BILATERAL PULMONARY RESECTIONS FOR ASPERGILLOMAS

Bilateral Pulmonary Resections for Aspergillomas

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A patient is described with bilateral aspergillomas who successfully underwent right upper lobe lobectomy and subsequent segmental resection of the left upper lobe for control of hemoptysis.

Aspergillus is an ubiquitous fungus and common invader of lung cavities secondary to tuberculosis, bronchiectasis, sarcoidosis and bronchogenic carcinoma. In 1968, the British Tuberculosis Association concluded that about 15 percent of patients with cavitary tuberculosis are subject to superinfection with Aspergillus. When hemoptysis occurs secondary to an aspergilloma, surgical removal of the infected cavity is generally recommended. Prophylactic resections of asymptomatic aspergillomas have also been advised to avoid the risk of future hemorrhage. Since the disease is localized, all cases reported but one describe unilateral segmental resection or lobectomy, resulting in cure with small loss of pulmonary function.

It is the purpose of this paper to present the second case of a patient who underwent bilateral surgery because of massive hemoptysis secondary to aspergillomas.

CASE REPORT

A 58-year-old man had been treated at another hospital for bilateral pulmonary tuberculosis from 1947-1964. Isoniazid (INH) and streptomycin were given for one year, then INH was continued alone. Cycloserine was added in 1966.

Four days prior to his first admission to Montefiore Hospital and Medical Center on February 6, 1966, the patient began coughing up blood-streaked sputum. On admission he denied weight loss, upper respiratory tract infection or chest pain. He had stopped smoking in 1957.

On physical examination the vital signs were normal. The pertinent physical findings included kyphoscoliosis and generalized hyperresonance to percussion of the chest. Bronchial breathing was heard in both upper lobes posteriorly. Laboratory data: CBC, urinalysis, FBS and BUN were normal. Sputum cultures for acid-fast bacilli were negative, as were sputum cytologic examinations for malignant cells. A pure culture of Aspergillus fumigatus was obtained from the sputum. The chest roentgenogram on admission (Fig 1) revealed bilateral apical fibrosis, apical radiolucencies and elevated hila. A pleural reaction was present on the right and the mediastinum was shifted to the right.

On February 9, 1966, bronchoscopy showed edematous mucosa throughout. Purulent material was aspirated from the right upper lobe bronchus; A fumigatus was grown on culture from this material. On February 18, massive hemoptysis occurred requiring tracheostomy to clear the airway; right thoracotomy was performed. Operative findings included a markedly thickened and adherent pleura and a small empyema cavity in the posterior paravertebral gutter. Following decortication, the middle and lower lobes appeared normal. The upper lobe was markedly shrunken and right upper lobe lobectomy was performed. Four units of blood were administered during surgery. The surgical specimen demonstrated a 8.5 cm multi-locluated cavity in the apical segment containing hemorrhagic, necrotic tissue and clotted blood. On microscopic examination, long, septated fungi, resembling Aspergillus, were noted within the wall of the cavity (Fig 2). There was a diffuse and chronic inflammatory reaction within the lung parenchyma and some Langhans giant cells were seen. No tubercles were noted and Ziehl-Neelsen stain revealed no acid-fast bacilli.

Hemoptysis occurred postoperatively, but subsided following another transfusion. Empyema then developed in the right hemithorax secondary to Pseudomonas pneumonia. Successful treatment consisted of chest tube drainage and colistin

FIGURE 1. Admission chest roentgenogram indicating thickened pleura at both apices and a cavity in the right apex.
The patient was readmitted three times in the next six months because of recurrent hemoptysis. Thirty to 90 ml of blood were brought up on each of many occasions. Chest roentgenograms showed further loss of volume on the right secondary to the lobectomy, and apical pleural thickening on the left. Tomograms of the left upper lobe were highly suggestive of an aspergilloma (Fig 3). A bronchogram disclosed bronchiecasis of both segments of the left upper lobe. Bronchoscopy on June 24, 1966 revealed a blood clot in the left upper lobe bronchus; biopsy of this area showed normal mucosa. A sputum culture was negative for Aspergillus. On July 13, 1966, pulmonary function tests revealed vital capacity (VC) 67 percent of predicted and maximum voluntary ventilation (MVV) 59 percent of predicted, indicating moderate restrictive and obstructive impairment.

