12 YEARS EXPERIENCE OF SURGICAL MANAGEMENT OF PULMONARY ASPERGILLOMA

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ABSTRACT

OBJECTIVE: To analyze the results of surgery in the management of Pulmonary Aspergilloma.

METHODOLOGY: Computerized records of 450 cases of diagnosed Pulmonary Aspergilloma were retrospectively analyzed from Jan 2003 to May 2014. Patients of all ages, both sexes, medically fit and unilateral Pulmonary Aspergilloma were included in the study. Medically unfit and bilateral pulmonary aspergilloma were excluded from the study. Routine investigations, serology for aspergillus, sputum culture, Computed Tomography, Pulmonary Function Tests and Bronchoscopy were performed in all cases. Type of pulmonary resection done according to extent of the disease. All patients underwent preoperative anesthetic evaluation by anesthetist and one lung ventilation during surgery and specimen sent for histopathology in all cases.

RESULTS: Out of 450 patients, 255 patients were male and 195 were female, age ranges from 16 years to 70 years, mean age was 35.6 years. The most common symptom was hemoptysis (92%) followed by persistent chest pain (30.7%) and recurrent cough with sputum (23%). The most common underlying lung disease was tuberculosis in 407 (90.44%) whereas lung abscess was present in 42 (9.33%) and lung cancer in 1 (0.22%) case. Simple Mycetoma was observed in 22 (4.88%) cases whereas complex Mycetoma was diagnosed in 428 (95.11%) cases. The procedures performed were Lobectomy in 380 (84.44%) cases, Bilobectomy 36 (8%), wedge resection 22 (4.8%) and Pneumonectomy in 12 (2.66%) cases. Postoperative complications occurred in 32 (7.11%) patients, of which 15 (3.33%) had prolonged air leak, 4 (8.8%) had significant postop bleeding out of which two required re-exploration, 2 (0.44%) patients developed Empyema and wound infection occurred in 11 (2.44%) patients. Mortality was 10 (2.2%) of which 09 patients died due to respiratory failure and one patient due to pulmonary embolism.

CONCLUSION: Even surgical resection for complex aspergilloma can be done with low morbidity and mortality rate in a high volume center with harmonic and intercostal muscle flap utilization.

KEYWORDS: Pulmonary Aspergilloma, Tuberculosis, Surgery.

INTRODUCTION

Pulmonary aspergilloma, the so-called fungus ball or mycetoma, refers to colonization of pre-existing lung cavities with the Aspergillus fungus, most commonly the fumigatus species, and the lesion itself consists of a tangled mass of fungal hyphae, fibrin, epithelial cells, mucus, debris and blood cells. Tubercular lesions are the most common cause of such cavities although aspergillomas may occur within cavities of diverse etiologies including lung abscesses, bronchiectasis, cysts and bullae, necrotic malignant cavities, pleural spaces. Other rare etiologies include ankylosing spondylitis, Wegener’s granulomatosis, and pulmonary infarction.

Clinical spectrum of this pathology ranges from an incidental radiologic finding to life threatening hemoptysis. Several mechanisms for hemoptysis have been proposed including erosion of vascular cyst wall, elaboration of endotoxin, Fibrinolytic substance produced by aspergillus micelles induces caseous necrosis of tissues, and this is the cause of haemoptysis by the fungus and the patient’s underlying disease. As pul-

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Pulmonary Aspergilloma may cause life-threatening hemoptysis, the disease has been brought to the attention of chest physicians and thoracic surgeons.

Medical treatment has little role in the management and surgery offers significant benefit for the patient diagnosed with pulmonary aspergilloma. However, high mortality and morbidity rates of the operation have been reported in literature. Surgery of aspergilloma has been known to be a technical challenge because of its high intra- and postoperative complication rate. Patients with the so-called simple aspergilloma (thin-walled cavity; no parenchymal/pleural disease) are offered surgical treatment liberally because operation carries low risk. However, surgical resection for complex aspergilloma (thick-walled cavity; associated parenchymal/pleural disease) carries significant morbidity and mortality rates which must be weighed against the clinical benefits. In particular, notoriously high morbidity rates have been reported when patients with complex aspergilloma undergo a Pneumonectomy.

The purpose of the present study is to analyze the results of open surgery in the management of Pulmonary Aspergilloma.

