

Topicalization & TIVA: A Successful Anesthetic Duo for Endobronchial Oxidized Cellulose Placement in the Treatment of Bronchopleural Fistula

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Bronchopleural Fistula

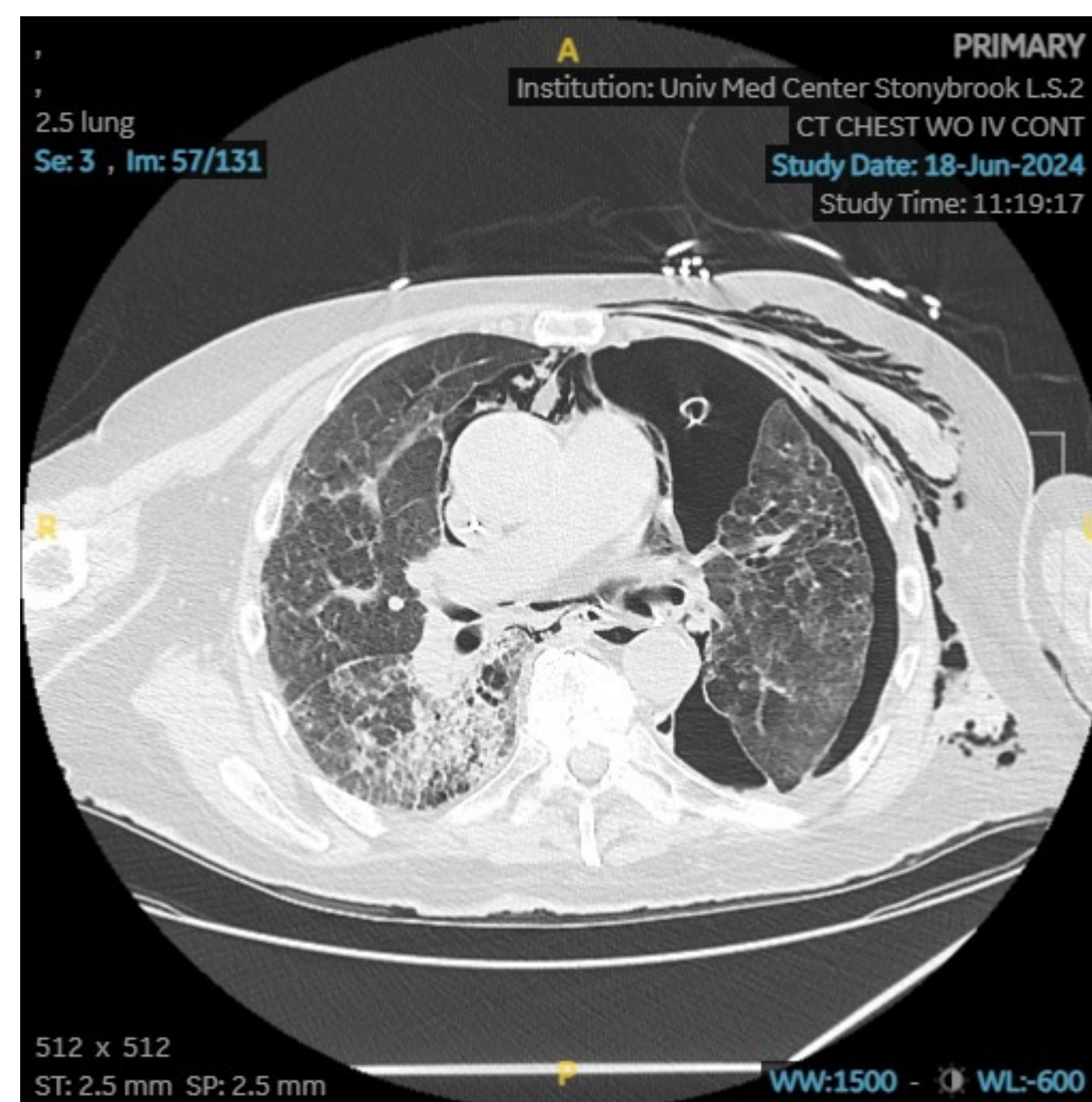
Bronchopleural fistula (BPF) is defined as an abnormal communication between the bronchial tree and pleural space. It can be a result of necrotizing pneumonia, lung neoplasm, or blunt and penetrating lung injuries. However, most commonly BPF arise as a complication of lung resection surgery following the failure of the bronchial stump to heal (improper initial closure, ischemia, stump infection, or residual tumor at the stump). The incidence of BPF ranges from 4.5%~20% after pneumonectomy and 0.5%~1% after lobectomy, with mortality between 18%~67%.

Prompt treatment is necessary to minimize morbidity and mortality; minimally invasive techniques using fibrin glue or silicone stent, which necessitates a rigid bronchoscopy, have recently gained traction for BPF. Several options exist for ventilation during rigid bronchoscopy including apneic oxygenation, spontaneous assisted ventilation, and jet ventilation. However, BPF presents an anesthetic challenge as positive pressure ventilation exacerbates the disease process and is contraindicated. As a result, spontaneous assisted ventilation is a practical choice for such a procedure, though there is not substantial evidence in this setting.

