



SURGICAL MANAGEMENT OF PULMONARY ASPERGILLOMA - AN INSTITUTIONAL STUDY IN STANLEY HOSPITAL FROM 2012 TO 2018

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ABSTRACT

Background Aspergillus are molds that are found in organic matter. Most of the human infections are caused by *Aspergillus fumigatus*, primarily affecting the lungs. Patients who are severely immunocompromised are most susceptible to these fungal infections. In India, where tuberculosis is endemic mostly in the rural areas, patients with pre existing cavities develops aspergilloma. These form a fungal ball which causes hemoptysis by erosion of bronchial vessels. Surgery remains the curative form of management.

Methods Clinical presentation, Radiological investigations, Surgical techniques, Post operative outcome, Histopathological features, and Follow up of 12 cases of Pulmonary Aspergilloma treated surgically were studied prospectively from 2012 to 2018 at Stanley Hospital, Chennai.

Results There were 9 male (75%) and 3 female (25%) patients in this study group. Mean age of the study group was 39.7 years. All the patients in this series had complex aspergilloma. 11 patients (91.66%) in this series had Tuberculosis. All these patients hailed from rural areas belonging to low socio economic status. The mean duration of period from first diagnosis of Tuberculosis to the presentation of aspergilloma was 4.1 years. The main presenting symptom was Hemoptysis in 91% of cases. Patients were investigated with chest X-Ray and Computed Tomography scan. Air crescent sign was characteristic in most of the cases. Right upper lobe was involved in 66.66% of patients and Left upper lobe was involved in 33.33% of patients. Thoracotomy with lung resection was done in these patients. Lobectomy was done in 9 patients (75%), Segmentectomy was done in 2 patients (16.6%) and Pneumonectomy was done in 1 patient (8.33%). Non fatal post operative complications occurred in 25% of the patients. The average period of follow up was 25.5 months, in which there was no mortality and no further seeding in same or opposite side and no symptoms suggestive of aspergilloma.

Conclusions Surgery involving aggressive resection remains the permanent effective curative management of pulmonary aspergilloma and to provide the patients effective outcome.

KEYWORDS : Aspergilloma, Pulmonary cavity, Lung resection

INTRODUCTION

Aspergillus primarily affects the lungs. Infection in human host is via inhalation of fungal spores. Aspergilloma is a fungal ball developing in pre existing pulmonary cavities, mostly in patients with tuberculosis. Fungal ball may move within the cavity. The fungal toxins elaborated from the fungus can erode the walls of the cavity. When the bronchial vessels are eroded, massive hemoptysis occurs. Radiological investigations show the characteristic fungal ball with air crescent sign. Surgical management includes excision of fungal ball along with the resection of involved lobe or segment. This remains the mainstay of management. In this series, we have studied the surgical outcome in 12 patients with pulmonary aspergilloma in our institute during the study period from 2012 to 2018.

MATERIALS AND METHODS

We have studied the clinical presentations, radiological findings, surgical techniques, post operative outcome, histopathological features and follow up of 12 cases of pulmonary aspergillosis who underwent surgical management at our institute from 2012 to 2018. The study period was from 2012 to 2018. This is a prospective and observational study.

All the patients in this series underwent the following investigations
Complete hemogram

Blood sugar
Blood urea and serum creatinine
Total protein and serum albumin
Chest X-ray postero anterior view
Computed tomography scan of chest
Pulmonary function test

SURGICAL TECHNIQUES

All the patients were operated under general anaesthesia and intubated with single lumen endotracheal tube in 7 patients and

double lumen endobronchial tube in 5 patients. After anaesthesia patient was turned laterally with affected side up. After painting and draping the local parts, posterolateral thoracotomy incision was made in 5th intercostal space and the thorax was entered. Adhesiolysis was done and the lung set free. The affected segment or lobe was removed and sent for histopathological examination. The vessels supplying the lobe were ligated. The bronchial stump was closed. The lungs were inflated and checked for any air leak. Perfect hemostasis maintained throughout the procedure. Chest drain kept and fixed. Wound closed in layers. Sterile dressing done. All of these patients were extubated in the immediate post procedure and shifted to intensive care unit.

POSTOPERATIVE OUTCOME

On the day of surgery, patients were given oxygen via face mask and kept nil oral for a period of 6 hrs and hydration was maintained with intravenous fluids. Orals started after 6 hrs. From the first post operative day, chest physiotherapy was given and breathing exercises were encouraged. Chest drain was removed when there was no output and lung expansion was adequate. Chest X-ray was done to check the expansion of lungs. Intravenous antibiotics and oral antifungals were given for 5-7 days. Sutures were removed on 10th postoperative day and most of the patients were discharged on 14th postoperative day. Patients were followed up with pulmonary function test and chest X-ray after 2 weeks of discharge and once in every 6 months.

RESULTS

There were 9 male (75%) and 3 female (25%) patients in this study group. Mean age of the study group was 39.7 years.

All the patients in this series had complex aspergilloma. 11 patients (91.66%) in this series had Tuberculosis and 1 patient had bronchiectasis. All these 11 patients with tuberculosis had completed anti tuberculous treatment previously. All these patients hailed from rural areas belonging to low socio economic status. The

mean duration of period from first diagnosis of Tuberculosis to the presentation of aspergilloma was 4.1 years.

