Respiratory Medicine Case Reports 22 (2017) 220–223

Contents lists available at ScienceDirect

Respiratory Medicine Case Reports

journal homepage: www.elsevier.com/locate/rmcr

Case report

A young immunocompetent patient with spontaneous *Aspergillus* empyema who developed severe eosinophilia

Fumiaki Kudo [a], Hiromitsu Ohta [a, *], Yoshiaki Nagai [a], Kentaro Minegishi [b], Shinichiro Koyama [a]

[a] Department of Pulmonary Medicine, Jichi Medical University Saitama Medical Center, Saitama, Japan
[b] Department of General Thoracic Surgery, Jichi Medical University Saitama Medical Center, Saitama, Japan

ARTICLE INFO

Article history:
Received 3 August 2017
Received in revised form
25 August 2017
Accepted 27 August 2017

Keywords:
Aspergillus empyema
Eosinophilia
Fungus

ABSTRACT

Aspergillus empyema is usually reported as a complication of surgical procedures, and spontaneous cases are quite rare. Here, we describe the case of a 16-year-old man who suddenly developed dyspnea despite previously being healthy. Chest computed tomography showed multiple mass-containing cavity lesions, pneumothorax, and pleural effusion in the left thorax. Within 2 weeks, *Aspergillus fumigatus* grew from his pleural effusion, thus he was diagnosed with *Aspergillus* empyema. He also developed severe eosinophilia after admission, and was treated with anti-fungal drugs. Although there are many factors that can cause eosinophilia, we suspect that infection with *Aspergillus fumigatus* was the major cause of the eosinophilia in this patient. The lack of bronchial symptoms and lesions were not consistent with a diagnosis of allergic bronchopulmonary aspergillosis. As far as we know, this is the first case of spontaneous *Aspergillus* empyema resulting in severe eosinophilia.

1. Introduction

Aspergillus species are ubiquitous airborne saprophytic fungi that cause a variety of lung diseases. These lung infections, including simple pulmonary aspergilloma (SPA), chronic cavity pulmonary aspergillosis (CCPA), chronic fibrosing pulmonary aspergillosis (CFPA), chronic necrotizing pulmonary aspergillosis (CNPA), invasive pulmonary aspergillosis (IPA), and allergic bronchopulmonary aspergillosis (ABPA), may manifest with clinically and radiologically distinct patterns. However, the lung disease, *Aspergillus* empyema is rare, and most cases occur as a surgery-related complication. Only a few spontaneous cases of *Aspergillus* empyema have been reported [1].

Aspergillus infections sometimes cause eosinophilia, most cases of which are ABPA. ABPA is a pulmonary disorder caused by hypersensitivity to *Aspergillus fumigatus*, and it is associated with chronic asthma or cystic fibrosis. ABPA is classified as sero-positive ABPA (ABPA without bronchial lesions), ABPA with central bronchiectasis, ABPA with high attenuation mucus, and ABPA with chronic pleuropulmonary fibrosis, according to the radiological findings [2]. Although numerous radiological findings are observed in ABPA, pleural effusion is an extremely uncommon manifestation [3].

Here, we describe the quite rare case of a previously healthy patient who developed spontaneous *Aspergillus* empyema and severe eosinophilia without bronchial symptoms.

2. Case presentation

A 16-year old man visited the emergency department at the local hospital owing to dyspnea. His medical history revealed that he had developed appendicitis at 9 years old and migraines at 16 years old, but he did not have bronchial asthma. A cavity was identified in his left lung during a chest X-ray that was performed at his annual medical check-up at his high school (Fig. 1). However, he did not complain of any symptoms; thus, no additional examinations were performed. Three months before visiting the hospital, he presented with yellow purulent sputum, and 1 day before his visit, he suddenly experienced left chest pain and developed dyspnea.

Chest radiographs revealed left pneumothorax and pleural effusion (Fig. 2). An intercostal drain was inserted and purulent

Abbreviations: ABPA, allergic bronchopulmonary aspergillosis; ANCA, anti-neutrophil cytoplasmic antibodies; CRP, C-reactive protein; CT, computed tomography; IgE, immunoglobulin E; WBC, white blood cell.

* Corresponding author. Jichi Medical University Saitama Medical Center, Amanuma 1-847, Oomiya, Saitama, Japan.
E-mail address: hootatky@jichi.ac.jp (H. Ohta).

