Radiologic Diagnosis / *Radyolojik Tanı*

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What is Your Radiologic Diagnosis?

Radyolojik Tanınız Nedir?

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A 14-year-old girl with cystic fibrosis (CF) was admitted to the pediatric pulmonology outpatient clinic with complaints of cough, increased amount of sputum and accompanying dyspnea. Physical examination revealed pale skin color and crepitant rales in bilateral upper lung zones. According to the information obtained from the history, follow-up oxygen saturation was 96% and 90% at the time of presentation. Other vital signs were normal. Laboratory tests revealed an elevated serum IgE value of 1140 IU/mL (reference value= 1.31-165 IU/mL). *Aspergillus* skin test was positive. Posteroanterior (PA) chest radiography showed radioopaque areas in the upper-middle zone of the left lung, peribronchial wall thickening in both lungs and accompanying bronchiectasis (Figure 1). Subsequent thoracic computed tomography (CT) revealed mucus plugs in the bronchial lumen (Figure 2A). There was also thickening of the bronchial walls and centrilobular nodular opacities distributed in all lobes of both lungs (Figure 2B).

When the patient's clinical findings and radiologic examinations are evaluated together, what is your diagnosis?

DIAGNOSIS: **Allergic bronchopulmonary aspergillosis**

An increase in *Aspergillus fumigatus* specific IgE value (18.5 kU/L, Class 4) was detected in samples taken from the patient. Sputum culture grew *A. fumigatus*. When the clinical and laboratory findings were evaluated together with CT findings, a diagnosis of allergic bronchopulmonary aspergillosis (ABPA) was considered. After one month of steroid treatment, the patient's complaints and pulmonary findings regressed.

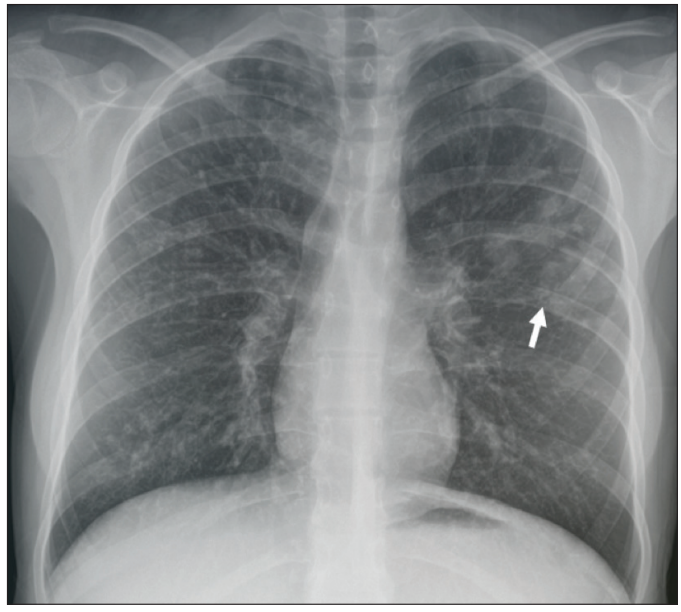

Figure 1. Posteroanterior chest radiograph. Radiopaque area in the upper-middle zone of the left lung (white arrow) and peribronchial wall thickening and accompanying bronchiectasis are observed in both lungs.

Short discussion

Allergic bronchopulmonary aspergillosis occurs as a result of hypersensitivity reaction to *Aspergillus* antigens, especially *A. fumigatus*, and is known as the most common cause of eosinophilic lung disease in developed countries (1,2). It is usually seen in patients with asthma and CF (2). Allergic bronchopulmonary aspergillosis is observed in 2-19%

