

The Surgical Management of Pluero-pulmonary Tuberculosis in Sudan

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Abstract

The aim of this study is to give a review about tuberculous cases managed by surgery in our country. The study was done at El-Shaab Teaching Hospital which is considered as a referral centre for thoracic surgical cases. All cases in the study have been diagnosed by chest physicians as pulmonary tuberculosis and have commenced the anti-tuberculous treatment.

Surgery for pulmonary tuberculosis (TB) has become rather limited. However, it is still required for some sequelae and complications. This is a 3 year study (1 year prospective and 2 years retrospective) of cases operated upon for pulmonary TB at El-Shaab Teaching Hospital- Khartoum-Sudan. Patients and methods: A total of 87 cases underwent surgical procedures for various complications of pulmonary TB. After excluding those managed by tube thoracostomy, all cases were taken up for major thoracic surgical procedures under general anaesthesia with double lumen endotracheal tube.

A total of 51 cases were operated for tuberculous empyema, 22 patients for aspergilloma and pulmonary cavity with recurrent haemoptysis, 8 patients for multi-drug resistant tuberculosis and 6 patients for tuberculous bronchiectasis. Lung resections including lobectomy were done for 31 patients, pneumonectomy for 1 patient and wedge resection for 1 case. Postoperative follow up was done for those patients and there was no death. The main postoperative complication was air leak which is found in 26 patients which resulted in delayed early hospital discharge, but has stopped spontaneously. This complication is just found in patients underwent decortications for tuberculous empyema. Broncho-pleural fistula (BPF) has been found in 4 cases but sealed spontaneously later on. Results were better in haemoptysis where the desired outcome was achieved in all cases of aspergilloma and lung cavity. All patients were improved apart from 6 patients who had advanced progressive tubercular disease. Conclusion: Surgery for pulmonary TB is the only option for many tuberculous cases with satisfactory results.

Introduction:

With the availability of effective chemotherapy of pulmonary tuberculosis after 1950s, indications of surgical management became limited. However, despite the advances and success of medical therapy, treatment failure, symptomatic complications and consequences of the disease continue to warrant surgical management.

The early period for surgical management of pulmonary tuberculosis was reflected in the three decades of the nineteenth century when collapse therapy was performed by open surgical pneumothorax with high rate of asphyxia associated death ⁽¹⁾. Induced pneumothorax was widely practiced in the pre antibiotic era in more than 100,000 patients with pulmonary tuberculosis over a period of quarter century starting in 1882 until early 20th century ⁽²⁾.

Lobectomy, open drainage and instillation of antiseptics into cavities were tried in the beginning of the 20th century. Improved collapse therapy and increased quality of thoracic surgery took place from 1930 onward along with advent of better diagnostic procedure with bronchoscopy, improvement in x-ray techniques and development of bronchspirometry. Nevertheless, pneumonectomies, lobectomies, thoracoplasty and pleurytic operations were performed in selected patients with some success. Throughout 1950s, thousands of pulmonary tuberculosis patients received surgical resections as adjuvant therapy to streptomycin therapy ⁽³⁾.

The classic indications for thoracic surgery in tuberculosis are recurrent chest infections, recurrent hemoptysis, any complications (empyema, bronchopleural fistula), and persistent sputum positivity with irreversible pulmonary destruction (cavitations and bronchiectasis) ⁽⁴⁾.

There are different surgical procedures involved in treatment of pulmonary tuberculosis. Nowadays, surgery usually entails lobectomy, pneumonectomy and pleural decortications.

In fact, there are no randomized prospected studies; recommendations for surgery are based primarily on case reports, retrospective studies, experiments, experience

and consensus ⁽⁶⁾. In this study I aimed at giving a review about surgery of pulmonary tuberculosis in Sudan, current indications of surgery, to collect data about common causes of referral, and the type of surgery commonly used to treat patients and moreover, to evaluate the surgical outcome in our country.

