

Surgical treatment of pulmonary tuberculosis: the phoenix of thoracic surgery?

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Pulmonary tuberculosis (TB) is the history of thoracic surgery. History tells that the first thoracic surgical procedure, an open drainage of a TB pleural empyema was performed by Hippocrates. During the first half of last century, the finding that *Mycobacterium tuberculosis* was an obligate aerobe led to rapid growth of thoracic surgical operation: thoracoplasty, induced pneumothorax, plombage, and phrenic nerve crushing (1). Remarkably, the thoracoscopy was also first introduced around first decades of 1900 by Jacobeus as approach for pleural biopsy and adhesiolysis in TB patients (2). In 1944, the discovery of Streptomycin modified the therapeutic protocol leaving still a little place for surgery. Developed in the 1960s, 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 incidence of lung cancer meant that thoracic surgeons soon found an important application for skills developed through years of TB's surgical treatment (3).

Nowadays, we are witnessing a resurgence of the role of surgery in managing TB due to the overall increase in global incidence, and the emergence of multidrug-resistant TB (MDR-TB, resistance 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) (4). Moreover, it was noted a trend for an increasing incidence of the disease in the western world due to people migration from developing

countries. Currently, thoracic surgery offers highly effective treatment of TB and its sequel 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 (5). In preoperative evaluation, in addition to routine laboratory work and acid-fast bacilli sputum smears and cultures, an accurate assessment of TB lesions' localization and of cardiopulmonary function should be done. Fiber-optic bronchoscopy has to be used to evaluate endobronchial tuberculosis, contralateral disease, and coexisting eventual malignant disease. Pulmonary-function tests are used to ensure adequate pulmonary reserve. Echocardiography can rule out pulmonary hypertension and congestive heart failure. It is also important to stress the value of preoperative comprehensive nutrition assessment with appropriate supplements for malnourished patients (6). Currently, the surgical indications in pulmonary TB are: TB complications (e.g., haemoptysis, empyema, cavity formation associated with aspergilloma, adenopathy with fistula); cases displaying an inappropriate healing response to medication, in which clinical and radiological pictures remain unchanged or indicate progression (e.g., cavity, tuberculoma); 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. The management of post-resection complications is still debated, featuring a wide range of procedures in order to reinforce the bronchial stump, to sterilize the residual cavity, and to obliterate it. The harvested pedicled *latissimus dorsi* and *serratus anterior* muscle graft transferred to affected side can fill out the residual post-resection space (7).

Perhaps, 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.

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