

Lesson of the Week

Lung collapse caused by allergic bronchopulmonary aspergillosis in non-asthmatic patients

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Allergic bronchopulmonary aspergillosis is recognised in about 8% of asthmatic patients,^{1,2} and its features are transient opacities seen on the chest radiograph, positive immediate and delayed skin test reactions to *Aspergillus fumigatus* extract, peripheral blood eosinophilia, and serum precipitins against *A fumigatus*. Mucus plugs or casts often containing the fungus are expectorated and proximal bronchiectasis may eventually develop.³⁻⁸ This condition has been reported in only a few non-asthmatic patients.^{3,4,9-11}

We describe five non-asthmatic patients who presented over seven years with lobar or complete lung collapse rather than pulmonary infiltrates. The presenting clinical features led to an initial diagnosis of bronchial carcinoma. The correct diagnosis was made only after the unusual bronchoscopic findings had prompted further investigation for allergic bronchopulmonary aspergillosis.

Case reports

Case 1—A 60-year-old woman presented with a four-month history of dyspnoea, cough, mucoid sputum, malaise, and anorexia, starting after a flu-like illness. Her symptoms did not respond to antibiotics. She was a non-smoker and apart from having had pneumonia and tuberculosis when aged 30 years, she had had no respiratory disease. On examination she was unwell, cyanosed, and dyspnoeic with signs of collapse of the

Allergic bronchopulmonary aspergillosis may occur in non-asthmatic patients

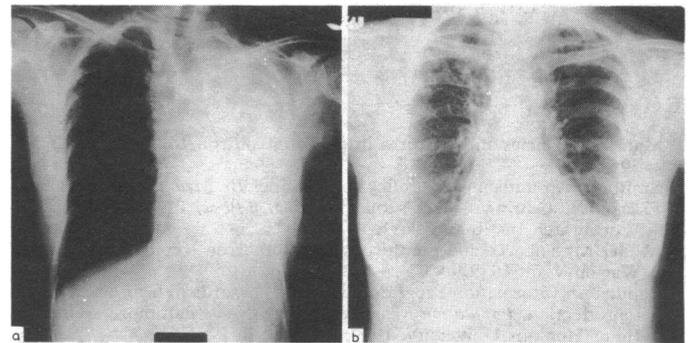


FIG 1—Chest radiographs of the patient in case 1, showing (a) complete collapse of left lung at presentation; (b) re-expansion of left lung after bronchoscopy.

left lung. A chest radiograph (fig 1a) confirmed complete collapse of the left lung, and bronchial carcinoma was thought likely. Bronchoscopy showed no evidence of carcinoma, but excessive mucoid secretions were aspirated from the left main bronchus and sub-segments, after which the lung re-expanded (fig 1b). Apart from physiotherapy no further treatment was required, and she has remained well. Further clinical and laboratory details are given in the table.

Case 2—A 74-year-old man had had a flu-like illness four months earlier and then developed a productive cough, pro-

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Details of clinical examination and results of laboratory tests in five patients

	Case No				
	1	2	3	4	5
Age (y)	60	74	36	57	56
Date of presentation	2/80	4/80	11/79	9/73	3/74
History of atopy at presentation	No	No	Hay fever	No	No
Skin tests	*	Neg	†	Neg	*
Blood eosinophilia	Yes	Yes	No	Yes	No
<i>Aspergillus fumigatus</i> skin test:					
Immediate	Positive	Positive	Positive	Positive	Positive
Delayed	?	Positive	Positive	Positive	Positive
<i>Aspergillus fumigatus</i> precipitins	Positive	Positive	Positive	Positive	Positive
Bronchial aspirate	<i>A fumigatus</i>				
FEV ₁ /VC% (1981)	75%	70%	75%	71%	70%

* 3 mm reaction to house dust mite only.

† House dust mite, grass pollen, animal dander, etc, all positive.