Patients and methodology:

87 patients were referred to the cardiothoracic surgery department at (El-Shaab Teaching Hospital, Khartoum [Sudan]) and reviewed for 1 year prospectively and 2 years retrospectively during the period 2014 to 2017. All those patients were diagnosed as having pulmonary tuberculosis and have received anti-tuberculous chemotherapy by chest physicians. They were clinically examined and tested for HIV and diabetes radiologically investigated. They underwent posterolateral thoracotomy under general anesthesia using double lumen endotracheal tube with single lung ventilation. However the following points were considered in the review: the age, sex, initial clinical presentation, time of diagnosis, radiological and operative findings, type of operation done, complications of surgery and the condition of the patient after surgery during the postoperative followup.

Objectives:

The aim of this study is to review the role of surgery in the management of pleuro-pulmonary tuberculosis in Sudan at El- Shaab Teaching Hospital. Other objectives are to review the Indications of surgery for pulmonary tuberculosis in Sudan, to identify the type of surgery practiced to treat pulmonary tuberculosis, to identify the co - morbid conditions e.g diabetes , HIV and chemotherapy, to rule out the outcome of surgery in term of clinical improvement and radiological evaluation and to detect the risks and complications of surgery.

Results:

It is found that empyema constitute the higher percentage of patients admitted to the unit in this study which was 58.6%. This is followed by aspergilloma which constitute 25.3% of patients. The multi-drug resistant tuberculosis was found to be the least among the list which is represented by 8 patients. (Table 1).

Regarding **age group**, the majority is found to be above 40 years which was 44.8% of patients underwent surgery. Nearly this, is age group between 20 to 40 years with 40.2% (Table2). Males are found to be predominant in **gender distribution**. There were 73 males and 14 females.

Cough is the main **presenting clinical features** of patients in this study, which comprises 93.1% (81 cases). This followed by dyspnea which is 57.5%. Hemoptysis is

found mainly in patients with aspergilloma representing the main indication for surgery in the disease with 22 patients (25.3%). Other clinical features include fever and chest pain of about 28.7% and 35.6% respectively.

The presence of **concomitant disease** is also included in the study. All patients are screened for HIV, which is found to be negative. Patients are also surveyed for diabetes and hypertension, 9 patients were have diabetes. Six patients were found to have viral hepatitis (4 patients hepatitis B and 2 patients with hepatitis C).

Moreover, the relation between pulmonary tuberculosis and people with chronic renal failure (or end stage renal disease) is also high. It is found that 3patients were suffering from ESRD and they have been on dialysis.

The radiological images used in this study were chest X-ray and CT scan. The findings were compatible with the operative findings which were used accurately to localize and manage the disease. The findings were as follows: Thick calcified pleura, pus/effusion , collapsed lung, pulmonary cavity, fungal ball and dilated bronchi. Feature of tuberculous empyema and trapped lung being the most. There are different **sites** that can be affected in pleuro-pulmonary tuberculosis. In this study, it is found that the pleura is the most common affected site, which comprises 63.2% of cases. The upper and lower lobes were found to be equally affected in16 cases for each (18.4%).

All patients in the study underwent postero-lateral thoractomy under general anesthesia with double lumen endotracheal tube. Meticulous pre-operative assessment was done including careful history and examination. Blood investigations were requested with pulmonary function tests in cases where lung resection is anticipated. The **operative findings** for pleuro-pulmonary tuberculosis show different manifestations. This is depend on the site involved. Fig3. Pleural thickening is found in 59 cases, while loculated pus and trapped lung is found in 58 and 57 cases respectively. Other finding were: fibrosis and destructed lung. Pulmonary cavity is found in 28 cases , while fungal ball is found in 25 cases.

Different procedures were carried out: decortication, lobectomy, pneumonectomy and segmentectomy. Table7. The most common procedure done was decortication for empyema thoracis for 54 patients (62.1%).

Regarding the postoperative period, some specific complications related to thoracic surgery were observed. In this research, air leak being the most which was 29.9%. It is found that air leak developed solely after decortications in this study. The second postoperative complication that needs attention is the development of bronchopleural fistula. It also followed decortications but was sealed spontaneously within an average of 2 months which is found in 4 patients. The 2 above complications were

the main causes of early hospital discharge. One patient was developed postoperative bleeding that needed exploration. He also underwent decortication for empyema.

The **duration of hospital stay** after surgery varies between different conditions. Most of the patients stayed for more than 3 weeks. They were 40 patients. It is found that all of them underwent decortication for tuberculous empyema. The second category stayed between 7 to 14 days and they were 28 patients. The third group stayed for 14 to 21 days and they were 17 patients. The minority stayed for less than 7 days and they were 2 patients.

The majority of patients were improved (81 patients out of 87) after surgery. There were 6 patients who did not improve. It is found that all patients with disease related hemoptysis (aspergilloma, lung cavity and bronchiectasis) were completely improved. The complications were related mainly to patients of tuberculous empyema. The six patients who didn't improve their lungs didn' t inflate despite decortication. No mortality is found during the study.

Presentation	Number of patients	Percentage
Cough	81	93.1
Chest pain	31	35.6
SOB	50	57.5
Hemoptysis	22	23.3
Fever	25	28.7
Total	87	100

Table No.1
 (This table shows the initial presentation of patients before surgery)

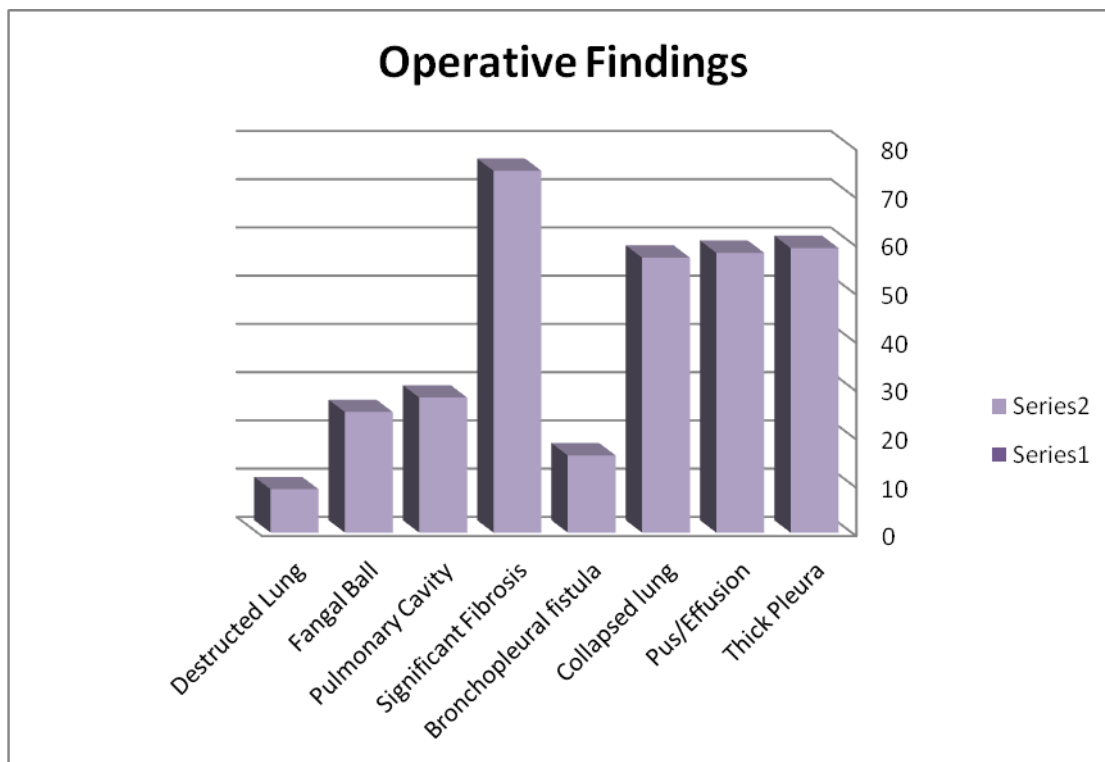


Figure 1

(This graph shows the operative findings during surgery of pulmonary tuberculosis).

