

Peri-Operative Anesthetic Management for Low Lying Tracheal Tumor; It is all About Sharing the Surgical Field between Anesthesia and Surgical Teams: A Case Report

Sirohiya Prashant^{1,2}, Vig Saurabh^{1,2}, Gulia Abhity^{1,2}, Rathe Brajesh K^{1,2}, Bharti Sachidanand J^{1,2*} and Kumar Sunil^{2,3}

¹Department of Onco-anesthesiology and Palliative Medicine, Dr. BR Ambedkar Institute Rotary Cancer Hospital, AIIMS, New Delhi, India

²Dr. BR Ambedkar Institute Rotary Cancer Hospital, AIIMS, New Delhi, India

³Department of Surgical Oncology, Dr. BR Ambedkar Institute Rotary Cancer Hospital, AIIMS, New Delhi, India

*Corresponding author: Dr Sachidanand Jee Bharti, Department of Onco-Anesthesiology and Palliative Medicine, Dr. BR Ambedkar Institute Rotary Cancer Hospital, AIIMS, New Delhi, India, Tel: +91-9968436042; E-mail: sachidadr@yahoo.co.in

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Abstract

We describe a case of a 36-year-old male, presenting with complaints of cough, dyspnoea and hemoptysis. He was diagnosed to have a mass in the lower trachea. The patient was scheduled to undergo tracheal resection and reconstruction through a right posterolateral thoracotomy. A 7 French Arndt bronchial blocker was advanced into the right main stem bronchus distal to the tumor for one-lung ventilation; followed by direct in-field intubation of left endobronchial lumen post tracheal transaction with 6.5 mm flexometallic tube to provide one-lung ventilation after the opening of the trachea. Our airway management plan aimed to provide maximal surgical access to the trachea with adequate ventilation. Surgeon guided serratus anterior plane catheter was placed to facilitate post-operative analgesia. Airway management in lower tracheal tumors is a complex challenge requiring close coordination between the surgical and anesthetic teams. Adequate intraoperative and postoperative analgesia is an important aspect in tracheal resections done via thoracotomy. Both anesthetist and surgeon should have backup management plans for airway and analgesic management for optimum management and successful outcomes.

Keywords: Tracheal resection; Postoperative analgesia; Thoracotomy

Introduction

Patients with primary or secondary tracheal neoplasms usually present with nonspecific symptoms like cough, wheeze, hemoptysis, and shortness of breath. A computed tomography (CT) scan of chest often confirms the diagnosis [1]. A rigid bronchoscopic assessment is essential for establishing the extent of disease. Surgical resection followed by reconstruction is considered to be the definitive treatment [2]. Distal tracheal tumors are usually approached through a right posterolateral thoracotomy. Surgical resection of these lesions is a challenging task for both anesthesia and surgical teams. It is important to maintain ventilation while providing free surgical field at the same time [3]. A successful outcome in these cases requires anticipation of problems, airway management, meticulous planning and adequate analgesia.

Case Report

A 36-year-old male, a known smoker (height - 176 cm; weight - 72 kg) presented with a history of hemoptysis 3 episodes over 6 months and gradually progressive dyspnoea which increase in severity in lying down position and stridor in the past 15 days. CT scan of the chest showed endotracheal soft tissue mass (1.9 × 2.1 × 3.1 cm) arising from the right anterolateral wall of trachea just proximal to carina causing partial obstruction. Rigid bronchoscopy was done under general anesthesia which revealed a large tumor in lower trachea arising from the right anterior tracheal wall. Electrosurgical snaring was performed and partial debulking of the tumor was done. Post-

procedure, there was no stridor and dyspnoea was improved. Biopsy of the tissue revealed adenoid cystic carcinoma. CT scan of chest done after one month showed mass like thickening involving anterior and the right lateral wall of trachea for a length of 2.3 cm, ending just cranial to carina focally abutting the arch of aorta with no definite infiltration. There was a reduction in the size of the intraluminal component of the mass as compared to the previous scan. Tracheal resection and reconstruction through right posterolateral thoracotomy under general anesthesia was planned. On pre-operative evaluation, there was no hemoptysis and his dyspnoea was improved. All blood and biochemical investigations, spirometry examination were within normal range. His cardiopulmonary exercise testing was done which showed VO₂ max 22 ml/kg/min and metabolic equivalents (METs) are 5.8.

In the operating room, the patient was counseled and after securing an intravenous line, intrathecal morphine 300 micrograms was given at L3-4 level for post-operative analgesia. Standard monitoring devices (pulse oximetry, non-invasive blood pressure, temperature) attached. An arterial line for continuous blood pressure monitoring and blood gas monitoring was set up. Anesthesia was induced with fentanyl 140 micrograms, Propofol 120 mg, mask ventilation was confirmed and rocuronium 60 mg was given. Oral endotracheal (ET) tube of size 8.5 mm was inserted using fibre optic bronchoscopy (FOB) and was fixed proximal to the tumour and carina. A check bronchoscopy was done after endotracheal intubation before arndt blocker insertion which showed mass in lower trachea reaching just above carina. (Figure 1) An arndt blocker 7 Fr was placed in right main stem bronchus just below carina through the ET tube using FOB and cuff was inflated to deflate right lung. Anesthesia was maintained with air and oxygen with FiO₂

0.5 and propofol through target-controlled infusion (effect site concentration maintained at 3-4 microgram/mL).



