

## Sharing and Caring of the Airway in the Interventional Rigid Bronchoscopy- A Case Report

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**Abstract:** Patients with endobronchial tumors often present with acute/ acute on chronic respiratory distress due to the obstructive lumen. The definitive management remains resection of intraluminal mass to make the airway patent. However despite so many advances in airway gadgets, anaesthesia and airway management in such a situation remains a challenge. We describe the anaesthetic management and perioperative considerations in a 65-year-old male patient planned for coring and debulking of endobronchial tumor.

### INTRODUCTION

Interventional bronchoscopy for tumor management is an intricate procedure often performed on patients with multiple co morbidities. Combination of severe systemic illness, shared airway, dynamic nature of the procedure and conflicting clinical objective of the anaesthesiologist and pulmonologist present a challenge to the anaesthesiologist. An in-depth understanding of the pathology for which procedure is being done and communication between the team members is critical for the successful management in these complex, high risk procedures.

### CASE REPORT

A 63-year-old, 50 Kg male, chronic smoker with no comorbidities presented with history of gradually increasing difficulty in breathing and decreased appetite since one and half months. Patient was tachypneic, using accessory muscles of respiration. On chest auscultation, air entry was decreased on the left side. The patient was maintaining 100% saturation on simple face mask at 5l/min. of oxygenflow. Airway assessment revealed Mallampati score II and multiple missing tooth. His preoperative blood gas analysis showed- PH 7.37, Po<sub>2</sub> 49.2 mmHg, PCO<sub>2</sub> 26.8 mmHg, HCO<sub>3</sub><sup>-</sup> 15, BE -8. Chest radiograph showed complete white out of left hemi thorax (Figure 1). Contrast enhanced computed tomography of the chest was suggestive of ill defined soft tissue lesion in left hilar and upper lobe region encasing the left main bronchus and left pulmonary artery suggestive of carcinoma lung. Other haematological and biochemical laboratory investigations were within normal limits. Cytopathology report for pleural fluid was suggestive of poorly differentiated malignant tumor.

The patient was posted for bronchoscopy and tumor debulking. A written informed consent was taken from the patient. Premedication was done with glycopyrrolate 0.2 mg and pantoprazole 40 mg intravenously (IV). Topicalization of the airway was done with 2% lignocaine and adrenaline prior to the procedure. Standard ASA monitoring was done. Baseline vitals parameters were heart rate-irregular ranging from 150-160 /min, Spo<sub>2</sub> of 89-94% on room air, blood pressure of 133/78 mmHg. Intravenous access was secured in right hand with 18G cannula. Ringer's lactate was administered at maintenance rate of 90ml/hr. A binasal prong was applied with oxygen at 10l/min throughout the procedure.

Preoxygenation was then initiated with 100% oxygen. Induction of anaesthesia was done with injection fentanyl 2mcg/kg IV and propofol 1mg/kg (administered in aliquots of 30 mg). After confirming adequate ventilation succinylcholine 75mg IV was administered and rigid bronchoscope was introduced, anaesthesia circuit attached to the bronchoscopic side port for ventilation. Thereafter coring of the tumor was done with the bronchoscope (Figure 2). Anaesthesia was maintained with intravenous boluses of ketamine and propofol. After the tumor debulking, patient had an episode of desaturation to 55-60%. Patient was intubated with endotracheal tube of size 8.0mm ID and ventilated with 100% O<sub>2</sub>. On endotracheal suctioning blood was aspirated. ABG revealed respiratory acidosis on arterial blood gas analysis (Paco<sub>2</sub> =73 mmhg, Po<sub>2</sub> 54 mmhg). Fiberoptic bronchoscope was inserted to ascertain the site of bleeding, and suctioning was done under vision. At the site of hemorrhage, injection tranexamic acid and adrenaline were instilled. Patient was shifted to intensive care unit for elective ventilated Patient was extubated next day and was discharged after five days with stable

Received : 24/03/2022  
Received in revised form : 16/05/2022  
Accepted : 29/05/2022  
Available online : 21/06/2022