FEV₁ = Forced expiratory volume in 1 second.
VC = Vital capacity.

gressive dyspnoea, vague chest pain, lassitude, and weight loss. His symptoms did not respond to antibiotics. He had smoked 20 cigarettes daily until age 55 years and had mild chronic bronchitis. Physical examination and a chest radiograph (fig 2a) showed complete collapse of the right lung, and bronchial carcinoma seemed likely. At bronchoscopy thick white mucus that could not be aspirated was seen blocking the right main bronchus and the adjacent mucosa was inflamed. After physiotherapy and a short course of flucytosine the lung re-expanded (fig 2b). He has remained well.

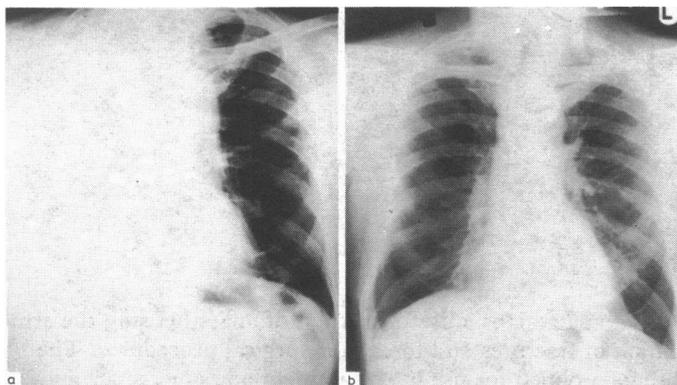


FIG 2—Chest radiographs of the patient in case 2, showing (a) collapsed right lung at presentation; (b) re-expanded right lung after treatment.

Case 3—A 36-year-old woman presented with recent onset of cough, copious purulent sputum with haemoptysis, fever, and dyspnoea. She smoked 20 cigarettes daily, had symptoms of bronchitis, had mild hay fever, and had had pertussis as a child. The examination and the chest radiograph showed collapse of the left upper lobe, from which thick secretions were aspirated at bronchoscopy. After aspiration and a short course of steroids the lung re-expanded and she became asymptomatic. She has had no further lung collapse or symptoms of asthma.

Case 4—A 56-year-old woman presented with an upper respiratory tract infection that was developing into pneumonia. She had had pleuritic chest pain, a non-productive cough, exertional dyspnoea, and an intermittent wheeze during the preceding few weeks. She had had pleurisy and pneumonia as a child and several chest infections as an adult. She was a non-smoker. Serial chest radiographs showed progressive collapse of the right lower and middle lobes despite treatment with antibiotics. Bronchial carcinoma was thought likely, but at bronchoscopy thick secretions were seen obstructing the right intermediate bronchus and the underlying mucosa was inflamed. The secretions were removed with biopsy forceps. The lung then re-expanded, and treatment was continued with natamycin inhalations. Four years later the right lower lobe collapsed again, and she was treated with prednisolone. She had a wheeze only at the times of the lung collapse, and she has subsequently remained well with no symptoms of asthma.

Case 5—A 56-year-old woman presented with a six-week history of dyspnoea and a non-productive cough. She was a non-smoker and had no previous chest disease. A chest radiograph showed patchy shadowing at the right apex, which suggested active tuberculosis, but investigations were negative. Serial chest radiographs taken over the next two months showed an enlarging left hilum, but investigations including bronchoscopy and mediastinoscopy were negative and the opacity eventually cleared. Nine months later she presented again with a cough productive of mucus plugs, dyspnoea, and wheeze. Physical examination and a chest radiograph showed collapse of the right lower lobe and again a neoplasm was suspected. Bronchoscopy showed that the whole of the right bronchial tree was obstructed by thick mucus and the mucosa was inflamed.

After treatment with physiotherapy, prednisolone, and natamycin inhalations the lung re-expanded and she became asymptomatic. A year later her symptoms recurred with collapse of the right middle and lower lobes. She responded to a course of prednisolone and has remained well with no evidence of asthma.

