

# Central bronchial carcinoid: Management of a case and anesthetic perspectives

## ABSTRACT

Obstructing lesions of the central airways present with a variety of symptoms and are often associated with pneumonia or asthma-like states. Anesthesia to these patients often presents challenges right from the preoperative stabilization of underlying lung condition, mask ventilation in the supine position to maintaining oxygenation and ventilation in the intraoperative and postoperative period. We present here a case of a young woman with a central bronchial tumor with significant airway obstruction with potential for major bleeding and subsequent anesthetic management without lung sacrificing measures and cardiopulmonary bypass assistance.

**Key words:** Anesthesia; bronchial carcinoid; resection

## Introduction

Anesthetic management of tracheal and bronchial tumors often requires careful planning and management. Maintaining oxygenation and ventilation right from induction of anesthesia to the post operative period remains the primary challenge. Extreme vigilance and care in handling such cases can sometimes obviate the need for cardiopulmonary bypass.

## Case Report

A 23-year-old female presented with a history of cough and expectoration with intermittent episodes of hemoptysis. There was worsening of symptoms in the last 3 months with breathing difficulty in supine and left lateral position. She came to our institute with a history of taking anti tubercular drugs for initial 2 months without improvement. Her personal and family history was insignificant. Clinical

examination revealed decreased left chest movement and air entry with tracheal shift to the left. Chest X-ray (CXR) showed collapse of left lung with compensatory emphysema of right lung. Contrast-enhanced computed tomography of the chest showed an endobronchial soft tissue mass involving the left main stem bronchus extending to left lower lobe bronchus [Figure 1a and b] which looked like a bronchial adenoma. Broad spectrum antibiotics, bronchodilators, and physiotherapy resulted in mild improvement. She had to sleep in a semi-upright or lateral position.

Urgent bronchoscopic debulking of the tumor was planned to relieve of distress and alleviate the tumor bleed possibility, which might be catastrophic. Standard monitoring with pulse oxymetry, electrocardiogram, end-tidal carbon dioxide concentration was done along with invasive blood pressure monitoring. Preoxygenation

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**How to cite this article:** Goswami D, Kashyap L, Batra RK, Bhagat C. Central bronchial carcinoid: Management of a case and anesthetic perspectives. Saudi J Anaesth 2016;10:104-6.

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<b>DOI:</b> 10.4103/1658-354X.169487	

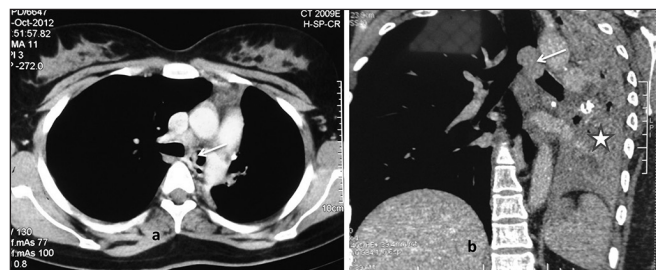
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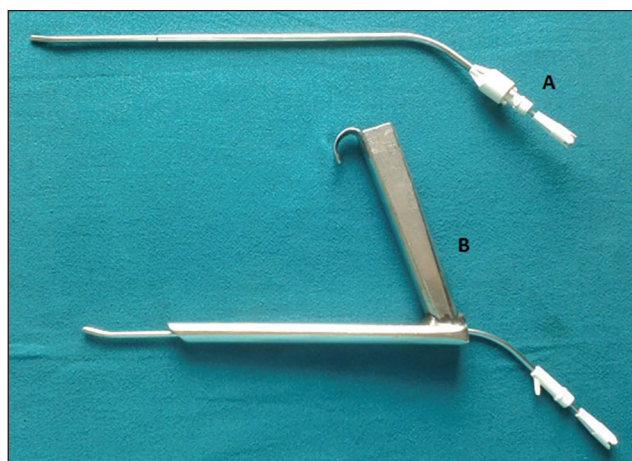
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done with 100% O<sub>2</sub> and anesthesia induced with Sevoflurane with intermittent boluses of propofol. Preinduction SpO<sub>2</sub> (98%) immediately fell to 80% on induction and maintaining oxygenation with mask ventilation became increasingly difficult as the airway pressures became very high (45-50 cmH<sub>2</sub>O). The rigid direct laryngoscope was introduced, and the mass could be visualized at the carina occupying the major part of the tracheal lumen and obstructing the left main stem bronchus [Figure 2c and d]. A 7 mm endotracheal tube (ETT) was introduced via the scope and placed just above the tracheal mass and ventilation attempted. Although ventilation was easier with ETT compared to the face mask and the arterial saturation improved, airway pressures remained high. Muscle relaxant (vecuronium) and opioid analgesic (fentanyl) was given after securing the airway.