http://dx.doi.org/10.1016/j.rmcr.2017.08.022

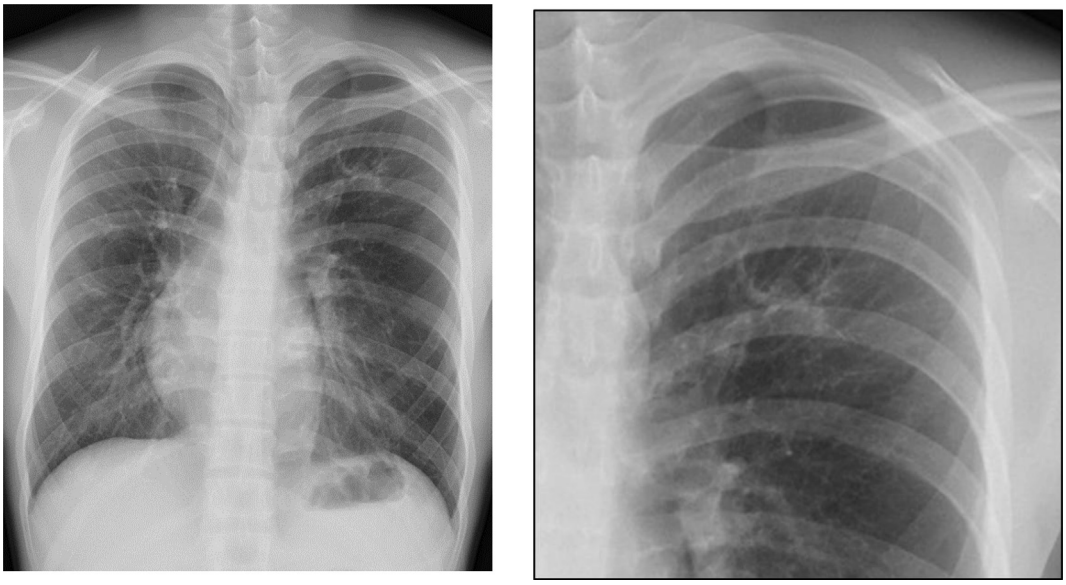

Fig. 1. A chest X-ray acquired 1 year before admission at the patient's annual medical check-up at his high school. The image reveals transparency of the left lung and deviation of the mediastinum. A cavity is also visible in the left upper lung field.

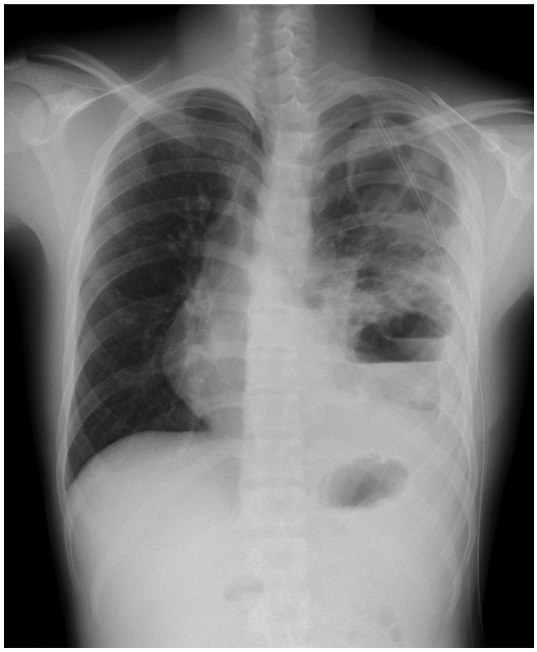

Fig. 2. A chest X-ray obtained upon admission to the local hospital. The image shows left pneumothorax, pleural effusion, and multiple cavities.

fluid was drained from the left thoracic cavity on the day he was admitted to the local hospital. Bacterial empyema was suspected and empirical antibiotic therapy with amoxicillin/sulbactam (3 g, three times daily, intravenously) was initiated. However, 3 days after, the patient developed a skin rash, and thus, amoxicillin/sulbactam was discontinued. A constant air leak from the left lung continued for a week, and he was transferred to our hospital.

He had low grade fever (37.2 °C), however blood pressure (106/58 mmHg) and pulse rate (92 beats/min) were normal. Physical examinations performed on admission showed that the patient had no gross lesions in the chest wall and he denied experiencing any trauma. Moreover, auscultation of the lungs revealed decreased breath sounds in the left lung but no abnormal sounds. Laboratory analyses indicated that most values were within the normal ranges, although his white blood cell (WBC) count was elevated (8460 with eosinophilia [22% of the WBCs]), as was his C-reactive protein (CRP) level (5.80 mg/dl). Microscopic examinations of the drained fluid did not reveal any bacteria or fungus. A chest computed tomography (CT) scan on the day of admission demonstrated mass-containing cavity lesions, which were surrounded by consolidation (Fig. 3A). Levofloxacin (500 mg, once daily, oral) was administered, however, 8 days after admission, it was discontinued due to the emergence of a spiked fever and deterioration of eosinophilia (WBC count: 12650, eosinophil count: 6578 [52% of the WBCs]). Ten days after admission, laboratory analyses showed that the number of WBCs and eosinophils in the peripheral blood had increased (WBC count: 21560, eosinophil count: 16170 [75% of the WBCs]), as had the CRP level (10.14 mg/dl). Analysis of the pleural effusion revealed an exudate and elevation of the eosinophil count (7200 [81.8% of the total number of cells]). His serum immunoglobulin E (IgE) level was 3900 KU/L. Repeated analyses performed for detecting *Aspergillus* antigens yielded negative results, and an analysis performed for detecting *Aspergillus*-specific IgE yielded a positive result (6.59 UA/ml, classIII; normal value $\leq$ 0.34 UA/ml). Analyses for perinuclear anti-neutrophil cytoplasmic antibodies (ANCA) and cytoplasmic ANCA were negative. The patient did not complain of dyspnea and wheezing was not heard over the lung fields. A chest CT scan acquired 15 days after admission showed the emergence of multiple bronchiolar nodules in the right lung field (Fig. 3B). Two weeks after admission, *Aspergillus fumigatus* was detected in the initially cultured sputum and pleural effusion.

The systemic administration of voriconazole (620 mg for the first dose, followed by 230 mg twice daily, intravenous) was initiated 15 days after admission. Afterwards, the patient's fever and peripheral eosinophilia decreased to within the normal range. Although the opacity on his chest CT scans also improved, the pleural effusion drainage and air leak continued. At 63 days after admission, an open window thoracostomy and debridement of the focus in the parietal pleura were performed (Fig. 4). Pathological examinations demonstrated that numerous hyphae had infiltrated