

# 유아의 무증상 폐결핵

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## Asymptomatic Pulmonary Tuberculosis in Infant

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A 3-month-old asymptomatic infant presented with bilateral extensive consolidation of the lungs, which was diagnosed as pulmonary tuberculosis. Evaluation of the baby for tuberculosis was initiated because of a history of contact with a known tuberculosis patient. This case is interesting because the baby rarely showed symptoms during the whole course of the disease.

**Key Words:** Infant; Tuberculosis; Asymptomatic infections

### Introduction

Compared with tuberculosis (TB) in adults or older children, infantile TB tends to be more symptomatic and carries much higher risk of a severe, life-threatening disease such as tuberculous meningitis, bone TB, or miliary TB<sup>1-3</sup>. However, establishing a diagnosis of primary pulmonary TB in children represents a challenging task for several reasons. Bacteriological confirmation is hardly achieved because of the difficulty of sputum collection, and positive gastric lavages are found in a small number of cases. Pediatric TB has been relatively neglected, mainly because of greater challenges in

diagnosis. Many case reports emphasize the sometimes atypical presentation of TB in infancy, so that whether TB is of congenital or postnatal origin, diagnostic delay contributes to poor outcome<sup>4-7</sup>.

We report the case of a 3-month-old male infant with pulmonary TB who presented with no remarkable symptoms despite the finding of extensive bilateral haziness in chest radiography (CXR).

### Case

A 17-week-old male infant was presented to our hospital because of exposure to his mother who had pulmonary TB. His mother, who have had a cough since 8 months of pregnancy, was diagnosed as having pulmonary TB 10 days prior to her visit to our hospital and had been receiving antitubercular therapy (ATT) since then.

The child was born through vaginal delivery at 37+1 weeks of gestation, weighing 3,000 g, and received vaccinations as per the National Immunization Schedule,