Figure 1: Bronchoscopy view showing tumor arising from anterolateral trachea.

Bispectral index (BIS) monitoring was used to assess depth of anesthesia and was maintained between 40-60. Thorax was entered through 4th intercostal space via right posterolateral thoracotomy. 4th rib was removed for access to the tumor. Trachea was separated circumferentially. Lower end of trachea was transected above the carina, and a 6.5 mm ID flexometallic tube (FMT) was directly inserted into left main stem bronchus by the surgeon and left lung was ventilated through this tube (Figure 2) The bronchial blocker was removed and the tracheal tube was kept in situ to be used in the later part of the surgery.



Figure 2: Direct in-field intubation of left main stem bronchus by 6.5mm ID flexometallic tube.

Tumor was resected with adequate margins. When surgical anastomosis was almost complete, FMT removed by the surgeon and oral ET tube was guided into left main stem bronchus under FOB guidance and primary closure was done over the tube. Primary anastomoses was done and pleural flap used to cover the anastomoses. Haemostasis was achieved, and air leak was checked. For post-operative analgesia, as per our institutional protocol, a surgeon guided SAP catheter was placed between serratus anterior and latissimus dorsi

and a bolus of ropivacaine 0.375% was given. Thorax was closed primarily over intercostal drains. A guardian suture was placed to keep neck flexed. When the procedure was complete, all the infusions were stopped and patient reversed. Patient was awake obeying commands and was pain free, and was extubated uneventfully. Total surgical procedure took 7 hours and duration of one lung ventilation was 5 hours. There were no major hemodynamic alterations during entire period of one lung ventilation. Patient was shifted to ICU for further management on Hudson's mask at oxygen 3L/min. For post-operative analgesia, Inj. Paracetamol 1 gm TDS, Inj. Ropivacaine 0.125 % @ 6 ml/hr through SAP Catheter, Inj. Fentanyl 25 microgram SOS was given. Only 2 rescue dosage of fentanyl were required till post-operative day (POD)-3. ICU course was uneventful. SAP Catheter was removed on POD3. Patient was discharged from ICU on POD 4. Subsequently, all ICDs and chest drain were removed and patient was discharged from ward on POD-11.

Discussion

Primary tracheal neoplasms are relatively uncommon. Most of the primary tracheal neoplasms are malignant, generally squamous cell carcinomas or adenoid cystic carcinomas and comprise 75% of all the tumors of trachea [4]. Tracheal resection and reconstruction with primary anastomosis is the preferred definitive treatment for tracheal neoplasms [2]. Anesthetic management for tracheal resection is distinctive because of problems of airway diameter narrowing and the need to maintain adequate ventilation during the perioperative period [5]. Therapeutic bronchoscopy with laser vaporisation, photodynamic therapy, cryotherapy, endobronchial brachytherapy or stenting are used for coring out endoluminal tumor in cases of unresectable tumors [6].

Anesthesiologist involved in the perioperative care of patients posted for tracheal resection must be familiar of the techniques that allow maximal surgical access to the airway while at the same time ensuring adequate ventilation and oxygenation [7]. In distal tracheal tumors, various techniques have been described like passing the ETT beyond the growth or placing the tip of the ETT above the growth and maintain spontaneous ventilation [8,9]. High frequency jet ventilation, [10] rigid bronchoscopy and removal of the tumor [6], combined use of Fogarty catheter, FOB and ETT [11], laryngeal mask airway [12] and cardiopulmonary bypass (CPB) [13-15]. CPB has many associated problems however, it was kept standby.

In our case, we used Arndt blocker 7 fr which could be negotiated beyond the growth into right main stem bronchus for primary one lung ventilation before transection of trachea and after tracheal opening, a 6.5 mm ID FMT inserted directly into left main stem bronchus to achieve adequate one lung ventilation. The plan was designed to provide maximal surgical access to the trachea as well as to provide adequate ventilation. Intrathecal morphine and surgeon guided serratus anterior plane catheter was placed to facilitate post-operative analgesia.

Conclusion

We are reporting an alternative way of airway and analgesia management in patients with lower tracheal tumors in which we used arndt blocker for securing the airway before the transection of trachea and to provide one lung ventilation and direct in-field endobronchial intubation with small sized cuffed flexometallic tube for maintenance of ventilation after the transection of trachea in patients. We used

intrathecal morphine and local anesthetic infusion through surgeon guided serratus anterior plane catheter for post-operative analgesia.

Good and effective communication and cooperation between the surgeon and the anesthesiologist are essential for a successful outcome. However, the anesthesiologist should be ready with an alternative plan in case of failure.

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