Allergic Bronchopulmonary Aspergillosis Caused by *Aspergillus terreus* Presenting Lobar Collapse

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A case of allergic bronchopulmonary aspergillosis (ABPA) is described which presents left upper lobe collapse caused by *Aspergillus terreus*, an organism rarely found in ABPA. It is unusual for initial radiographic findings of ABPA to include extensive collapse. (Internal Medicine 31: 140–142, 1992)

Key words: ABPA, mucoid impaction, massive atelectasis

Introduction

Allergic bronchopulmonary aspergillosis (ABPA), a disease caused by hypersensitivity reactions to aspergillus organisms, is characterized by bronchial asthma, pulmonary opacities and eosinophilia (1, 2). Although pulmonary collapse is one of the features of ABPA, it is extremely uncommon case for the patient to have extensive collapse (3, 4). In the present patient, collapse of the left upper lobe due to ABPA was presented as part of the initial radiographic findings, and in addition, the causative organism was *Aspergillus terreus*, which is rarely encountered in ABPA (5, 6).

Case Report

A 71-yr-old woman had been well until November 1988, when she had a productive cough, exertional dyspnea and intermittent wheezes. Her chest roentgenogram showed progressive collapse of the left upper lobe; she had a high fever despite treatment with antibiotics. She was admitted to our hospital on December 19, 1988. She was a non-smoker and had no clinical history of atopy or previous chest disease. On physical examination, breath sounds were decreased at the left anterior lung field and rales were not audible. The laboratory findings on admission are shown in Table 1. Hemoglobin value was 10.1 g/dl and white blood cell count was 9,060/mm³ with 1,993/mm³ of eosinophils. Erythrocyte sedimentation rate was 85 mm in 1 h. Cell analysis in the bone marrow appeared to be normal except for the eosinophils at 15%. Serum IgE level was elevated to 15,700 IU/ml

and radioallergosorbent test (RAST) for *Aspergillus fumigatus* (*A. fumigatus*) was positive. Intradermal skin test with *A. fumigatus* antigen gave a strongly positive immediate reaction but no late reaction was observed at 4 to 6 h, and precipitins against *Aspergillus terreus* (*A. terreus*), assayed by Ouchterlony double-diffusion gel technique (9), were detected, but not against *A. fumigatus*. Repeat sputum cultures grew *A. terreus*. The chest roentgenogram on admission showed complete collapse of the left upper lobe (Fig. 1). Bronchoscopy demonstrated mucoid impaction which plugged the orifice of the left upper lobe bronchus (Fig. 2). *A. terreus* was cultured from the bronchial aspirates containing eosinophils and sputum. Therefore, it was highly likely that this organism caused the ABPA in the present patient. A chest CT showed proximal bronchiectatic change of the upper lobe bronchus after treatment with physiotherapy and aspiration by bronchoscopy. She was treated with a short course of prednisolone (30 mg/day). Three weeks thereafter her chest roentgenogram cleared completely and she has remained well.

Discussion

ABPA is an example of asthmatic pulmonary eosinophilia. This condition was first described in 1952 by Hinson et al (1). A variety of serologic, radiologic and clinical observations had been reported before 1977, when the criteria for the diagnosis of ABPA were established by Rosenberg and co-workers (2). The primary criteria include the following: episodic bronchial obstruction (asthma), eosinophilia, positive immediate skin

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Table 1. Laboratory Findings