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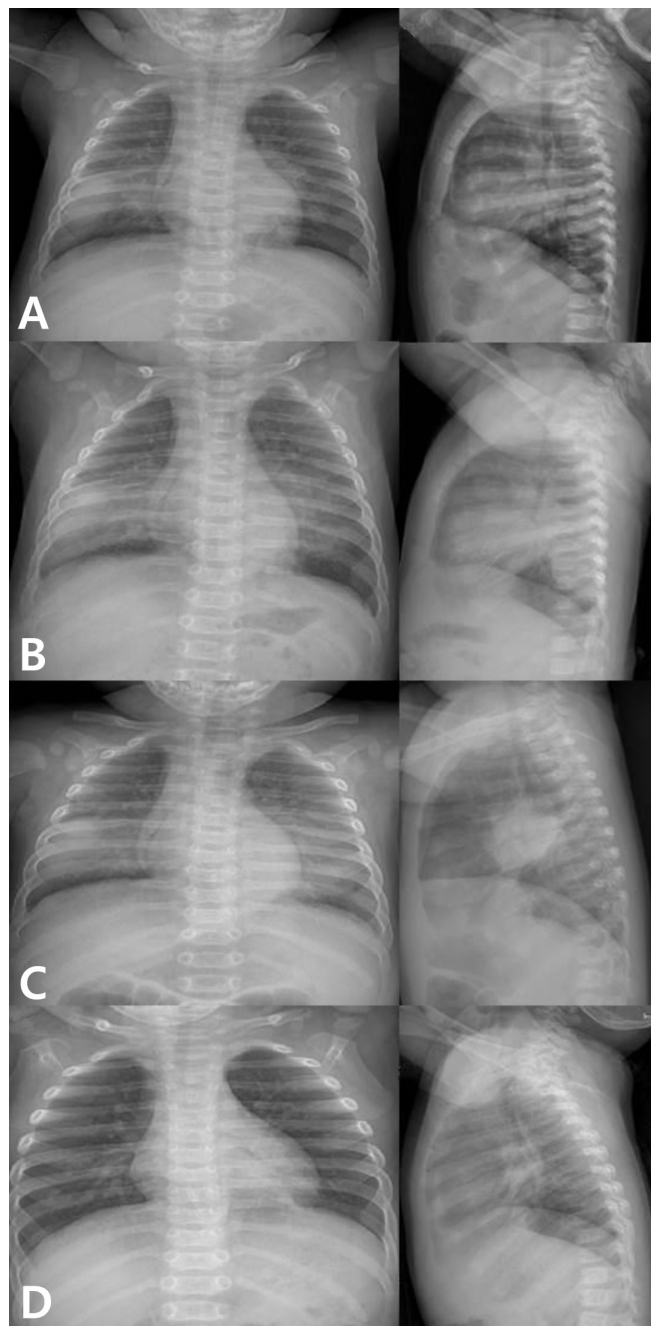
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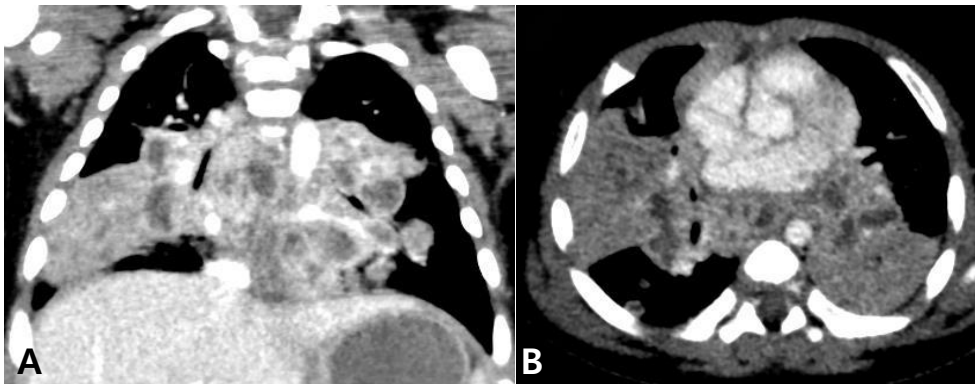
including the Bacillus Calmette-Guérin (BCG) vaccine (Danish (Copenhagen) 1331) at 3 weeks of age. His mother reported that he did not have any symptoms such as fever, cough, and sputum, and he gained weight well (7.3 kg, 50th to 75th percentile). Physical examination results were unremarkable, with no tachypnea, crackle, and hepatic or splenic enlargement. Blood tests performed at presentation showed no abnormalities except mild elevation of erythrocyte sedimentation rate (ESR; 21 mm/hr). CXR showed bilateral consolidations occupying the entire right middle lobe and some parts of the left lower lobe (Fig. 1A). The Mantoux test result was positive (18 mm of induration) at 48 hours.

The parents refused admission to our hospital because he was asymptomatic. The CXR performed after 4 days showed rapid progression (Fig. 1B). He appeared to be in a good condition and had good appetite, with no signs of respiratory disease. He was hospitalized for evaluation of the lung haziness. The results of the blood tests, including complete blood count, and liver and renal function tests remained within their normal ranges, except for the increasing ESR (37 mm/hr) and CRP level (4.6 mg/dL). His first morning gastric content was obtained through a nasogastric tube and used for acid-fast bacilli (AFB) smear, polymerase chain reaction (PCR), and mycobacterial culture for 4 consecutive days. The AFB smear and PCR results were negative for all the four samples. The results of the analysis and AFB smear, PCR, and cerebrospinal fluid culture were all within the normal ranges or negative. However, 1 month later, *Mycobacterium tuberculosis* complex was identified in one of four gastric washing AFB cultures. Chest computed tomography (CT) revealed extensive consolidation in the whole right middle and left lower lobes with low-attenuation areas, representing caseating necrosis and necrotizing mediastinal lymphadenopathies, which suggested pulmonary TB (Fig. 2). Since there was suspicious epidural abscess in spinal canal at lower thoracic level in the chest CT, L-Spine and T-spine magnetic resonance imaging was taken, and the lesions were identified as pseudolesions with no evidence of bone and epidural abscess.

