

TUBERCULOSIS – RECRUDESCENCE OF THORACIC SURGERY

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TBINFO

Abstract:

From the time of Hippocrates, Tuberculosis was known as phthisis, a term derived from the Greek language which means “decaying”. There is no more dangerous disease than pulmonary phthisis; no other is so common. It destroys a very great part of the human race. Antoine Portal, Paris, 1832 The swollen glands of the neck were known as scrofula and the King’s evil. Although Tuberculosis (TB) is essentially a medical disease, a sizeable proportion of patients fall into the realm of surgery, may it be due to the primary disease or its sequelae. TB was the leading cause of death in the 17th century. Patients were nursed in sanatoriums and treated with plenty of sunlight and good food. Surgery then became widely prevalent as a treatment modality, and Pulmonary Tuberculosis (TB) became the history of thoracic surgery.

Introduction:

The first thoracic surgical procedure, an open drainage of a TB pleural empyema was performed by Hippocrates. During the first half of the last century, the finding that Mycobacterium tuberculosis was an obligate aerobe led to the rapid growth of thoracic surgical operations: thoracoplasty, induced pneumothorax, plombage, and phrenic nerve crushing [1]. Remarkably, Thoracoscopy was first introduced in 1886 by Francis Richard Cruise [2] and popularized by Jacobeus as the approach for pleural biopsy and adhesiolysis in TB patients [3].

In 1944, the discovery of Streptomycin modified the therapeutic protocol leaving little place for surgery. Developed in the 1960 s, Rifampicin and other anti- TB drugs radically transformed the prognosis of the disease and undermined the existence of thoracic surgery as a specialty; however, rapid increase in the incidence of lung cancer meant that thoracic surgeons soon found an important application for skills developed through years of TB’s surgical treatment [4] and more recently in Post COVID 2019 complications of the lung [5]. Presently, the world is witnessing a resurgence of the role of surgery in managing TB due to the overall increase in global incidence and the burgeoning emergence of Multi Drug- Resistant TB (MDR- TB to both Isoniazid and the Rifampicin) or Extensive Drug Resistant TB (XDR TB, resistance to Rifampin and Isoniazid, to fluoroquinolones and at least one of the following injectable anti TB drugs: capreomycin, Kanamycin, or Amikacin) [6]. Moreover, a trend for an increasing incidence of the disease in the western world are due to people migrating from developing countries and a surge in tourism.

Thoracic surgery offers highly effective treatment of TB and its sequelae with less trauma and morbidity than ever before. The advantage of Minimally Invasive Thoracic Surgery allows a wider range of TB patients to be considered for effective surgical management [7]. A thorough preoperative evaluation is essential - routine laboratory work, acid- fast bacilli sputum smears and cultures and accurate localization of TB lesions. Cardiopulmonary function should be assessed and similarly Pulmonary- function tests to ensure adequate pulmonary reserve. Fiber- optic bronchoscopy is used to evaluate endobronchial tuberculosis, contralateral disease and co- existing malignant disease. Echocardiography rules out pulmonary hypertension and congestive heart failure. The value of nutritional assessment with appropriate supplements for malnourished patients cannot be more stressed [8].

TB remains the foremost cause of death from an infectious agent. Current drug regimens achieve a cure rate > 85 %, with poorer outcomes in geographical areas where multi- drug resistant (MDR) strains are prevalent. Presently, the surgical indications in pulmonary TB are TB complications and cases displaying an inappropriate healing response to proper drug regimens.

In this critical global scenario, surgery could be crucial in the treatment of the sequelae of TB as well as for clinically and bacteriologically severe forms of pleuro-pulmonary MDR-TB. The need for surgery is estimated to have increased from 5% to 15% over the last twenty years [9].

Indications for Surgery:

Referrals for surgery are often made when treatment has been failing for a long time, a large part of the lung parenchyma has already been destroyed and the patient is extremely symptomatic. In this sense, the physician’s awareness should be increased to identify and call for early surgical evaluation before the disease is far too advanced denying the patient the benefits of resection – relief of symptoms and/or possible cure.

Although specific practical guidelines concerning surgical indications and approaches are currently unavailable, a summary of the evidence is listed [1,4].

Emergency indications where without surgery, death is imminent and unavoidable include:

- profuse lung hemorrhage - massive hemoptysis
- tension spontaneous pneumothorax

Elective indications are**A. Complications of Scarring**

- Massive hemoptysis
- Cavernoma (cavity)
- Lung cancer
- Tracheoesophageal or bronchoesophageal fistula
- Bronchiectasis
- Extrinsic airway obstruction by tuberculous lymph nodes
- Endobronchial tuberculosis and bronchostenosis
- Middle lobe syndrome
- Aspergilloma

B. Failure of Medical Therapy

Cases displaying an inappropriate healing response to medication, in which clinical and radiological pictures remain unchanged or indicate progression, lung destruction and left bronchus syndrome.