METHODOLOGY:

Computerized records of 450 cases of diagnosed Pulmonary Aspergilloma were retrospectively analyzed from Jan 2003 to May 2014. Patients of all ages, both sexes, medically fit and unilateral Pulmonary Aspergilloma were included in the study. The most common symptom was hemoptysis (92%) followed by persistent chest pain (30.7%) and recurrent cough with sputum (23%). Routine investigations, serology for aspergillus, sputum culture, Computed Tomography, Pulmonary Function Tests and Bronchoscopy were performed in all cases. Specimen sent for histopathology in all cases.

Procedure: The surgery was performed under general anesthesia one lung ventilation via the use of a double-lumen endobronchial tube. The chest was opened via a posterolateral thoracotomy. Pleural space was often obliterated with fibrous and vascular adhesions. Lung was mobilized by extra pleural dissection; avoiding entry to the infected cavity Harmonic scalpel was used to dissect adhesions to minimize the blood loss. Bleeding from the chest wall was checked and stopped. Lung was visualized for the diseased areas and surgical resections done in the form of wedge resection lobectomy, bilobectomy or pneumonectomy with the aim to preserve healthy lung as much as possible with complete resection of the mycetoma cavity. The extent of lung resection was determined by the amount of involvement by the aspergilloma and the degree of lung function. At the end of surgery, bronchial stump was checked for any air leak. Pleural flap /intercostals muscle flaps were used to prevent Bronchopleural fistulas. Two Chest Drains (apical and basal) were kept in the pleural cavity in cases of wedge resection, lobectomy and bilobectomy while single basal drain were kept in cases of pneumonectomies. Chest cavity was closed in two layer with Vicryl. All patients were put on low pressure suction to avoid air space problem post operatively. Patients were encouraged to have incentive spirometry, physio therapy postoperatively with judicious use of analgesia.

RESULTS:

Out of 450 patients, 255 patients were male and 195 were female, age ranges from 16 years to 70 years, mean age was 35.6 years. The most common symptom was hemoptysis (92%) followed by persistent chest pain (30.7%) and recurrent cough with sputum (23%). The most common underlying lung disease was tuberculosis in 407 (90.44%), whereas lung abscess was present in 42 (9.33%) and lung cancer in 1 (0.22%) case. Simple Mycetoma was observed in 22 (4.88%) whereas complex Mycetoma was diagnosed in 428 (95.11%) cases. The procedures performed were Lobectomy in 380 (84.44%) cases, Bilobectomy 36 (8%), wedge resection 22 (4.8%) and Pneumonectomy in 12 (2.66%) cases. Postoperative complications occurred in 32 (7.11%) patients, of which 15 (3.33%) had prolonged air leak, 4 (0.88%) had significant postop bleeding out of which two required re-exploration, 2 (0.44%) patients developed Empyema and wound infection occurred in 11 (2.44%) patients. Mortality was 10 (2.2%) of which 9 patients died due to respiratory failure and one patient due to pulmonary embolism.

DISCUSSION:

Pulmonary aspergilloma is an opportunistic infection of the lung complicating necrotic cavitory lesions. Soubani, Regnard, and Lin et al pointed out that fungi grow in a pre-existing cavity, either in the lung or a dilated bronchus. Patients with aspergilloma are usually non typical and have chronic underlying lung diseases including advanced tuberculosis, bronchiectasis, interstitial fibrosis or emphysema, solid or cavitating neoplasm, abscess cavity containing necrotic tissue.

Tuberculosis is the most common underlying disease which ranges from 50% to 90% of the patients. In our series, we found that open healed tuberculosis cavity contributed 90.44% of the patients. The British Thoracic and Tuberculosis Association reported 6% of patients with open healed tuberculous cavity developing an aspergilloma within three years.

The high mortality from aspergilloma is related to the underlying disease and to the frequent occurrence...
of hemoptysis. As pulmonary aspergilloma may cause life-threatening hemoptysis, symptomatic patients with aspergilloma are deemed candidates for therapy. Efficacy of medical treatment for aspergilloma is still limited, and definitive treatment is surgical removal of the affected lung. Belcher and Plummer divided aspergilloma into two groups: simple aspergilloma and complex aspergilloma, according to the nature and extent of the underlying disease of the lung. Simple aspergilloma develops in isolated thin walled cysts of bronchial origin with little or no abnormality in the surrounding lung. On the other hand, complex aspergilloma develops in cavities with gross disease in the surrounding lung tissue. Patients with simple Aspergilloma are considered good candidates for pulmonary resection, because surgery carries little risk. However, surgical removal of complex aspergilloma is associated with a high incidence of complications following operation.