Case Discussion

A 67-year-old male with history of interstitial lung disease initially presenting for left lower lobe wedge resection that resulted in a persistent air leak treated by left lower lobectomy that was complicated by BPF, hypoxemia, and severe dyspnea. An endobronchial approach via rigid bronchoscopy was attempted to close the fistula

Preoperatively:
 - Exhibited poor pulmonary reserve with high-flow-nasal-cannula requirements of 60L/Min and 100% FiO₂.



CT Chest prior to bronchoscopy

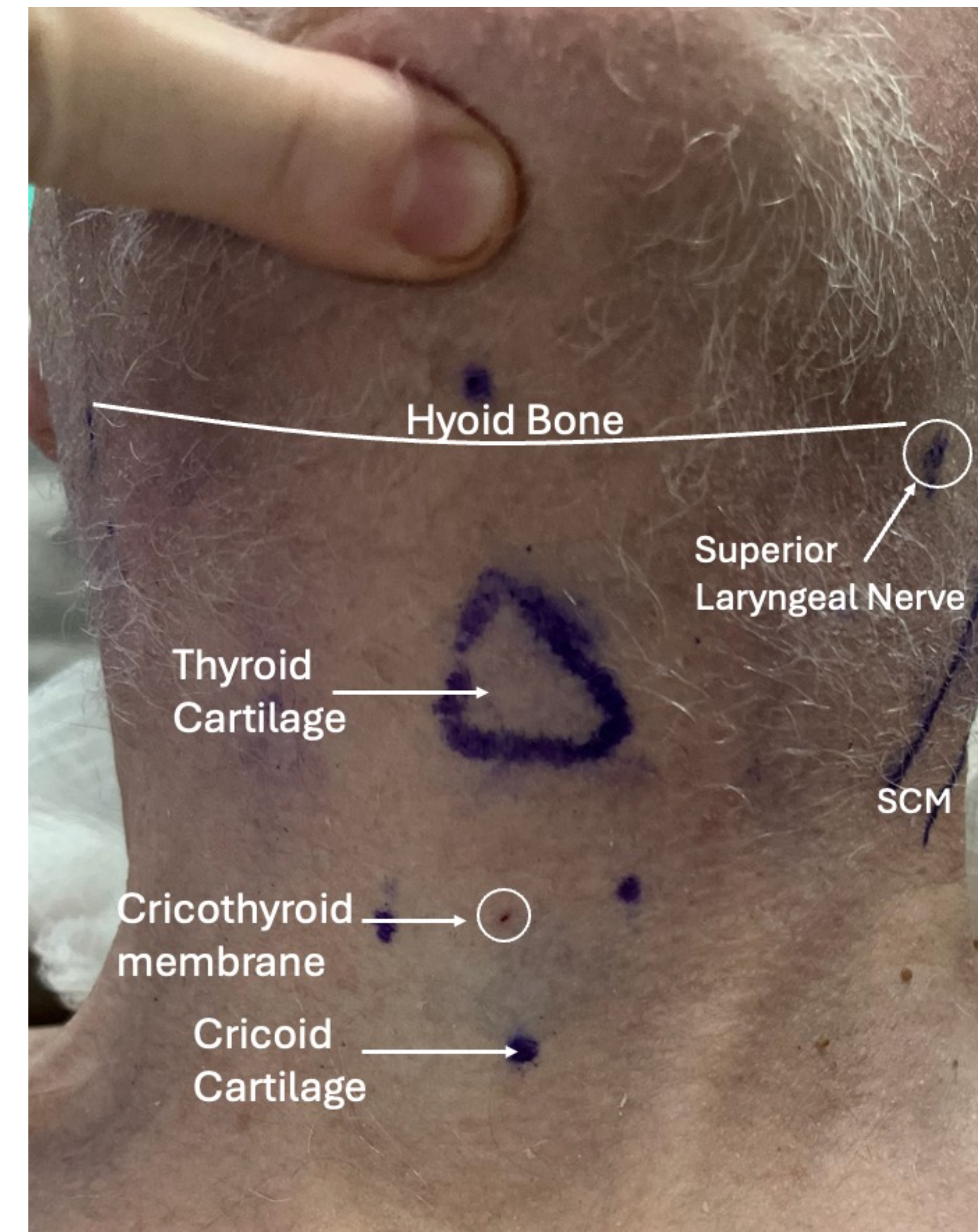
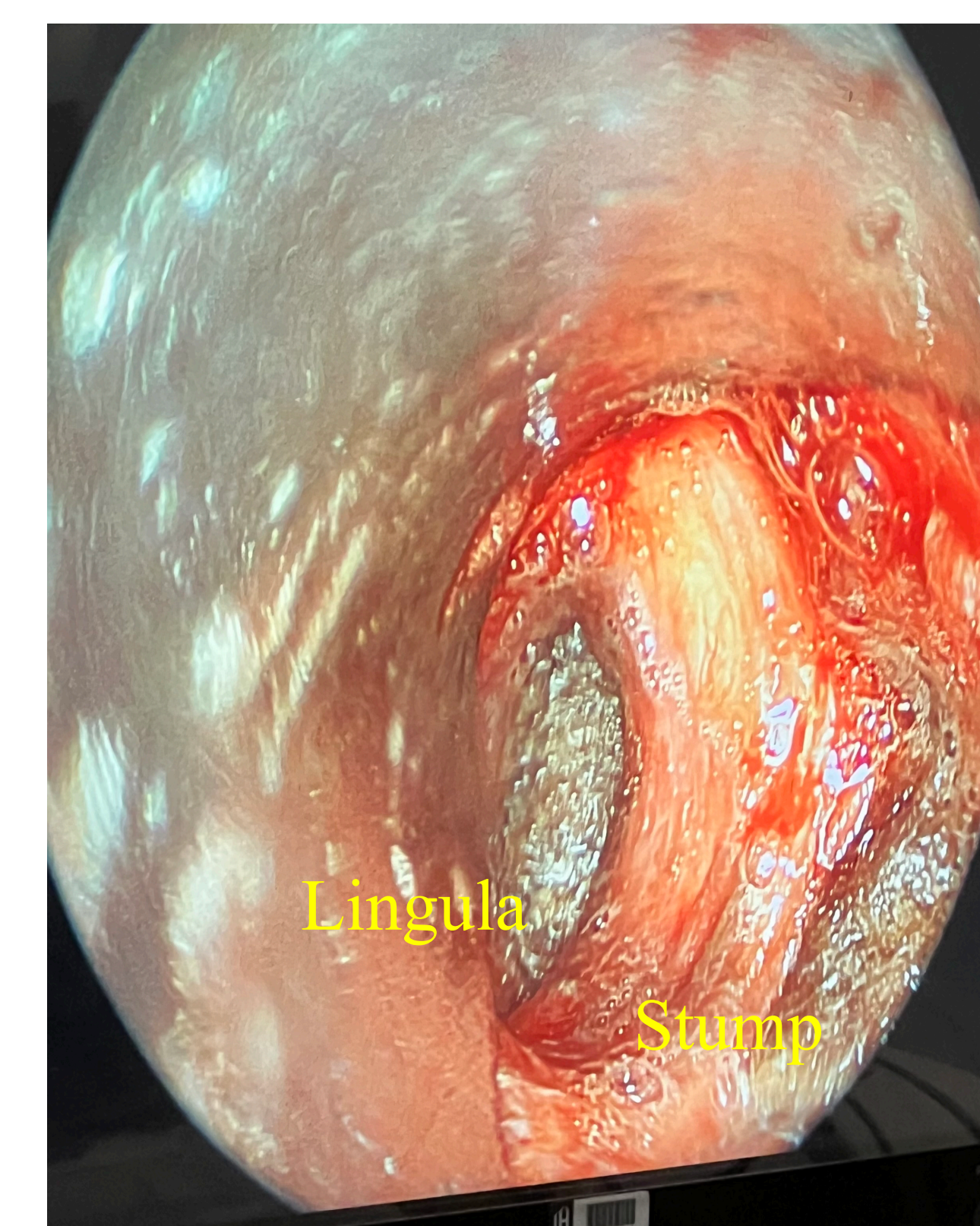


