Resection of bronchial stricture and destroyed lung after pulmonary tuberculosis

Masaki Ikeda, Makoto Sonobe* and Hiroshi Date

Department of Thoracic Surgery, Kyoto University Hospital, Kyoto, Japan

* Corresponding author. Department of Thoracic Surgery, Kyoto University Hospital, Shogoin-Kawara-cho 54, Sakyo-ku, Kyoto 606-8507, Japan. Tel: +81-75-7514975; fax: +81-75-7514974; e-mail: m.sonobe@kuhp.kyoto-u.ac.jp, (M. Sonobe).

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Abstract

We present a 53-year-old man with destroyed lung syndrome (right upper and middle lobes and S6 of lower lobe with bronchial stricture between the right main and intermediate bronchus) due to tuberculosis 25 years earlier. Aspergillus infection in the destroyed lung was suspected on the basis of antigen positivity. The patient underwent right upper and middle lobectomy, S6 segmentectomy and bronchial resection from the distal end of the right main bronchus to the proximal end of the right basal bronchus. The membranous part of the right main bronchus was cerclaged in order to circularize the flattened bronchus and to match its diameter with that of the basal bronchus. End-to-end anastomosis was then carried out. The postoperative course was uneventful. Pathological examination revealed Aspergillus infection in the cavity of the destroyed lung. Bronchoscopic findings 6 weeks after surgery revealed good healing of the anastomosed portion without stenosis.

Keywords: Tuberculosis • Bronchial stricture • Destroyed lung • Aspergillus infection • Surgery

INTRODUCTION

Although the incidence of pulmonary tuberculosis has gradually been decreasing in Japan [1], thoracic surgeons still encounter several types of sequelae such as bronchial stenosis, destroyed lung and chronic empyema [2]. Here, we report a case of tuberculous bronchial stenosis and destroyed lung due to Aspergillus infection in which an ingenious bronchoplastic technique was effective.

CASE REPORT

A 53-year-old man with repeated pneumonia in his right lower lung field and haemoptysis was admitted to our hospital. He had suffered from right pulmonary tuberculosis 25 years earlier. His right upper and middle lobes were destroyed (Fig. 1a and b), and bronchial stenosis from the distal end of the right main bronchus to the distal end of the right intermediate bronchus was documented by bronchoscopic examination (Fig. 1c). We considered that long-term deformation due to pulling up of the hilar structure after pulmonary tuberculosis had caused cicatricial bronchial stenosis. Smears and cultures of sputum were negative for tubercle bacilli and other pathogens. However, Aspergillus infection in the cavities of the destroyed lung was suspected on the basis of a positive serum Aspergillus-antigen test.

A conservative treatment such as bronchial stent placement or ballooning was contra-indicated because the right upper and middle lobes distal to the stricture were destroyed and could also have been infected with Aspergillus. We planned to carry out sleeve right upper and middle lobectomy to resect the destroyed lung and stenotic bronchus.

We started surgery through a right posterolateral incision and fifth intercostal thoracotomy. Pedicled fifth intercostal muscle was preserved. Severe pleural adhesions were carefully dissected so as not to rupture the cavities. We observed destruction of the right upper lobe, middle lobe and S6 that was more extensive than we had anticipated on the basis of computed tomography. We thought that one stoma-type carinal reconstruction was difficult because the stump of the right basal bronchus did not reach the carina. The bronchial cartilages of right main bronchus were not destructed by infection, so that we resected the right upper and middle lobes, the right S6 segment and the stenotic bronchus from the distal end of right main bronchus to the inlet of the right basal bronchus. The membranous portion of the stump of the right main bronchus was cerclaged with 4/0 Prolene sutures in order to circularize the flattened bronchus and to match the diameter of the proximal stump to that of the stump of the right basal bronchus (Fig. 2a). End-to-end bronchial anastomosis between the right main bronchus and the right basal bronchus was then accomplished using 4/0 PDS-II sutures. The anastomotic site was wrapped with pedicled fifth intercostal muscle for reinforcement and facilitation of the blood supply. The operation time was 354 min and blood loss was 1046 ml.

The postoperative course was uneventful. All chest drainage tubes were removed by day 6 after surgery. Pathological and bacterial examination of the resected destroyed lung with multiple cavities confirmed Aspergillus infection but no tubercle bacilli. No Aspergillus or tubercle bacilli were detected in the resected stenotic bronchus. Postoperative anti-fungal therapy...
was not introduced because the infected cavities were completely resected and the infection control team in our hospital did not recommend it. The patient was discharged 16 days after surgery. Bronchoscopic examination after 6 weeks revealed that the anastomotic site was round and the bronchial mucosa well regenerated (Fig. 2b). Chest X-ray film 6 months after surgery revealed that the right basal segment was well expanded (Fig. 2c). The patient remained in good health, and did not experience lung infection or haemoptysis after surgery.

**DISCUSSION**

Pulmonary tuberculosis occasionally involves the central airway (endobronchial tuberculosis) resulting in bronchial stenosis [2]. Bronchial stenosis related to bronchial tuberculosis is due to damaged bronchial cartilage and fibrosis [2–4]. Airway stenosis due to bronchial tuberculosis is often overlooked and is misdiagnosed as asthma or chronic obstructive pulmonary disease even if recurrent infection or persistent cough is symptomatic, as seen in our patient.

Surgical resection is one of the most assured management methods for relatively short segments of stenotic central airway caused by bronchial tuberculosis. However, it requires complex bronchoplastic or tracheobronchoplastic surgery [3–5]. Therefore, surgical resection is accompanied by a high incidence of operative mortality and morbidity. Late re-stenosis at the anastomotic site has been reported. Kato et al. [3] reported that in 36 patients receiving surgery for tuberculous tracheobronchial stenosis, 2 (5.6%) died and 7 (19.4%) developed re-stenosis at the anastomotic site. Intervention under bronchoscopy, including laser ablation, balloon dilatation and stent placement, is a reasonable alternative [6].

In our patient, we selected surgical resection because his stenotic bronchus was relatively short and his severely destroyed lung with potential Aspergillus infection needed resection. The expected problems on surgery in such patients are the determination of the area of destroyed lung, possibility of infection, length of bronchial stricture and re-stenosis at the anastomotic site [3, 4]. In our case, the destroyed area was more extensive than expected preoperatively and we needed S6 segmentectomy as well as right upper and middle sleeve lobectomy. Therefore, the length of bronchial defect was greater than expected, and anastomosis between the right main bronchus and the right basal bronchus was needed. To prevent ischaemia at the anastomotic site that might lead to stenosis, as observed in lung transplant patients [7], we used a pedicled intercostal muscle to cover the anastomotic site circumferentially. Circularization of bronchial cartilage with plication of the membranous part of the right main bronchus was a critical point in our case. The tensional force of the bronchial cartilage kept the anastomotic site round to prevent re-stenosis. Thus, when surgical resection of bronchial strictures caused by tuberculosis is required,
techniques regarding complex airway surgery should be fully applied to obtain a satisfactory outcome for patients.

Conflict of interest: none declared.

REFERENCES