The main presenting symptom was Hemoptysis in 91% of cases. Other presenting symptoms were cough with expectoration, chest pain and fever. Patients were investigated with chest X-Ray and Computed Tomography scan. Air crescent sign was characteristic in most of the cases. Right upper lobe was involved in 66.66% of patients and Left upper lobe was involved in 33.33% of patients. Thoracotomy with lung resection was done in these patients. Lobectomy was done in 9 patients (75%), Segmentectomy was done in 2 patients (16.6%) and Pneumonectomy was done in 1 patient (8.33%). Histopathological report were consistent with features of aspergilloma in all these patients. Non fatal complications occurred in 25% of the patients. Postoperative complications encountered were severe bleeding, air leak and wound infection. The average period of follow up was 25.5 months, in which there was no mortality and no further seeding in same or opposite side and no symptoms suggestive of aspergilloma.

FIG 1-CHEST X RAY POSTERO ANTERIOR VIEW SHOWING FEATURES OF ASPERGILLOMA IN RIGHT UPPER LOBE

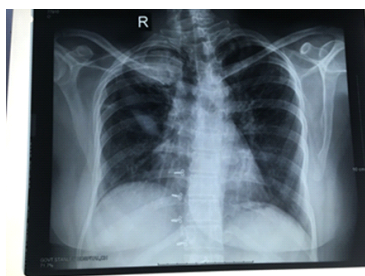


FIG 2-COMPUTED TOMOGRAPHY IMAGE SHOWING ASPERGILLOMA IN RIGHT UPPER LOBE

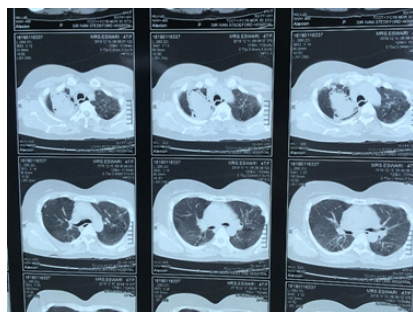


TABLE 1-GENDER DISTRIBUTION

GENDER	NO. OF PATIENTS	PERCENTAGE
MALE	9	75%
FEMALE	3	25%

TABLE 2- UNDERLYING DISEASE

UDERLYING DISEASE	NO. OF PATIENTS	PERCENTAGE
TUBERCULOSIS	11	91.66%
BRONCHIECTASIS	1	8.33%

TABLE 3 – PRESENTING COMPLAINTS

PRSENTING COMPLAINTS	NO. OF PATIENTS	PERCENTAGE
HEMOPTYSIS	11	91.66%
COUGH WITH EXPECTORATION	8	66.66%
CHEST PAIN	5	41.66%
FEVER	1	8.33%

TABLE 4 – SURGICAL PROCEDURES

SURGICAL PROCEDURES	NO. OF PATIENTS	PERCENTAGE
LOBECTOMY	9	75%

SEGMENTECTOMY	2	16.6%
PNEUMONECTOMY	1	8.33%

DISCUSSION

Aspergillus fumigatus is a saprophytic fungus, which is the most common cause of infections in humans. Infection occurs when the fungal spores are inhaled. Mostly affects the immunocompromised individuals with pre existing pulmonary cavities. The four most common manifestations of *Aspergillus* lung disease are allergic bronchopulmonary aspergillosis, pulmonary aspergilloma, chronic necrotising pulmonary aspergillosis and invasive aspergillosis.

Aspergillus colonises in the healed tubercular cavities and leads to formation of fungal ball, mostly occurring in the upper lobes. In this series, tuberculosis was the underlying disease in 91% of the patients. All these patients hailed from rural areas belonging to low socio economic status whose major occupation was agriculture and were exposed to hay. The duration of period from first diagnosis of Tuberculosis to the presentation of aspergilloma varied from 2 to 6 yrs with mean duration of 4.1 years.

The main presenting symptom was Hemoptysis in 91% of cases. Other presenting symptoms were cough with expectoration, chest pain and fever. Fungal toxins causes erosion of bronchial vessels and leads to hemoptysis. Right upper lobe was involved in 66.66% of patients and Left upper lobe was involved in 33.33% of patients. Thoracotomy with lung resection was done in these patients. Lobectomy was done in 9 patients (75%), Segmentectomy was done in 2 patients (16.6%) and Pneumonectomy was done in 1 patient (8.33%).

Bronchial artery embolization can be done in cases of massive life threatening hemoptysis who are unfit for surgical procedure. Computed tomography guided insertion of catheters in cavity to instill antifungals can be done. Overall surgical resection remains the effective treatment in case of pulmonary aspergilloma.

Non fatal post operative complications occurred in 25% of the patients in this series. Intra operatively and post operatively, massive bleeding can occur due to dense adhesions. Air leak and wound infection can occur in the post operative period. Histopathological features were consistent with aspergilloma in all these cases. The average period of follow up was 25.5 months, in which there was no mortality and no further seeding in same or opposite side and no symptoms suggestive of aspergilloma.

From this study we analysed the results of surgical management of pulmonary aspergilloma and to confirm that aggressive surgical resection can provide effective outcome.

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