Surgical procedure	Number of patients	Percentage
Decortications	54	62.1
Pneumonectomy	1	1.1
Lobectomy	31	35.6
segmentectomy	1	1.1
Total	87	100

Table No.2

(The table shows different surgical procedures done for patients with pleura-pulmonary tuberculosis)

Discussion:

Nowadays we are witnessing a resurgence of the role of surgery in managing pulmonary tuberculosis due to the overall increase in global incidence of multidrug-resistant tuberculosis. Other indications include bronchiectasis, hemoptysis, bronchopleural fistula and empyema. Aspergilloma is a frequent indication of surgery.

Renewed interest in surgical intervention in tuberculosis was driven by increasing failures in chemotherapy with the advent of multi-drug resistant -TB. Surgery has been shown to be safe and effective ⁽⁷⁾. Indications of lung resection in drug resistant-TB are failed medical treatment with persistent sputum positivity and the patient who had localized cavitary lung disease or bronchiectasis ⁽⁸⁾.

The multi- drug resistant tuberculosis is defined as resistance to at least isoniazid and rifampicine, the two most effective first line anti-tuberculosis drugs ⁽⁹⁾. The burgeoning drug resistant TB epidemic is a public health problem of global importance. Although TB incidence and mortality has decreased in several parts of the world, the overall prevalence of multi-drug resistant-TB is increasing in many high burden countries particularly in Africa ⁽¹⁰⁾. The indication for surgery for drug resistant- TB has remained largely unchanged since they were first described by Iseman et al in 1990.

The thick walled cavitary lesions made by tuberculosis contain up to 107 to 109 Mtb organisms ⁽¹¹⁾ harboring actively replicating bacilli even in patients who are sputum culture negative ⁽¹²⁾. These tuberculous lesions have reduced exposure to host defenses and are penetrated poorly by chemotherapy ⁽¹³⁾. The cavities act not only as a huge reservoir of infection but also as likely sites of the development of drug resistance.

The rationale behind surgery for drug resistant -TB is that excision of these cavities will dramatically reduce the overall organism burden in the lung while simultaneously removing the sites of high concentration of drug resistant bacilli. The surgical approach is almost always via muscle sparing posterolateral thoracotomy, while the procedures performed in case series and cohort studies were predominantly lobectomies or pneumonectomies^(15,16 and 17)

Extensive necrosis with cavitations usually occurring in the upper lung or apex, is a characteristic feature of secondary or adult type. Pulmonary Aspergilloma, the so called the fungus ball is a clinical syndrome due to Aspergillous commonly fumigatous species. It colonizes a pre- existing lung cavity usually by tuberculosis.

The definitive management of Aspergilloma is surgical resection. Patients with Aspergilloma who present with hemoptysis are at risk of death due to massive blood loss and or respiratory failure caused by aspirated blood. Catheter embolisation of bronchial arteries can be used to control acute bleeding but is not durable. Likewise intra- cavitary instillation of anti fungal agents have mixed outcome and seldom result in complete resolution of the cavity ⁽¹⁸⁾

Tuberculosis of the lung may also lead to formation of pleural effusion or empyema. Tuberculous empyema is a chronic active infection of the pleural space. Anti-tuberculous drugs alone can not cure the patient. It should be managed in its acute exudative phase to avoid the development of chronic empyema which carries a high risk of morbidity and mortality and fatal outcome may result ⁽¹⁹⁾.

Decortication is an extensive operation but so far it is the best treatment modality which can offer a complete resolution of the thickened parietal and visceral pleura. It also retains the functional capacity of the lung to a great extent ⁽²⁰⁾.

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