Peripheral blood		Na	140 mEq/l
RBC	$344 \times 10^4/\text{mm}^3$	K	4.0 mEq/l
Hb	10.1 g/dl	Cl	104 mEq/l
Ht	31.3%		
WBC	$9,060 \times 10^3/\text{mm}^3$	ESR	80 mm/h
Stab	6%	Serology	
Seg	45%	CRP	8.3 mg/dl
Lymph.	23%	RA	(+)
Mono.	4%	ASLO	(-)
Eosino.	22%	ANA	<10×
Plt	$27.8 \times 10^4/\text{mm}^3$	C ₃	112 mg/dl
Blood chemistry		C ₄	47.6 mg/dl
T.P.	6.4 g/dl	CH50	62.5 U/ml
Alb	51.2%	IgE	15,700 U/ml
α_1	4.5%	RAST <i>A. fumigatus</i>	3.3 PRU/ml
α_2	10.2%		
β	11.1%	Precipitins	
γ	22.9%	<i>A. fumigatus</i>	(-)
T.B.	0.26 mg/dl	<i>A. terreus</i>	(+)
GOT	25 IU	Skin test	
GPT	14 IU	PPD (48 h)	2 × 2 mm
LDH	482 IU	<i>A. fumigatus</i>	40 × 30 mm
Al-p	152 IU	(15 min)	
Ch-E	0.62 ΔPH	Sputa (bronchoschopic exam.)	
T.chol.	165 mg/dl	Culture	
ZTT	9.3 IU	Bacteria	(-)
BUN	12.6 mg/dl	Acid-fast bacill	(-)
Cr	0.65 mg/dl	<i>A. terreus</i>	(+)
UA	2.6 mg/dl	Cytology	class II
FBS	100 mg/dl

Fig. 1. Chest X-ray film on admission showing left upper lobe collapse.

Fig. 2. Endobronchial photographs revealing mucoid impaction plugging the orifice of the left upper lobe bronchus.

reactivity, serum precipitating antibodies, elevated serum IgE, history of pulmonary infiltrates and central bronchiectasis. The secondary criteria include: *Aspergillus*-positive sputum culture, history of expectrating brown plugs or flecks, Arthus (late) skin reactivity. The patient in this report satisfied six of the seven primary criteria and two of the three secondary criteria (2). In addition,

the lesion seen on the chest roentgenogram as well as clinical symptoms were improved by the steroid therapy. Based on these clinical manifestations, the diagnosis of ABPA in this case was justified. Remarkable was the fact that culture of the patient's bronchial aspirates and sputum grew *A. terreus*, which had only been regarded

as a contaminant in the past. Indeed only a few cases of ABPA with *A. terreus* have been reported in the literature (5, 6).

In this case, *A. fumigatus* antigen gave a strongly positive immediate reaction but no late reaction at 4–6 h, and precipitins for *A. fumigatus* were negative. Laham et al (5) reported a case of ABPA caused by *A. terreus*, in which skin tests with *A. fumigatus* gave a positive immediate reaction, but no late reaction, and precipitins against *A. terreus*, but not against *A. fumigatus* were detected in serum. Therefore, we prepared *A. terreus* and *A. fumigatus* antigens adjusted to the optimal protein content, according to the methods of Laham et al, and assayed the present patient's serum for precipitins by the double-diffusion gel technique of Ouchterlony (9). And, as a result, precipitins were positive against *A. terreus* antigen but not *A. fumigatus*. Therefore, there seems to be no doubt that *A. terreus* is the causative organism in this case of ABPA.

A radiographic feature commonly found in ABPA is transient migrating infiltrate, which may be patchy, triangular, or oblong, and it usually appears in the upper lobes. Such infiltrates consist of subsegmental atelectasis due to mucoid impaction and parenchymal infiltration. Proximal bronchiectasis or secretions in the damaged bronchus may contribute to other radiographic findings such as toothpaste shadow, glove-finger shadow, tramline shadow, and air-fluid levels (7, 8). Although collapse is one of the radiographic findings caused by ABPA, it is usually presented as subsegmental atelectasis secondary to mucoid impaction. In this patient, the chest roentgenogram showed left upper lobe collapse; bronchoscopy

revealed mucoid impaction of the left upper bronchus with the more distal bronchi filled with inspissated mucus. These findings are compatible with the features of ABPA, but it is unusual that such extensive collapse as was encountered in the present patient's left upper lobe is found in the initial radiographic findings of ABPA (3, 4). It recommended that ABPA is included in the differential diagnosis of extensive pulmonary collapse.

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