The frequency of hemoptysis with risk of a fatal hemorrhage and evidence of disease in the left upper lobe prompted the decision to remove the involved area surgically. At thoracotomy on January 9, 1967 the pleura was densely adherent. The anterior segment of the left upper lobe appeared to be normal; therefore, apico-posterior segmental resection and decortication were performed. The resected specimen contained a 4.5 cm cavity filled with friable material which was identified as an aspergilloma (Fig 4).

Postoperatively, the patient developed left sided bronchopleural fistula and empyema. Treatment consisted of ampicillin and open drainage.

Pulmonary function tests on February 4, 1970 revealed VC 55 percent of predicted and MVV 84 percent of predicted. The diffusing capacity for carbon monoxide was 64 percent of predicted. Arterial blood gases at rest revealed pH 7.43, PO₂ 86 mm Hg, and PCO₂ 38 mm Hg. The PO₂ dropped to 62 mm Hg with exercise and the PCO₂ was unchanged. The patient is now fully ambulatory with a small amount of drainage persisting from the bronchocutaneous fistula. A degree of reversible bronchospasm probably accounts for the markedly improved MVV on February 4, 1970. Figure five summarizes the course of this patient.

**DISCUSSION**

This case in an example of the most common type of pulmonary aspergillosis, the aspergilloma, which is usually localized to preexisting cavities. Radiologically it often appears as the well known "fungus ball." The vast majority of these lesions are unilateral, although multiple bilateral aspergillomas have been described. The usual symptom, as in this case, is hemoptysis which occurs intermittently and is generally of small quantity. Massive hemoptysis is, however, not rare. Kilman et al reported hemoptysis in more than 50 percent of their patients with aspergillomas. Similarly, Pecora and Toll noted hemoptysis in the majority of 45 cases of pulmonary aspergillomas.

In their review, Pecora and Toll mentioned persistence of hemoptysis in many patients who were unsuccessfully treated medically. Hemoptysis disappeared only after resection. Kilman et al and Takaro recommend prophylactic resection of the fungus-containing cavity. Both groups feel that one would then avoid the risk of future hemorrhage or invasion by another opportunistic organism. This viewpoint is not shared universally, however.

There are scattered case reports of cure of this disease with various anti-fungal drugs given orally, parenteral-
ly or instilled endobronchially, but most investigators have found that although the sputum is sterilized, the roentgenogram is unchanged. In addition, it is not established that the clinical course is altered by medical therapy. Takaro states simply that the medical treatment of aspergillosis is unsatisfactory. The best of the antifungal agents, amphotericin B, should probably be reserved for far advanced or complicated fungal infections. Killman and associates feel there is no need to use amphotericin B either pre- or postoperatively in patients with aspergillosis. Four of their patients were so treated without discernible benefit.

Since the infection is well localized, the most common procedure is lobectomy or segmental resection. Our patient is only the second described in the literature to require bilateral pulmonary resections. The first was included in Killman's series of 14 patients operated on for removal of aspergillomas. In this series, there were two postoperative deaths (7 percent) and seven patients with residual spaces or empyemas (50 percent).

Another group found a similar morbidity rate (43 percent) where surrounding lung parenchyma was the site of active tuberculosis or bronchiectasis. This was not the case in patients who were free of such complicating disease. Their morbidity rate was only 5 percent. With or without active disease, the mortality rates were 7 and 9 percent respectively.

It is therefore apparent that the patient with a unilateral mycetoma is readily cured by a procedure with a relatively low mortality rate. The morbidity rate may depend upon the extent of active disease elsewhere in the lung at the time of surgery. With inactive disease the complication rate is approximately 7 percent. As our patient and the other reported case demonstrate, bilateral aspergillomas associated with life-threatening hemoptyses are also amenable to surgical cure providing age, pulmonary function and other underlying illness are not a contraindication.

REFERENCES


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