We started administering ATT with four drugs, namely isoniazid, rifampicin, pyrazinamide, and ethambutol. At follow-up after 4 weeks of ATT, the child remained in good condition. However, CXR revealed aggravating consolidations on the bilateral lung (Fig. 1C). Despite



**Fig. 1.** (A) Chest X ray at presentation. (B) Chest X ray after 4 days. (C) Chest X-ray after 4 weeks of anti-tuberculous treatment. (D) Chest X-ray after 6 months of anti-tuberculous treatment .



**Fig. 2. (A) Multiple, various sized, round, hypodense lesions with rim enhancement in subcarinal, hilar, and bronchial spaces and even in lung parenchyma. Extensive segmental consolidation in lateral segment of right medial lobe and superior segment of left lateral lobe. (B) Nodular lesion in epidural space of spinal canal and paravertebral space at T11/12 level due to tuberculosis.**

the extensive haziness in both lungs, he only showed mild grunting during feeding, with no respiratory distress or fever. At follow-up after 6 months of ATT, CXR revealed marked improvement (Fig. 1D).

## Discussion

In this case, the authors observed that infantile pulmonary TB could manifest with no expected symptoms such as dyspnea, fever, productive cough, or general weakness, despite such a large, lobar consolidation involving both lungs. In the absence of a history of TB exposure, early diagnosis and prompt treatment would have been difficult.

While many factors, including host genetics, microbial virulence, and underlying conditions that impair immune competence (e.g., malnutrition and human immunodeficiency virus infection), determine the outcome of infection in young children, the high rate of progressive TB is likely largely a reflection of the immaturity of immune response<sup>8)</sup>. Poor cell-mediated immunity is thought to allow unrestrained proliferation of bacilli with progressive parenchymal lung damage (with or without cavity formation)<sup>9)</sup> and dissemination<sup>10)</sup>.

Asymptomatic presentation might be partly explained by the immaturity of immune response, as innate immune response such as cough reflex, mucus, or fever

requires activation of the body's complement system and chemical substances.

If diagnosis and treatment were delayed, dissemination might have occurred with significant long-term sequelae. Only a few studies have been conducted on infantile TB. In one study about radiographic and CT findings of pulmonary TB in infants, the frequent radiological findings were mediastinal or hilar lymphadenopathy with central necrosis and air-space consolidations, especially mass-like consolidations with low-attenuation areas or cavities within the consolidation. Disseminated pulmonary nodules and airway complications were also frequently detected<sup>11)</sup>.

This case is interesting because the baby rarely showed any symptoms and abnormal physical findings. Considering that infantile TB can progress with no definite presenting symptoms, contact investigation in all infants exposed to person with newly diagnosed TB would be important. In addition, as most cases of infantile TB present with mediastinal or hilar lymphadenopathy, when these radiological findings are observed, high suspicion would be necessary and serial follow-up will be needed.

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## 요약

영아에서의 결핵은 소아나 성인의 결핵에 비해 더 심한 증상과 합병증을 초래할 수 있다. 하지만 증상이 전형적이지 않거나 균 검출이 잘 되지 않는 경우가 많아 진단에 어려움이 있다. 본 증례는 폐결핵으로 진단된 3개월 환아에 대한 보고이다. 환아는 광범위한 양측 폐의 병변에도 불구하고 발열이나 호흡곤란, 기침 등의 증상을 보이지 않았으며 항결핵제 투약 6개월째 폐병변이 호전되었다. 일부 영아 결핵에서 증상이 나타나지 않는 것은 면역반응의 미성숙으로 부분적으로 설명될 수 있을 것이다. 따라서 영아에서 결핵 접촉자 검진의 중요성이 강조된다.