Thorax, 1980, **35**, 953–954

Short reports

Radiotherapy for massive haemoptysis from an aspergilloma

J M SHNEERSON, P A EMERSON, AND R H PHILLIPS

From the Departments of Medicine and Radiotherapy, Westminster Hospital, London

Recurrent haemoptysis is common in patients with an aspergilloma and occasionally is large enough to be life-threatening or even fatal.[1] We report the first case in which massive haemoptysis from an aspergilloma has been treated with radiotherapy and suggest that this method should be more widely used when there are contraindications to surgery.

Case report

This man (AK), aged 42 years, presented in February 1979 with three haemoptyses of about 150 ml each within 36 hours. On the day after admission to hospital he had a larger haemoptysis which caused a respiratory arrest requiring hand ventilation for an hour and a blood transfusion of four units. He had a smaller haemoptysis that evening and a week later bled about 700 ml; again he required intubation and hand ventilation.

He had had asthma since the age of 4 years and had positive prick tests to house dust, grass pollen, dog hair, cat fur, feather, and *Aspergillus fumigatus*. Since 1962 his symptoms had been worse in winter. Transient shadows were first noticed on the chest radiograph in 1967 at which time aspergillus precipitins were present and his blood eosinophil count was $0{\cdot}72\times10^9$/l. A diagnosis of allergic bronchopulmonary aspergillosis was made and by 1971 bilateral upper lobe shrinkage was already present. By 1979 he was dyspnoeic on climbing one flight of stairs, had a cough with a small amount of yellow sputum in the mornings, but had had no previous haemoptyses.

On examination he was thin, kyphotic, and centrally cyanosed. Finger clubbing was present and there were widespread wheezes and crackles. His chest radiograph showed bilateral upper lobe contraction with bronchiectasis on the right and a large aspergilloma, confirmed by tomography, on the left. Sputum was negative for tubercle bacilli and malignant cells. His precipitins to *Aspergillus fumigatus* were strongly positive and total IgE was greater than 4000 international units/ml. Fibreoptic bronchoscopy confirmed that the bleeding was coming from the left upper lobe.

His FEV_1/FVC was only 0·63/1·91 litres and it was felt that surgical resection of his aspergilloma would be too hazardous. Bronchial artery embolisation was attempted but this was not possible because of the small size of the bronchial arteries. He was, therefore, irradiated on a cobalt 60 mobaltron unit with a single anterior field to a total incident dose of 2000 rads given in five fractions over seven days.

His bleeding ceased completely three days after starting radiotherapy. However, eight weeks later he had three haemoptyses, totalling about 150 ml, for which he received a further 1000 rads midline dose with opposing fields to the left upper zone in five fractions over seven days. He has had no further bleeding during eight months' follow-up. Regular measurement of his spirometry, lung volumes, and carbon monoxide transfer factor have shown no deterioration. The aspergilloma has not changed in size after treatment.

Discussion

Surgery has until now been the treatment of choice for massive bleeding from aspergillomas.[2] Unfortunately, many patients in this category are unsuitable for surgery because of their poor respiratory reserve, pulmonary hypertension, or the presence of multiple aspergillomas. Even in those assessed as fit for surgery the mortality rate is 7% and the frequency of major complications, such as empyema, air space problems, bronchopleural fistulae, and haemorrhage is over 20%.[3] Some improvement of haemoptysis has been seen with percutaneous nystatin and amphotericin paste injected into the cavity[4] but this technique has not been widely used. In the present case radiotherapy was effective in stopping the bleeding and indeed appeared to be a life-saving measure.

The haemoptysis stopped despite the aspergilloma remaining the same size radiographically after treatment. Presumably the radiation had no net effect on the growth of the fungus but was acting on the vascular lining of the cavity. The early effects of radiation on small blood vessels include swelling, necrosis, and possibly hyperplasia of the endothelial cells resulting in thrombosis, and compression of the vessels by perivascular oedema. Eventually perivascular and medial fibrosis occludes the vessels and impairs the capacity of the microcirculation to regenerate and remodel in the presence of injury or infection. These effects are dose-dependent.[5] Unfortunately very little

Address for reprint requests: Dr JM Shneerson, Westminster Hospital, Horseferry Road, London SW1P 2AP.

is known of the vascular microanatomy of the walls of cavities containing aspergillomas and of the causes of haemoptysis from them, but the radiation may have acted similarly in this patient.

Bleeding from an aspergilloma is too variable a phenomenon for too much to be inferred from a single case, but the cessation of bleeding on two occasions after radiotherapy suggests that it may well be a very useful form of treatment for serious haemoptysis, particularly in patients unfit for surgery. We have been unable to find any previous report of the use of radiotherapy in this situation. The theoretical disadvantage that radiation fibrosis might cause a deterioration in pulmonary function was not seen, probably because the radiation was applied to lung tissue that was already grossly damaged and non-functioning. Radiotherapy may also prevent recurrent haemoptyses from aspergillomas but further experience is needed to answer this question.

References

1 Solit RW, McKeown JJ Jr, Smullens S, Fraimow W. The surgical implications of intracavitary mycetoma (fungus balls). *J Thorac Cardiovasc Surg* 1971; **62**:411–22.

2 Mattox KL, Guinn GA. Emergency resection for massive haemoptysis. *Ann Thorac Surg* 1974; **17**:377–83.

3 Varkey B, Rose HD. Pulmonary aspergilloma. A rational approach to treatment. *Am J Med* 1976; **61**:626–31.

4 Krakowa P, Traczyk K, Walczak J, Halweg H, Elsner Z, Pawlicka L. Local treatment of aspergilloma of the lung with a paste containing nystatin or amphotericin B. *Tubercle* 1970; **51**:184–91.

5 Rubin P, Casarett GW. *Clinical radiation pathology*. Philadelphia: WB Saunders, 1968:1.