Hemoptysis is the most common presenting symptom, occurring in 48% to 100% of patients, which may be mild, severe, or even exsanguinating; especially in the intracavitary type. Ninety two percent (92%) of patients presented with recurrent hemoptysis in our study. Bronchial artery embolization rarely results in control of hemoptysis because of the massive collateral blood vessels. However, it should be considered as a temporary treatment in patients with life-threatening hemoptysis.

Serological diagnosis has reasonably good sensitivity and specificity but has limited clinical importance in a typical scenario. Serum precipitating antibodies (Ig G) are almost always present, initially in high concentration, but become weaker and even negative, if the fungus ball is taken out. In our series, as is usually the case, radiology formed the basis of diagnosis. Chest X-ray shows the typical ‘air-crescent’ sign in patients with Aspergilloma and CT gives you the extent of the disease.

In patients with pulmonary aspergilloma, surgical resection is generally performed through a standard posterolateral thoracotomy because of severe adhesions and the risk for massive hemorrhage. In the past decade, video-assisted thoracic surgery (VATS) has undergone significant evolution and refinement, and continues to change the way thoracic conditions are managed. However, the safety and feasibility of a thoracoscopic approach to lung resection for pulmonary aspergilloma have not been well evaluated. Gossot D et al.

Use of the harmonic scalpel for the control of vessels during open thoracic surgical procedures is safe, shortens operative time by almost 30 minutes and minimizes blood loss by almost 200mls compared with the conventional technique. This represents a refinement of technique, with decreased anesthesia and operating time, minimal blood loss, less post-operative complication and significant cost savings. In our study we have used harmonic scalpel for dissection during surgical resection of complex Mycetoma and find it very effective in hemostasis and better surgical outcome.

Surgery offers three potential benefits: control of symptoms; prevention of hemoptysis; and prolongation of life. The ideal operative procedure should be a formal pulmonary resection. However, the technique involved ranks among the most complex in thoracic surgery due to severe intra pleural adhesion and many patients already have a poor pulmonary reserve that is a contraindication of pulmonary resection. When surgical resection is performed, lobectomy is the most common procedure. Pneumonectomy is preferred over less aggressive procedures for patients with multiple lobes affected by aspergilloma or with a totally destroyed underlying lung. However, previous studies have reported that pneumonectomy for complex aspergilloma is associated with extremely high complication rates. During the Pneumonectomy procedure for complex aspergilloma, surgeons encounter dense fibrosis with obliteration of the pleural space, extension beyond the extra pleural plane of dissection, and distortion of hilar structures. These structural alterations due to the inflammatory disease process make dissection extremely difficult. Many investigators experience excessive blood loss in patients undergoing a pneumonectomy for complex aspergilloma. In our series Simple Mycetoma was observed in 22 (4.88%) whereas complex Mycetoma was diagnosed in 428 (95.11%) cases, the procedures performed were Lobectomy in 380 (84.44%) cases, Bilobectomy in 36 (8%), and Pneumonectomy in 12 (2.66%) cases for complex mycetoma whereas wedge resection was done in 22 (4.8%) cases for simple Mycetoma cases.

The overall complication rate in our study was 7.11% which is comparable to recent reports. The most common complications included prolonged air leak in 15 cases (3.33%), which was conservatively treated with low pressure suction. Wound infection occurred in 11 (2.44%) patients was treated according to culture sensitivity. Four patients (0.88%) had significant postop bleeding out of which two required re-expansion and empyema occurred in two (0.44%) patients whom operated again.

Recent reports show mortality rates of 1% to 9.5% in our study mortality was 10 (2.2%) of which 09 patients died due to due to respiratory failure and one patient due to pulmonary embolism. Though surgical resection for complex Mycetoma carry high morbidity and mortality, in our series the results of surgical resec-
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tion for complex Mycetoma are good and low compare to other series mainly because:
1) high volume center in which all the team members are gear up for pre op, per op and post-operative management.
2) use of harmonic for dissection reduces blood loss and post-operative complications.
3) use of intercostal muscle flap to prevent Broncho pleural fistulas.

CONCLUSION:

Even surgical resection for complex aspergilloma can be done with low morbidity and mortality rate in a high volume center with harmonic and intercostal muscle flap utilization.

REFERENCES:


