

Concurrent tracheobronchoplasty and bilateral lung transplant for obstructive lung disease



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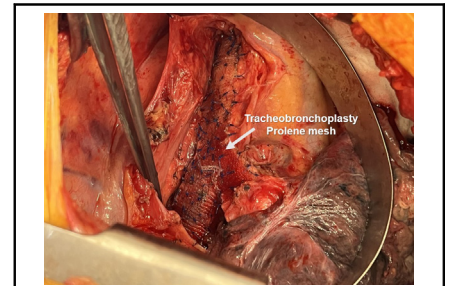
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Completed mesh tracheobronchoplasty of the trachea and right and left mainstem airways.

A 70-year-old male patient with oxygen-dependent chronic obstructive pulmonary disease presented to our lung transplant clinic with progressive dyspnea and chronic cough. A computed tomography scan demonstrated partial collapse of the right upper lobe, prompting awake bronchoscopy. The cartilaginous trachea was found to be malacic with a redundant membranous portion. During expiration, there was near-complete collapse of the trachea and bilateral mainstem airways, establishing the diagnosis of tracheobronchomalacia (TBM) (Figure 1, A). The patient was deemed a candidate for transplantation; however, given that unrepaired TBM would result in outflow obstruction of the implanted allografts, the patient was listed for bilateral lung transplantation with concurrent tracheobronchoplasty (TBP). Institutional review board approval was not required; the patient gave informed consent for publication of this case report.

After acceptance of suitable allografts, we first performed a polypropylene mesh TBP via a right posterolateral muscle-sparing fourth interspace thoracotomy (Figure 2). The azygous vein was divided and the posterior mediastinal pleura was dissected to expose the trachea from the thoracic inlet to the distal bilateral mainstem airways. Dissection lateral to the airway was limited to avoid devascularization.

The airway was measured and the mesh downsized to restore the coronal diameter. Two separate mesh segments were used; one that was placed along the entire length of the intrathoracic trachea and carried down the right mainstem airway, and a separate segment that stabilized the left mainstem airway. The mesh was secured to the cartilaginous membranous junction and carina with interrupted PROLENE sutures (Ethicon). The posterior membranous portion of the airway was plicated with a series of partial-thickness PROLENE sutures affixed to the mesh. After TBM repair, the right pneumonectomy and lung implantation was performed via the thoracotomy access. The

CENTRAL MESSAGE

Tracheobronchoplasty at the time of lung transplantation is technically feasible. Tracheobronchomalacia is not an absolute contraindication for lung transplantation.

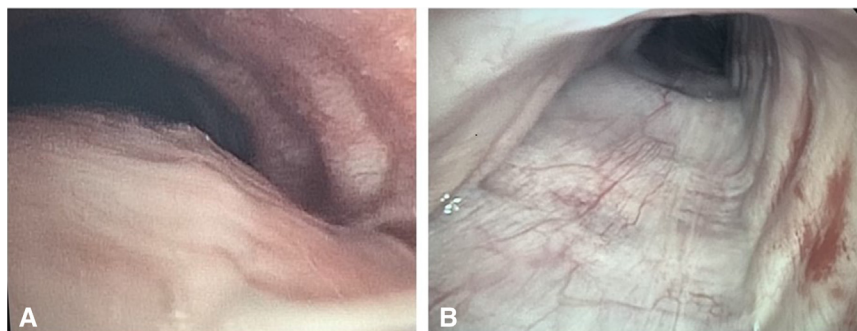


FIGURE 1. Bronchoscopic images of the trachea (A) pre- and (B) posttracheobronchoplasty.

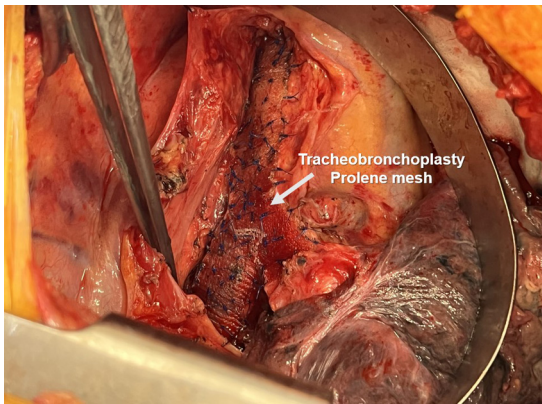


FIGURE 2. Intraoperative view of the completed tracheobronchoplasty of the trachea and right and left mainstem airways.

bronchial anastomosis was completed in a running fashion with polydioxanone suture just distal to the end of the right mainstem mesh. Once completed, the thoracotomy was closed, the patient positioned supine, and the left pneumonectomy and implantation was completed in a similar fashion via a left anterolateral thoracotomy. The patient was extubated on postoperative day 1, transitioned to room air by day 2, and discharged on day 13 after a noncomplicated hospital course. One month after surgery, bronchoscopy revealed a widely patent trachea (Figure 1, B) and mainstem airways without expiratory collapse, and patent, well-healing, bilateral bronchial anastomoses. These findings were redemonstrated on bronchoscopy 1 year after transplantation. Notably, there was no stenosis at the anastomoses and no regions of mesh erosion.

Tracheobronchomalacia is a dynamic collapse of the trachea and mainstem bronchi during exhalation attributed to a combination of weakened cartilage and tissue redundancy. The technique of TBP with mesh reinforcement has been shown to be an effective method of treatment in select

patients.^{1,2} In patients with end-stage chronic obstructive pulmonary disease and TBM, lung transplantation may be deemed prohibitive, given that dynamic obstruction remains proximal to the implanted allografts. To our knowledge, this is the first report of concomitant TBP performed at the time of lung transplantation. We conjecture that concomitant severe TBM at the time of lung transplantation is rare, and that, previously, these patients were not listed. Equally, it is likely that a number of patients with mild-to-moderate disease have been transplanted without TBP. In this report, we performed TBP due to severity of the patient's TBM and, given the potential added morbidity, would only consider this procedure for end-stage disease. Although concurrent TBP at the time of lung transplantation increases operative complexity and duration, it is technically feasible, and in this case, provided an excellent clinical result. Although further surgical experience is warranted and patient selection requires a thoughtful assessment, TBM is not an absolute contraindication for lung transplantation.

Conflict of Interest Statement

The authors reported no conflicts of interest.

The *Journal* policy requires editors and reviewers to disclose conflicts of interest and to decline handling or reviewing manuscripts for which they may have a conflict of interest. The editors and reviewers of this article have no conflicts of interest.

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