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# Surgery for pulmonary aspergilloma: preoperative embolisation of the bronchial circulation

CF HUGHES, R WAUGH, D LINDSAY

*From the Department of Cardiothoracic Surgery, Royal Prince Alfred Hospital, Camperdown, New South Wales, Australia*

Haemoptysis is a common complication of pulmonary aspergillosis, being reported in 52–78% of patients.[1 2] Although most episodes are minor, some patients will succumb to massive haemoptysis.[3 4] While surgical resection has been recommended for patients with massive haemoptysis it is not without considerable risk. We report the use of selective bronchial artery embolisation in a patient about to undergo lobectomy for pulmonary aspergillosis.

## Case report

A 38 year old white woman was admitted to our hospital in May 1984 after a major haemoptysis. The patient had been receiving regular treatment for asthma since early childhood. At the age of 14 she contracted tuberculosis and received a course of *p*-aminosalicylic acid, isoniazid, and streptomycin.

In 1977 the diagnosis of "allergic aspergillosis" was made on the basis of asthma, *Aspergillus fumigatus* in the sputum, and positive serological results. In the same year she had a major haemoptysis on two successive nights but refused admission to hospital. In January 1984 she developed night sweats, weight loss, and palpitations. Four months later, after coughing about 1 litre of blood in 24 hours, she was admitted to hospital.

The only positive physical findings were fine crepitations anteriorly and scattered rhonchi over both lung fields. The sputum grew *Aspergillus fumigatus*. The chest radiograph showed bilateral apical fibrosis and a large cyst occupying most of the left upper lobe. A small cyst was seen in the left mid zone and a still smaller one in the right apex.

Pulmonary angiography and selective bronchial arteriography were performed to delineate the sight of bleeding and to facilitate surgical decisions. The pulmonary vasculature appeared normal but a large tortuous left bronchial artery was seen to be coursing towards the diseased left mid zone (fig 1).

On the 21st May 1984 this artery was selectively embolised with Gelfoam particles (fig 2), after which a thoracotomy was performed. As the entire upper lobe was destroyed, lobectomy was performed. A large cyst in the apical segment of the lower lobe was removed by wedge resection. There were numerous dense vascular adhesions and precise identification of the pulmonary anatomy was tedious. We could not identify the bronchial circulation. There was no major bleeding, however, from the bronchial arterial system.

After operation an apical haematoma required surgical evacuation on two occasions. Each exploration revealed numerous small haemorrhagic areas on the chest wall, which were cauterised. After a slow recovery the patient was discharged on day 52.

One year later she manages to work as an executive secretary and to bring up two teenage children on her own, although troubled by persistent asthma and some minor haemoptyses.

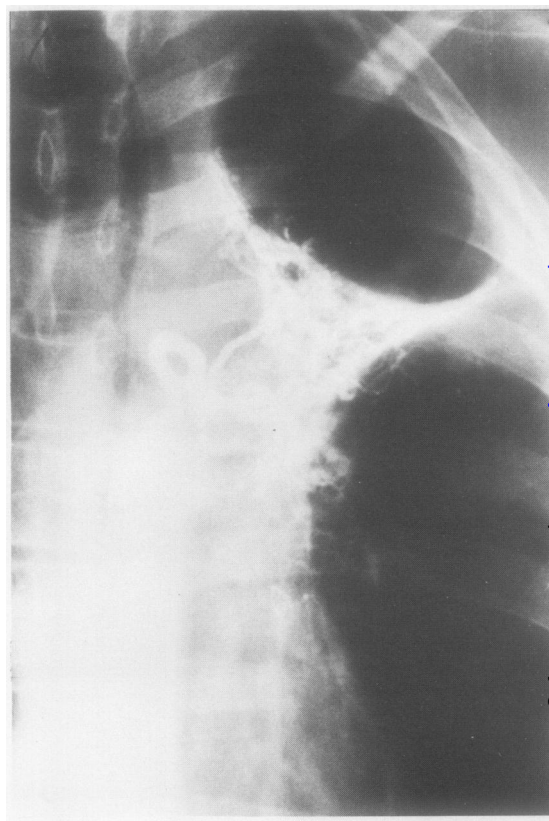

Fig 1 *Left bronchial angiogram, showing enlarged left bronchial artery with an area of increased vascularity in the diseased lung remnant.*

Address for reprint requests: Mr CF Hughes FRACS, Department of Cardiothoracic Surgery, Royal Prince Alfred Hospital, New South Wales 2050, Australia.

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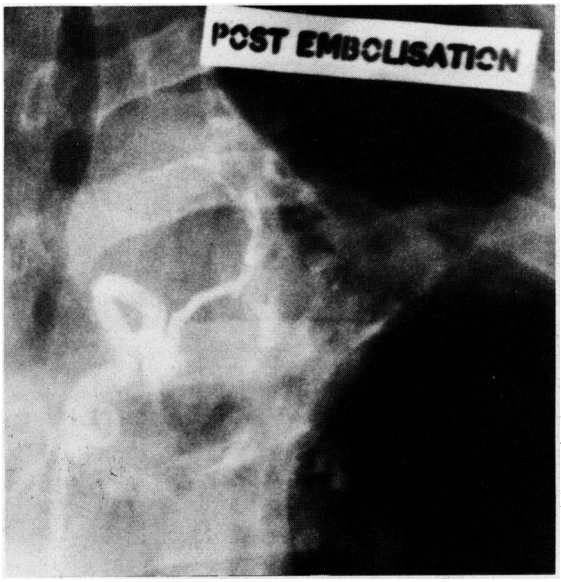


Fig 2 *Arteriogram of the left bronchial artery after embolisation, showing obliteration of blood supply to the diseased area.*

## Discussion

The first surgical resection of a fungus ball was performed in 1946 by Gerstl *et al.*[5] Since that time the possibility of sudden massive and possibly fatal haemoptysis has prompted surgeons to attempt resection in selected cases. Some authors would even advocate resection for all patients with a fungus ball, while others would operate only in the presence of adequate lung function and severe haemoptysis.[1 2 6 7] Uflacker *et al*[8] reported bronchial artery embolisation in 33 patients with massive haemoptysis. Of seven patients with pulmonary aspergillosis, four subsequently underwent resection and one a cavernostomy. Two of these patients had recurrent haemoptysis and one died. In our case surgery was undertaken only after the patient had suffered two major haemoptyses.

Angiography showed the precise anatomy of the pulmonary artery before surgery. This provided reassurance during the difficult dissection of the pulmonary vasculature from the surrounding chronic inflammation. Further, the knowledge that the major bronchial artery was in the upper lobe encouraged us to be conservative in the treatment of the chronic lower lobe disease. Embolisation of this artery appeared to provide a relatively bloodless field and minimised the blood loss.

Pulmonary aspergillosis is often bilateral and these patients most commonly have recurrent massive haemoptysis after surgery.[8] They frequently have diminished respiratory reserve. Surgical treatment should conserve as much functioning lung tissue as possible. In our case lobectomy was performed only because the lobe was totally destroyed. Virtually all functioning tissue in the lower lobe, however, was preserved.

Pulmonary and bronchial arteriography enables the surgeons to define the most appropriate and conservative resection. When combined with newer surgical methods, such as stapling techniques, selective embolisation should ensure that maximal conservation of lung tissue is performed with a minimum of operative difficulties.

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