Dissection of the tracheal mass was attempted via the oral route with a micro-debrider [Figure 3A and B] after withdrawing the ETT, but it started to bleed profusely. Hence tracheostoma was made immediately. A 6 mm ETT passed through the stoma to the right main bronchus and a smaller scope was also introduced through the stoma, and the tumor could be



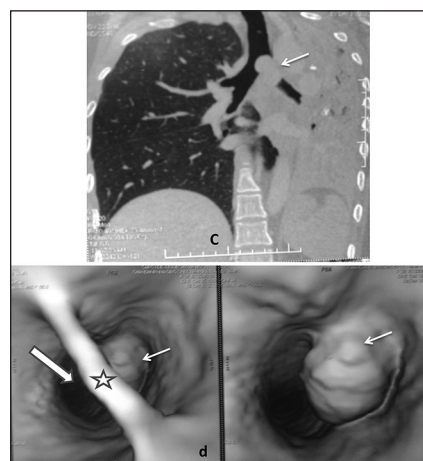
**Figure 1:** Contrast enhanced computed tomography axial (a) and coronal (b) images in mediastinal window showing endobronchial mass in left main bronchus (arrow) projecting into the carina. Coronal image (b) showing the left lung collapse (\*)



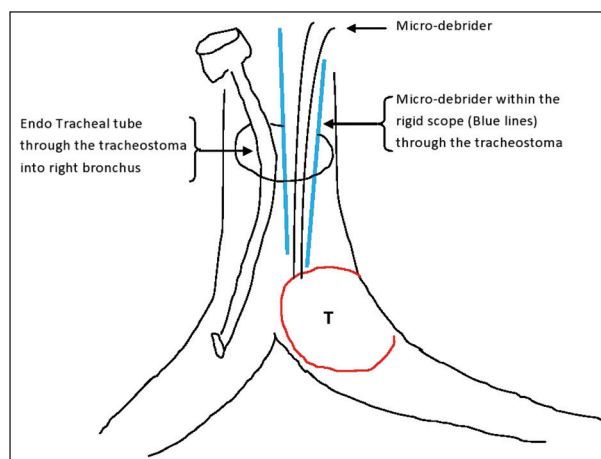
**Figure 3:** Image of the micro-debrider (A) and the rigid direct laryngoscope (B) through which the micro-debrider is inserted

resected completely using micro-debrider from the carina and the left main bronchus [Figure 4]. Aggressive suctioning was continued throughout the procedure to prevent soiling of the lung by blood.

Tracheostomy tube was placed at the end of the procedure. Patient was shifted to intensive care unit and was on pressure support ventilation for 24 h along with careful monitoring, frequent tracheobronchial suctioning and chest physiotherapy. Tracheal tube change was required after 48 h due to mild blood soakage. Decannulation was done after 2 weeks. The biopsy report revealed features of neuro-endocrine tumor (atypical carcinoid). No mitosis or necrosis was seen. The tumor cells were immune positive for chromogranin, synaptophysin, CD56 and cytokeratin. MIB-1 labeling index was approximately 4-5% in the highly proliferative area. In view of the mildly elevated MIB-1 labeling index, a close follow-up was recommended.



**Figure 2:** Contrast enhanced computed tomography coronal (c) lung window and virtual bronchoscopy (d) images showing endobronchial mass in left main bronchus (arrow). Note the normal right main bronchus (long thick arrow) and upper part of carina (\*)



**Figure 4:** Schematic image showing the exact position of endotracheal tube and micro-debrider through the rigid laryngoscope while approaching the tumor (T)

## Discussion

Bronchial carcinoids are neuroendocrine tumors of the central airways exhibiting well-defined margins. They have either typical (low grade) or atypical (aggressive) histopathological morphology secreting neuroendocrine peptides, with the propensity to metastasize with the rare endocrine presentation.<sup>[1,2]</sup> Predominant signs are of bronchial obstruction like cough, localized wheeze, and recurrent pneumonitis. High vascularity and central location of the tumor can lead to hemoptysis. CXR can be beneficial in about 75-90% cases however CT scan can identify endobronchial tumors not visualized by plain radiographs.<sup>[2]</sup> The treatment of choice is a surgical resection with a maximum conservation of the airway and lung tissue. Lasers can also be used, but have their own limitations often requiring definitive surgery later. Rigid scopes are recommended over laser if vascular structures are near the tumor.<sup>[3]</sup>

We would like to highlight the anesthetic difficulties faced in case of resection of a bronchial carcinoid approached via the oral and tracheostoma route. Prioritizing the anticipated difficulties and tools to handle them are of utmost importance. Monitoring of oxygenation and ventilation is a priority as both are a major challenge. Inducing in the supine position itself causes distress to the patient and a lateral, or semi-upright position may be more comfortable. Maintaining oxygen saturation with simple face mask may be difficult and so alternative methods, e.g., tracheostomy, has to be kept ready. Awake intubation is a safer way of establishing a definitive airway.

Surgery for tracheal and carinal tumors falls under a group of non-cardiac surgery where cardiopulmonary bypass (CPB) is used. CPB may be used as an adjunct for very difficult cases, but it has its own set of complications like postoperative bleeding, coagulopathy, neurologic defect and hypothermic circulatory arrest. So, it may be prudent to avoid CPB unless it is absolutely necessary.

Retrospective reviews of surgery tumors of the trachea and main bronchus have shown good results with or without the use of CPB. Selection has to be guided by the patient's condition taking into account the safety of such measures.<sup>[4,5]</sup>

The tumor needed urgent debulking because of considerable respiratory distress and progressive deterioration of

underlying lung condition. It could be managed without resorting to thoracotomy and lung sacrificing method, thus giving the patient almost immediate relief of respiratory distress. Good postoperative chest physiotherapy and medications are required for proper recovery of lung functions. However, the long-term success of the treatment depends on proper management of the disease where early stage has a low recurrence compared to atypical carcinoids.<sup>[6-8]</sup> Our patient is on follow-up after 12 months of surgery.

In summary, tracheal or bronchial tumors should be dealt with extreme caution. A proper arrangement has to be made for alternate ways of securing airway if one technique fails. The possibility of hemorrhage is another factor and means to control it should be ready as soiling of the lung with blood is undesirable. Assistance of CPB should be reserved for the most difficult cases where benefit outweighs its hazards.

## Financial support and sponsorship

Nil.

## Conflicts of interest

There are no conflicts of interest.

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