

## Case Report

# Unusual case of a vanishing bronchus of the left allograft in a lung transplant recipient

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### Abstract:

We present an interesting case of a complete vanishing of the left main bronchus in a lung transplant recipient who had a successful outcome due to acute respiratory support with venovenous extracorporeal membrane oxygenation in order to perform airway dilation.

### Key words:

Acute, extracorporeal membrane oxygenation, left main bronchus, lung transplantation, vanishing, venovenous

A vanishing bronchus is a known airway complication after lung transplantation that typically is a slow and evolving process rather than an acute emergent situation.<sup>[1-4]</sup> We present a case of an acute vanishing left main bronchus occurring rapidly and resulting in hypoxic respiratory failure. The urgent placement of venovenous (VV) extracorporeal membrane oxygenation (ECMO) was required for respiratory support in order to perform airway dilation.

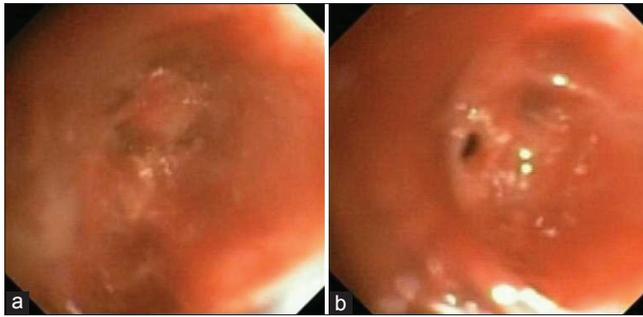
### Case Description

A 17-year-old female lung transplant recipient for cystic fibrosis underwent bronchoscopy to assess response to both intravenous (IV) pulse methylprednisolone for acute A2B0 allograft rejection diagnosed 2 weeks earlier and ongoing IV ganciclovir and foscarnet for cytomegalovirus (CMV) infection. Upon inspection of the left main bronchus, there were substantial changes as compared to the bronchoscopy 2 weeks before, showing narrowing of the airway lumen and mucosal edema with friability to the point of not being able to advance the bronchoscope into either the left upper or lower lobe segments. Subsequently, the right allograft was evaluated with bronchoalveolar lavage and transbronchial biopsies of both right middle and lower lobes being performed without difficulty. The patient tolerated the procedure well including biopsies until 5 min after withdrawing the bronchoscope when she dropped her oxyhemoglobin saturation (SaO<sub>2</sub>) to 86% despite mechanical ventilation. Chest radiograph revealed left lung collapse [Figure 1], so the bronchoscope was immediately re-inserted with the discovery of complete occlusion or

vanishing of the left main bronchus [Figure 2a]. The bronchoscope was not able to be advanced through this tissue occluding the airway, so alligator forceps were used to try to perforate it. After numerous attempts, eventually a small opening [Figure 2b] was obtained. However, her respiratory status declined due to severe hypoxic respiratory failure with no improvement with inhaled nitric oxide and trial of high-frequency oscillatory ventilation. She was therefore placed on VV ECMO with immediate normalization of SaO<sub>2</sub>. While on VV ECMO, balloon dilatation of the left main bronchus was successfully performed through the small opening attained earlier. A CRE™ balloon was used to dilate the area from 4 mm initially to 6 mm, and then to 8 mm diameter. The balloon was passed through a 6.4 mm dia Olympus bronchoscope. She was removed from ECMO the following day and extubated 3 days later. The remaining part of her hospital course was unremarkable with her being discharged 2 weeks later.



Figure 1: Chest radiograph demonstrating complete collapse of left lung soon after completion of the initial bronchoscopy with transbronchial biopsies



**Figure 2:** (a) Complete occlusion of the left main bronchus after re-insertion of the bronchoscope into the lower airway to evaluate the left lung collapse. (b) Perforation of the occluding tissue in the left main bronchus, achieved using alligator forceps

### Discussion

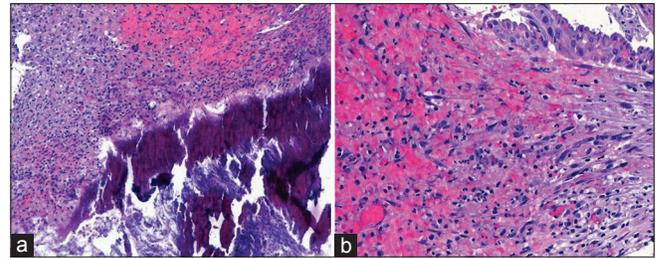
Despite significant advancements in lung transplantation, airway complications continue to occur with the most severe form being complete bronchial stenosis. These airway complications typically manifest after the first posttransplant month, but can occur several years after transplantation.<sup>[5]</sup> There are two patterns of bronchial stenosis after lung transplantation, with one pattern occurring at the surgical anastomosis and the other one being more distal narrowing referred to as segmental nonanastomotic bronchial stenosis.<sup>[2,6]</sup>

The development of lower airway stenosis after lung transplant is typically a slow and gradual process that can affect any section of the lower airway in either allograft. A much higher frequency segmental nonanastomotic bronchial stenosis, which is also the most severe form, occurs on the right side and is termed the vanishing bronchus intermedium syndrome.<sup>[2,6]</sup>

The atypical presentation for the current case was how rapid the left main bronchus vanished with histological evidence of an acute and chronic process. This tissue occluding the lumen [Figure 3a] comprised granulation tissue and recent hemorrhage along with dystrophic calcifications. Furthermore, the submucosa was filled with acute and chronic inflammation, granulation tissue, and recent hemorrhage [Figure 3b].

### Conclusions

This case illustrates a rare presentation of acute vanishing of a left main bronchus in a lung transplant recipient, driven by



**Figure 3:** (a) Histological image of the occluding tissue in the left main bronchus that shows granulation tissue and recent hemorrhage (upper half of image) and large area of dystrophic calcifications (lower half of image) [hematoxylin and eosin stain (H and E), magnification  $\times 100$ ]. (b) Histological image of the occluding tissue in the left main bronchus that shows the submucosa filled with granulation tissue and recent hemorrhage along with acute and chronic inflammation with intact respiratory epithelial lining (top of the image) (H and E,  $\times 200$ )

an acute and chronic process as determined by histological evaluation. The urgent implementation of VV ECMO for respiratory support and immediate airway dilation proved vital in the successful outcome for this patient.

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