Keywords:

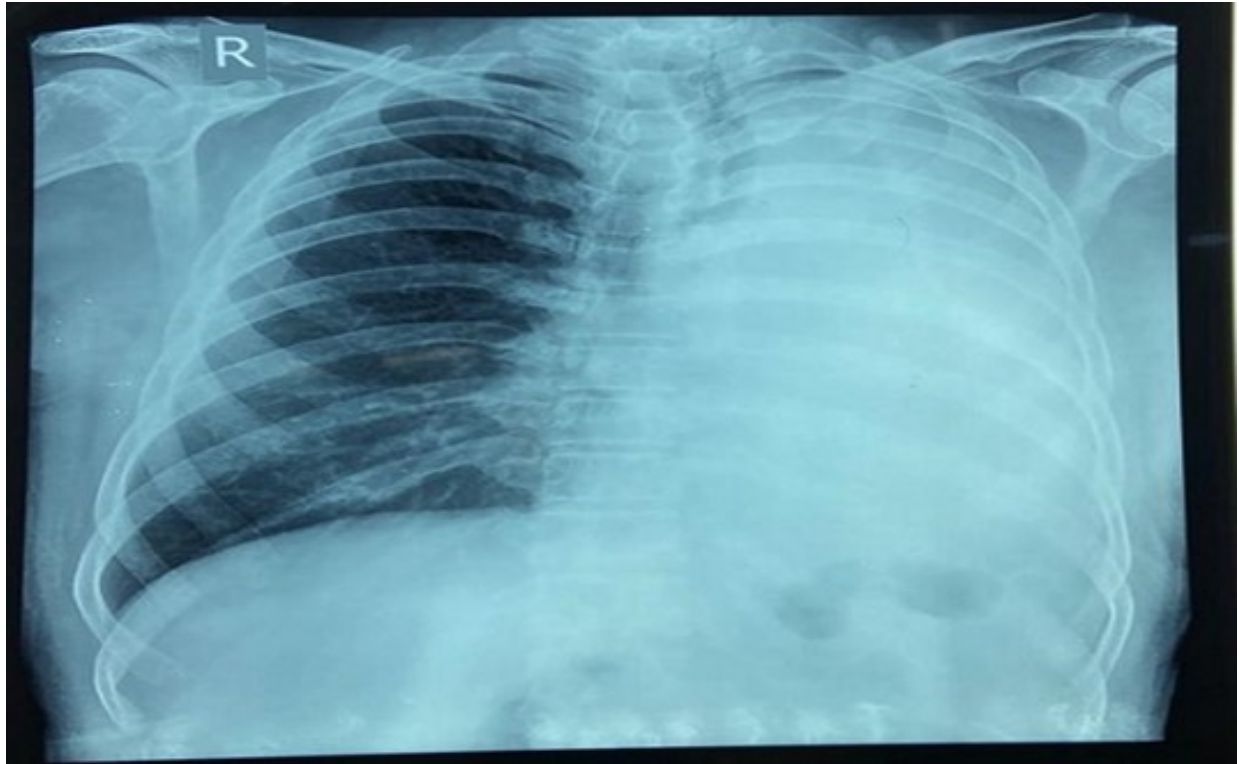
Interventional bronchoscopy,  
Debulking,  
Total intravenous anesthesia

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<http://dx.doi.org/10.47009/jamp.2022.4.2.17>

Int J Acad Med Pharm,  
2022; 4 (2); 78-80



haemodynamic parameters.