Figure 1. Annotated anatomy for superior laryngeal and transtracheal block



Figure 2. Prior bronchial stump and lingula segmental bronchi (left) plugged with oxidized cellulose (right)



Case Discussion (continued)

Interventional pulmonology, dental anesthesiology, and cardiothoracic anesthesiology collaborated to produce an interdisciplinary periprocedural care plan:

- A HFNC was set up in the operating room
- Upon arrival, the patient was with an oxygen saturation of 96% on 60L/Min 100% FiO₂ via HFNC
- Patient received 3cc nebulized and 4 cc trans-tracheal 4% lidocaine prior to induction with total intravenous anesthesia (TIVA) with propofol. *Total lidocaine: 280 mg*
- Rigid bronchoscopy was tolerated without additional anesthetics. HFNC was continued throughout the intervention and **spontaneous ventilation** was maintained without any hypoxemia or hypoventilation. *Total anesthesia time: 100 minutes*
- Prior bronchial stump and lingula segmental bronchi were identified and plugged with oxidized cellulose resulting in significant improvement in the patient's air leak.

Postoperatively, the patient was weaned off HFNC to minimal supplemental oxygenation.

Conclusion

BPF repair presents as an anesthetic challenge due to the contraindicated use of positive pressure ventilation. In this case, the patient exhibited extremely poor pulmonary reserve preoperatively necessitating the use of HFNC. We have shown the successful utilization of regional airway anesthesia with TIVA for rigid bronchoscopy, thus facilitating spontaneous assisted ventilation through HFNC in the operating room. An interdisciplinary periprocedural approach is critical in providing an optimal patient outcome in the setting of endobronchial intervention for BPF.



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 References on request.

