



Risk of short- and long-term pulmonary complications should be determined before surgery for tuberculosis-destroyed lung

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Despite recent advances in the treatment and preventive strategies of tuberculosis, the disease burden remains substantial, with an estimated 1.5 million mortality cases associated with tuberculosis in 2020 (1). Even after successful bacterial elimination of active tuberculosis, a considerable proportion of patients experience pulmonary and extrapulmonary complications (2-4). Furthermore, the risk of overall mortality is substantially increased in tuberculosis survivors compared to those without tuberculosis (5).

Of the pulmonary comorbidities that can be complicated by tuberculosis, tuberculosis-destroyed lung is one of the most severe. This condition is associated with chronic respiratory symptoms (e.g., dyspnea, cough, sputum production, and hemoptysis), reduced lung function, and increased economic burden (6). Although medical treatment is the main strategy for patients with tuberculosis-destroyed lung, surgical resection might be needed to control massive hemoptysis, and recurrent pulmonary infections (7). However, unlike lung cancer surgery, that for tuberculosis-destroyed lung is

usually complicated due to adhesions caused by tuberculosis sequelae. In such cases, extensive resection such as pneumonectomy frequently is needed, leaving patients with tuberculosis-destroyed lung at a higher risk of postoperative pulmonary complications. However, due to the small number of surgical cases, few studies have comprehensively evaluated risk factors for such early and late complications. Accordingly, pulmonologists and thoracic surgeons have to determine the risk of postoperative pulmonary complications based on the study results of lung cancer surgery (8).

From this view, Ruan *et al.* recently published important study results about risk factors for predicting respiratory failure after lung resection surgery in patients with tuberculosis-destroyed lung (7). In their study, the authors evaluated 116 patients who underwent surgical treatment for tuberculosis destroyed lung. It is not surprising the study period is 20 years (from 2001 to 2020) considering the rare cases. They evaluated factors predicting respiratory failure after surgery and long-term dyspnea [modified Medical Research Council (mMRC) ≥ 1] 1 year after surgery.

Of the 116 patients, more than one-fourth experienced respiratory failure immediately after surgical resection. Factors associated with respiratory failure were low albumin (<30 g/L) and intraoperative bleeding >1,000 mL. These results are not surprising since low albumin and intraoperative bleeding are well-known factors predicting postoperative pulmonary complications. However, interestingly, forced expiratory volume in 1 second and the diffusion capacity for carbon monoxide, established predictors of postoperative pulmonary complications were not associated with increased risk of respiratory failure after resection surgery for tuberculosis-destroyed lung. However, interpretation should be performed with caution since surgical candidates might have been selected based on lung function in this study. Numerous studies have repeatedly revealed that these two pulmonary function measures are cornerstones in the evaluation of postoperative pulmonary complications after lung resection surgery. Beyond pulmonary function tests, other functional measurements including 6-minute walk test are now used to predict postoperative pulmonary complications (9), however, this study did not evaluate these tests.

The authors also revealed that postoperative respiratory failure and dyspnea (mMRC ≥ 1) at discharge are predictors of long-term dyspnea. These findings indicate the importance of a preventive strategy for postoperative respiratory failure to improve long-term outcomes after tuberculosis destroyed lung surgery. Recent studies have shown that bronchodilators use in individuals with obstructive ventilatory impairment and preoperative rehabilitation can be helpful to prevent postoperative pulmonary complications and improve lung function after lung resection surgery (10,11). Accordingly, such strategies might be implemented in patients planning to undergo tuberculosis-destroyed lung surgery.

Due to the advancement of medical treatment, the bacteriological cure rate of tuberculosis has been increasing. Despite this achievement, bacteriological cure does not mean we do not need to pay attention to tuberculosis survivors. A considerable proportion of tuberculosis survivors suffer from post-tuberculosis pulmonary complications, including tuberculosis-destroyed lung. Although some studies have shown promising data, including improved outcomes of tuberculosis-destroyed lung by bronchodilators (12,13), there is a lack of evidence on the disease. Unfortunately, the current tuberculosis guidelines do not address this point (14). Thus, future studies and guidelines are needed to prevent and manage

tuberculosis-destroyed lung after successful bacterial eradication.

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