**Fig. 1.** Chest X-Ray showing complete white out of left hemithorax



**Fig. 2.** Bronchoscopic view of tumor

## DISCUSSION

Overall, lung cancer is the leading cause of cancer related deaths throughout the world<sup>1</sup>. Even with emerging advanced diagnostic techniques and treatment, five year survival rate is still low ranging from 10-20% as most of the patients are diagnosed at an advanced stage<sup>2</sup>. Bronchoscopic management of these tumors is less invasive, leads to bronchial opening, shorter hospital stays and lower costs<sup>3</sup>. There are various methods for endobronchial resection of an intraluminal lesion which includes laser, electrocautery, cryotherapy and argon plasma laser<sup>4</sup>. However these procedures require skills and extra care should be taken while using these techniques as there is a risk of tension pneumothorax<sup>5</sup>, endobronchial fire, pulmonary barotrauma, laryngospasm, injury to glottic structures and tracheal rupture<sup>6</sup>.

Primary goals of anaesthesia during bronchoscopic procedures are maintaining adequate oxygenation, ventilation, alleviating perioperative stress, blunting of cough reflex and providing amnesia<sup>7</sup>. During preoperative evaluation special attention should be given to the nature and extent of the proposed procedure, associated comorbidities like aspiration pneumonia, COPD, coronary artery disease, smoking and malnutrition.

Detailed airway assessment with review of signs/symptoms of airway obstruction like hoarseness, stridor, and use of accessory muscles of respiration, dysphagia and orthopnea is of paramount importance. Review of the available radiological reports, clinical notes concerning size, location and extent as well as relation of the lesion with other vital structures can help the anaesthesiologist to predict and prepare for any possible complication that may occur. Premedication with an anticholinergic agent causes bronchodilatation and reduces airway secretions allowing better visualization and examination of the airway. It also has an added benefit of protecting the airway against vasovagal reaction and bronchospasm<sup>2</sup>.

Choice of anaesthesia depends on multiple factors ranging from anesthesiologist's expertise, patient profile, availability of equipments and drugs, site and extent of lesion. General anesthesia is one of the most commonly used techniques for these procedures. It requires a step by step induction of anesthesia with continuous monitoring of gas exchange and hemodynamics<sup>8</sup>. Total intravenous anaesthesia (TIVA) with or without relaxant is preferred over inhalational agents as it allows continuous and adequate delivery of anesthesia while ventilation leaks occur in inhalation technique<sup>9</sup>, it avoids operation theatre pollution and exposure of operating room staff to inhalational gases. Muscle relaxation during bronchoscopic procedure facilitates easy insertion of supraglottic device, endotracheal tube and bronchoscope. Besides improving chest wall compliance, they increase precision to take biopsy. They minimize trauma caused by frequent insertion and removal of bronchoscope against contracted vocal cords. Long acting neuromuscular agents should be used cautiously in patients with partial airway obstruction.

Airway can be secured using supraglottic device or endotracheal tube. Supraglottic airway can be used in subglottic tracheal lesions<sup>10</sup>. Supraglottic airway device (SAD) has advantage of allowing ventilation along with simultaneous introduction of fiberoptic. However there is risk of aspiration with SAD and it doesn't provide definite airway. Endotracheal tube is standard airway device for securing the definite airway. A greater size ETT is used to allow free movement of the bronchoscope and adequate ventilation without compromising airway pressures due to sharing of the airway with pulmonologist. Patients posted for bronchoscopy have usually low cardiopulmonary reserve so apnea and desaturation can occur even with minimal dose of sedative agent. Topicalisation of the airway prior to the procedure blunts the reflexes thus reducing dose of sedatives. Lignocaine is the topical agent of choice and can be delivered as nebulisation, spray as you go and transtracheal injections.

Despite the conflicting reports, corticosteroids particularly dexamethasone are used as prophylactic measure to decrease the airway edema after airway surgery. Emergence from anaesthesia in the patients is as tricky and risky as is the intraoperative management.

Patient can pass through a phase of upper airway obstruction during the emergence process. Inability to maintain the airway and effective ventilation can lead to hypoxemic arrest. A brief period of elective ventilation post procedure allows the time for stabilization of the metabolic and respiratory parameters.

## Conclusion

Understanding the lung pathology, nature of the procedure, vigilant intraoperative monitoring and good communication between the pulmonologist and anaesthesiologist can help in the successful management of these high risk procedures.

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