is the most common type of the disease in children and prevalent in the 0-5 year age group. In children, the state of immunity, presence of HIV infection, and being aged below two years may lead to advancement of the disease and/or development of extra-pulmonary TB (7).

Tuberculosis generally transmits to children from adult patients with TB. One of the most important factors in transmission is the number of bacilli in the lungs of the index case. The number of bacilli range between 10^2 and 10^4 in solid nodules, whereas it reaches to 10^7-10^9 in cavitary lesions (8). In our case, a cavitary lesion was found on lung radiography in the patient's mother who was found to be the source of infection and bacillus load was found to be high in the investigations.

The fact that the initial findings in TB in children are non-specific findings including cough, fever, loss of appetite, wheezing, recurrent bronchiolitis and bronchopneumonia makes the differential diagnosis difficult (1, 4, 8). Treatment directed to pneumonia was administered because right middle lobe pneumonia was found in our patient who had no other pathology in her history. However, a clinical and radiologic response could not be obtained and a diagnosis of primary cavitary TB was made as a result of the investigations performed.

Detection of ARB in recurrent sputum samples and/or fasting gastric aspirates and TT are important in the diagnosis. However, bacillus is detected in sputum and fasting gastric aspirate in rare cases because bacillus load is low in children. The bacillus can be isolated in <50% of children with tuberculosis disease (7). In our case, ARB could not be detected in fasting gastric aspirate samples, which we obtained three times, and TT was found to be negative.

It has been reported that the test based on IFN-γ release (Quantiferon-TB Gold test) is more specific and sensitive in the diagnosis compared with TT in children with a high risk of developing tuberculosis disease, in the elderly, and in immunocompromised individuals (9). However, this test is expensive and not available in all centers.

It is difficult to make a diagnosis of TB in children, especially in infants. Therefore, a history of contact with an adult with TB, presence of unhealed respiratory system symptoms with empiric antibiotic treatment, TT positivity, and LAP on lung radiography are considered important clues for the diagnosis (3, 4). In our patient, further investigations were performed because it was later learned that the grandfather and aunt had had TB previously and the patient had clinically unhealed pneumonia, though TT was negative.

Lung tuberculosis may be characterized by intrapulmonary (cavitary lesion, pneumonia, disseminated consolidation, atlectasis, bronchiectasia, endobronchial

disease, pleuritis) or systemic invasion (3). Lung radiography is still the primary and basic imaging method in the diagnosis of TB. However, CT is also useful in detecting small parenchymal lesions, in specifying the degree of invasion of the disease, in demonstrating endobronchial TB, and in detecting LAP, cavitation, and bronchiectasis developing as a result of these (1, 3). In our patient, CT was performed because the appearance of infiltration continued on lung radiography, which revealed multiple LAPs and cavitation and was helpful for us to consider the diagnosis of TB.

It has been reported that consolidation is generally observed mostly in the middle and lower lobes in primary TB. Hilar LAP, lobar or segmental involvement and atelctasis are common radiologic findings in primary TB in children aged below two years. Development of cavitary lesions observed in adults is rare in children and infants who develop primary tuberculosis (3, 4). In the literature, primary cavitary TB in infancy has been reported in two patients aged two months and eight months (5, 10). In the patient who was aged two months, a bronchogenic cyst was found on lung CT performed when a lung infection did not improve and a diagnosis of primary cavitary TB was made on the tissue sample obtained with surgical operation (5). The other patient was treated because of recurrent lung infection, presented at the age of eight months with respiratory failure, and was diagnosed as having primary cavitary TB and cerebral tuberculoma (10). In our patient, there was an appearance of consolidation, which appeared as middle lobe syndrome. The patient did not respond to treatment and cavitation was found on lung CT.

A patient with lung TB may transmit the disease to 3-5 individuals until the diagnosis is made. Therefore, it is important to make the diagnosis and initiate treatment as soon as possible. Although contamination of TB in children is low, presence of active primary TB and cavitary lesions increases the risk of contamination. Delayed initiation of treatment also leads to progression of the disease (8). Owing to our patient, the mother was also diagnosed.

In conclusion, childhood TB is still a very important public health problem in our country, which is a developing country. In infants, laboratory tests (TT, ARB) are not helpful in making the diagnosis. In patients who do not respond to treatment administered for lung infection, attention paid to family history in terms of TB and performing family screening will be helpful in making the diagnosis. In addition, it should be kept in mind that TB may be manifested with different clinical and radiologic findings, and primary cavitary TB may also be observed in the infancy age group.

Informed Consent: Written informed consent were obtained from patients' parents.

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