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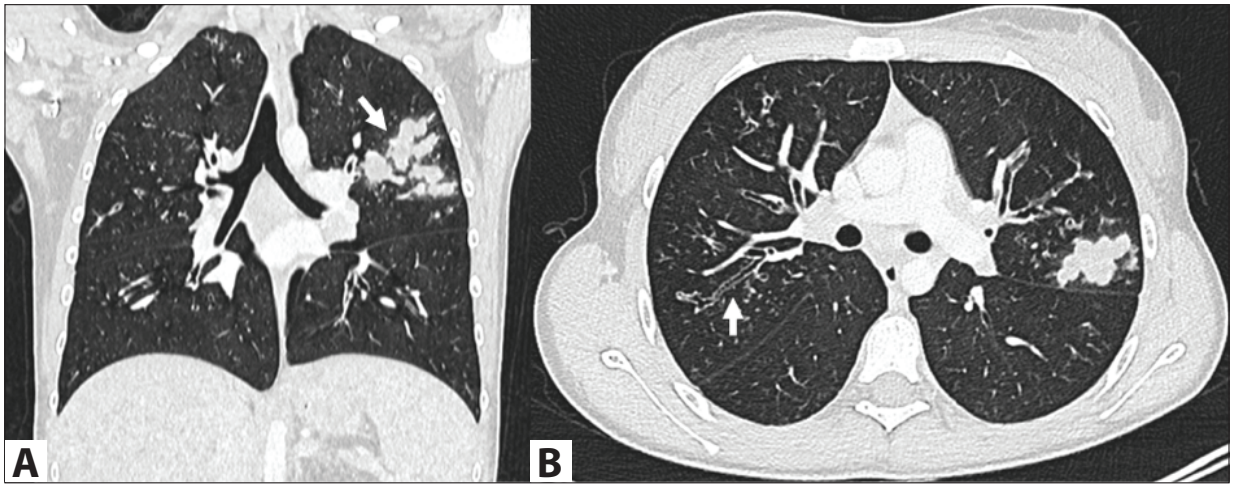

Figure 2. Coronal reformat CT **(A)** in the parenchymal window and axial plan thorax CT **(B)** through the upper lobes showing bronchi filled with mucus plugs (white arrow, A), thickening of bronchial walls (white arrow, B) and centrilobular nodular opacities.

of patients with CF (3). Patients present clinically with wheezing, cough, pleural chest pain, increased amount of sputum and sputum containing brown mucus plugs, especially in the acute exacerbation period. Systemic symptoms such as fever, malaise and weight loss may also accompany (1,2).

Allergic bronchopulmonary aspergillosis is usually suspected with clinical findings and the diagnosis is confirmed with radiologic and serologic tests (4). A diagnosis of CF or asthma are considered predisposing conditions for ABPA. In addition, laboratory and serologic findings that help the diagnosis of ABPA include the presence of hypersensitivity reaction in *Aspergillus* skin test, precipitant or IgG antibody positivity against *A. fumigatus* antigens, elevated *A. fumigatus-specific* IgE, and growth of *A. fumigatus* in smear or sputum culture (5). Allergic bronchopulmonary aspergillosis is characterized by peripheral eosinophilia and high IgE levels (2). IgE level is a useful laboratory test for ABPA since it correlates well with the activity of the disease (4). If performed, increased eosinophil and IgE concentration may be observed in bronchoalveolar lavage (1).

Chest radiography may be normal or transient pulmonary opacities and homogenous, tubular, finger in glove shaped areas of increased opacity predominantly involving the upper and central zones of the lung may be observed in the early stage findings of the disease. In advanced stages, central bronchiectasis and pulmonary fibrosis may develop (4). Computed tomography findings in ABPA include central predominant varicose bronchiectasis, mucus plugs with higher density than paraspinal muscles, thickening in bronchial walls, centrilobular nodular opacities that may be seen with a tree-in-bud, and consolidations that partially or completely resolve with steroid treatment (3,6). Bronchiectasis and mucus plugs predominantly involving the segmental and subsegmental bronchi of the upper lobes extend from the hilus to the periphery as tubular opacities. This appearance is described as a finger in glove sign. In addition, mucus plugs with a higher density than the described paraspinal muscles are considered pathognomonic for ABPA (1,5).

Other causes of mucoid obstruction such as bronchial atresia/narrowing, bronchial tumor, bronchial asthma, tuberculosis, and endobronchial foreign body should be considered in the differential diagnosis (7).

The most effective treatment option is systemic corticosteroids (5). Immunomodulatory therapies are beneficial in patients with high IgE levels. In addition, antifungal treatment may be beneficial in some patients. Response to treatment is monitored by pulmonary function tests and serum IgE levels (1).

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