Drug resistance - acid-fast bacilli sputum smears positivity after 3-month treatment period, with a circumscribed radiological lesion or a destroyed lung; and previous relapse(s) in patients with histories of TB and proper drug regimen (e.g., cavity, tuberculoma).

C. Pleural Tuberculosis

- Undiagnosed pleural effusion
- Empyema
- Bronchopleural fistula

D. Surgery for Diagnosis

- Pulmonary lesions of unknown cause
- Mediastinal adenopathy of unknown cause

E. Miscellaneous

- Cold Abscess and Osteomyelitis of the Chest Wall
- Consequences of insufficient surgery
- Thoracoplasty
- Delayed complications of plombage

A multi- disciplinary approach should be adopted when surgery is contemplated. The new evolving role of thoracic surgery in the treatment of pulmonary TB involves infectious disease specialists, respiratory physicians, radiologists, and thoracic surgeons to continue working in partnership to identify TB patients who can benefit from surgery. Surgery is always considered as an adjunct to proper medical therapy. A diagnostic surgical approach is recommended when pleural effusion occurs without any radiologic signs or established cause [10]. VATS or mediastinoscopy with ex- tempore histological examination may be helpful to distinguish between malignant and TB lesions. With proper indications for surgery, sputum conversion rates of more than 90 % can be obtained. In established cases of TB, patients are operated on with proper antibiotic coverage of at least 3 months duration, and surgeries are always followed by complete courses of therapy, the lengths of which are dictated by the resistance of the organisms and the susceptibilities of the hosts.

One of the main indications for surgery is massive hemoptysis along with known destructive pulmonary sequelae such as destroyed lung. It may occur due to infection, cavity, aspergilloma or bronchiectasis. Surgery is also recommended for cases with major residual pleural thickenings. The role of surgery is to remove the burden of mycobacteria in actively infected patients or to treat debilitating consequences caused by the ongoing scarring process that characterizes the healing of TB. It is indeed very difficult to sterilize cavities or destroyed lungs, probably because the medications are unable to penetrate the lesions. Surgery would also benefit patients who have extreme patterns of drug resistance who are left with residual cavities and destroyed lung despite maximum medical treatment. These lesions pose a risk of relapse which are difficult to manage. Excision of such localized pathology can significantly improve the chances of cure in this group. There is also a higher percentage of non-conversion with lobectomy and segmentectomy compared to pneumonectomy, suggesting that a more radical procedure may be more effective than a smaller resection [11]. However maximal parenchymal sparing should be exercised in cases of MDRTB due to the possibility of relapse – a catch-22 situation. The mortality rate after lobectomy is about 2–3%, after pneumonectomy is 7-8% and surgery for empyema has complications of about 8–11% [12]. The post-operative complications of surgeries are 9–26%, the commonest being persistent air leakage (40%) however most get resolved with suitable maneuvers [13].

Thoracotomy, VATS and RATS:

Video-assisted thoracoscopic surgery (VATS) was first reported in 1992. Thoracoscopy has an amplifying action and a deep illumination effect. Further, in addition to the advantage of cosmetic appearance, pain is minimal as there is little injury to the ribs, muscles and subcutaneous tissues. VATS therapeutic resection could be safely performed in selected patients with medically failed pulmonary TB as an effective adjunct with satisfactory results [14]. Similarly, Robotic Assisted Thoracoscopic Surgery (RATS) may be employed. However, there is no clear conclusion whether RATS can achieve an equal or even better surgical effect when compared with VATS [15]. Further a recent paper stated that in the setting of a comprehensive enhanced recovery protocol, patients undergoing VATS versus open lobectomy exhibited similar short-term outcomes [16]. Incompleteness of interlobar fissures and solid pleural symphysis and dense fibro-vascular adhesions, common in tuberculous destroyed lung, are among “technical contraindications” for thoracoscopy [17]. However, there is no role for VATS or RATS in the emergency setting of massive hemoptysis; instead, a thoracotomy is to be performed.

Conclusion:

Most of the available literature is from North America and Europe where the incidence of TB is low in comparison to the developing countries. India has the dubious distinction of having the largest estimated number of MDR-TB cases in the world, responsible for around 26% of the global burden [18]. In our series of over 1,000 patients during the past 25 years, the most common indications for Surgery in TB were the sequelae - Bronchiectasis, Aspergilloma, Empyema, Bronchopleural fistula and Destroyed lung. Emerging indications are resection of localized lesions in patients with persistent sputum AFB positive and MDRTB. A significant number of patients belonged to ASA Class IV. Outcomes were on par with existing literature [19]. Successful treatment of TB depends on prompt diagnosis and proper medical therapy. Sequelae of TB forms the major chunk of patients requiring surgery. The increase in the number of new TB cases and the number of patients with MDRTB are the present challenges for medical providers. When patients fail medical therapy or are at high risk to do so, surgery remains a very effective tool in the management of this difficult problem. Relevant indications, appropriate timing of referrals and proper selection of patients are crucial to the final outcome. The increasing role of surgery in the treatment of TB is incontrovertible.

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