Comment

These five patients presented with symptoms and signs that were highly suggestive of bronchial carcinoma, and initial investigations were consistent with this diagnosis. When referred for bronchoscopy the unusual finding of thick mucus in the major bronchi with underlying acute mucosal inflammation led to further investigations that confirmed the diagnosis of allergic bronchopulmonary aspergillosis. Except for the patient in case 3 with hay fever, none had a clinical history of atopy. Two patients (cases 4 and 5) had a short history of wheezing associated with lung collapse, and one (case 2) had a wheeze due to chronic bronchitis. None has had an episode of lung collapse since, and none has developed asthma (see the table for forced expiratory volume in 1 s (FEV₁) and vital capacity (VC) ratios).

The criteria for diagnosis of allergic bronchopulmonary aspergillosis have always included asthma, in addition to pulmonary infiltrates and hypersensitivity to *Aspergillus*.³⁻⁸ It has been suggested that the criteria should be changed to include non-asthmatic patients who otherwise have the typical features of this condition.¹¹ It should also be appreciated that although pulmonary infiltrates and segmental collapse are the usual radiological findings,¹²⁻¹⁴ more extensive collapse can occur,¹⁵ as in these five patients. It is salutary to note that the diagnosis of this treatable condition, which has a good prognosis,^{4,16} may not have been made had the patients not undergone bronchoscopy.

References

- Pepys J, Riddell RW, Citron KM, Clayton YM, Short EI. Clinical and immunologic significance of *Aspergillus fumigatus* in the sputum. *Am Rev Respir Dis* 1959;**80**:167-80.
- Campbell MJ, Clayton YM. Bronchopulmonary aspergillosis. A correlation of the clinical and laboratory findings in 272 patients investigated for bronchopulmonary aspergillosis. *Am Rev Respir Dis* 1964;**89**:186-96.
- Rosenberg M, Patterson R, Mintzer R, Cooper BJ, Roberts M, Harris KE. Clinical and immunologic criteria for the diagnosis of allergic bronchopulmonary aspergillosis. *Ann Intern Med* 1977;**86**:405-15.
- McCarthy DS, Pepys J. Allergic bronchopulmonary aspergillosis. Clinical immunology: (1) clinical features. *Clin Allergy* 1971;**1**:261-86.
- Anonymous. Diagnosing allergic bronchopulmonary aspergillosis. [Editorial]. *Br Med J* 1977;**iii**:1439-40.
- Malo JL, Hawkins R, Pepys J. Studies in chronic bronchopulmonary aspergillosis. 1. Clinical and physiological findings. *Thorax* 1977;**32**:254-61.
- Hinson KFW, Moon AJ, Plummer NS. Bronchopulmonary aspergillosis. *Thorax* 1952;**7**:317-33.
- Slavin RG, Stanczyk DJ, Lonigro AJ, Broun GO. Allergic bronchopulmonary aspergillosis—a North American rarity. *Am J Med* 1969;**47**:306-13.
- Elder JL, Amyth JT. Allergic bronchopulmonary aspergillosis. *Med J Aust* 1967;**ii**:231-2.
- Henderson AH. Allergic aspergillosis: review of 32 cases. *Thorax* 1968;**23**:501-12.
- Glancy JJ, Elder JL, McAteer R. Allergic bronchopulmonary fungal disease without clinical asthma. *Thorax* 1981;**36**:345-9.
- McCarthy DS, Simon G, Hargreave FE. The radiological appearances in allergic bronchopulmonary aspergillosis. *Clin Radiol* 1970;**21**:366-75.
- Malo JL, Pepys J, Simon G. Studies in chronic allergic bronchopulmonary aspergillosis. 2. Radiological findings. *Thorax* 1977;**32**:262-8.
- Mintzer RA, Rogers LF, Kruglik GD, Rosenberg M, Neiman HL, Patterson R. The spectrum of radiological findings in allergic bronchopulmonary aspergillosis. *Radiology* 1978;**127**:301-7.
- Ellis RH. Total collapse of the lung in aspergillosis. *Thorax* 1965;**20**:118-23.
- Safirstein BH, D'Souza MF, Simon G, Tai EH-C, Pepys J. Five year follow-up of allergic bronchopulmonary aspergillosis. *Am Rev Respir Dis* 1973;**108**:450-9.

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