

A case report: Anaesthetic management of intratracheal tumor for rigid bronchoscopy and mechanical coring

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Citation this Article: Dr. Ashok Sehgal, Dr. Garima Anant, Dr. Asha Sharma, “A case report: Anaesthetic management of intratracheal tumor for rigid bronchoscopy and mechanical coring”, IJMSIR- January - 2022, Vol – 7, Issue - 1, P. No. 411– 415.

Type of Publication: Case Report

Conflicts of Interest: Nil

Abstract

Patients with tracheal tumor can present with catastrophic airway obstruction. Interventional bronchoscopy is generally reserved for patients with emergent airway obstruction. We report a case of a 72year old male patient, who presented with severe respiratory distress due to obstruction caused by intratracheal mass and its anaesthetic management, during rigid bronchoscopy and further mechanical coring of the intratracheal mass. Careful preoperative evaluation of the site and degree of obstruction, intraoperative communication between surgeon and anaesthetist, vigilant intraoperative hemodynamic monitoring with tailored anaesthetic management and postoperative care help to avoid difficulties and complications associated with these cases.

Keywords: Airway obstruction, Rigid bronchoscopy, Mechanical debulking, Intratracheal tumor, ventilation during bronchoscopy.

Introduction

Central airway (trachea and mainstem bronchi) tumors are a common cause of airway obstruction with the most common tumor being bronchogenic carcinoma¹. Patients with tracheal tumor can present with catastrophic airway obstruction. Interventional bronchoscopy is the mainstay of diagnosis and staging of tracheal neoplasm whereas therapeutic bronchoscopy is generally reserved for patients with emergent airway obstruction. There are many challenges in the anaesthetic management during rigid bronchoscopy and coring of tumor for relieving airway obstruction caused by intratracheal tumor such as difficulty in ventilation, securing the airway, sharing of airway with the surgeon and controlling seepage of blood and tumor tissues distally into the tracheobronchial tree during resection. We report a case of a 72year old male patient, who presented with severe respiratory distress due to obstruction caused by intratracheal mass and its

anaesthetic management during rigid bronchoscopy and further mechanical coring of intratracheal mass.

Case presentation

72year old male patient, chronic smoker, a known case of COPD for the last 20 years, on bronchodilators and steroid metered dose inhalers, presented with chief complaints of difficulty in breathing for the last one year which was insidious in onset, gradually progressive, aggravated in lying down position and relieved upon sitting, and is now worsened to the point where the patient is unable to carry out daily routine activities. From last two weeks, difficulty in breathing is associated with harsh whistling sounds, and feeling of something obstructing the airway. There was associated cough with blood-stained sputum for the last two weeks.

On general physical examination, patient was conscious, oriented with audible stridor. Blood pressure =138/78mmHg, respiratory rate = 26 / min, pulse rate = 90/min and room air $spO_2 = 88 \%$. Chest examination revealed bilateral wheeze. Laboratory investigations included hemoglobin of 13.6 g/dl, white blood count - 9400 mm^3 , differential leucocyte count - N75/L18/M7/E0, platelet count - 2.3×10^6 , blood urea – 23 mg/dl, serum creatinine - 0.6 mg/dl. Chest X-ray(fig.-1) was suggestive of COPD changes and ECG suggestive of sinus tachycardia.

HRCT chest (fig.-2) revealed polypoidal growth in the upper part of proximal trachea in left anterolateral aspect with moderate to severe luminal narrowing. Emphysematous changes noted in both lungs with cyst in right middle lobe and a bulla in left lower lobe. Pulmonary function tests could not be done as patient had severe symptoms. For definitive as well as symptomatic relief, patient was scheduled for emergency rigid bronchoscopy and debulking of tumor.

After obtaining informed written high-risk consent, patient was accepted for procedure under ASA -III 'E'. In the operating room, fiberoptic scope, small sized endotracheal tubes (of sizes 4,5 and 6) and equipment for tracheostomy were kept ready (in case of failed ventilation at any point during the procedure). Standard ASA monitors were attached. A 16G intravenous line was secured in the left hand and slow crystalloid fluid infusion was started. Preoperative preparation included injection glycopyrrolate 0.2 mg i/m, nebulization with lignocaine 4% and salbutamol, injection dexamethasone 8mg i/v, injection hydrocortisone 100 mg i/v. After adequate preoxygenation, induction of anesthesia with intravenous injection fentanyl 100 mcg and titrated doses of injection propofol was done. After confirmation of ease of ventilation with face mask, injection succinylcholine 75mg was given to facilitate neuromuscular blockade. A rigid bronchoscope (Karl Storz size 6) was introduced and manual ventilation was continued via the side port of the bronchoscope by connecting it to the anaesthesia breathing circuit. Boluses of injection propofol 20 mg were given subsequently.

A bleeding ulcerated tracheal mass was localized and bronchoscope could be negotiated beyond the growth (fig.3) and it was possible to ventilate the lungs. After that muscle relaxation was achieved with a bolus dose of intravenous injection of atracurium 25 mg and subsequent anaesthesia was maintained with sevoflurane, oxygen and manual positive pressure ventilation, as well as boluses of injection propofol. Biopsy of mass was taken with punch forceps and then debulking of tumor was done by using "core - out technique" followed by retrieval of cored mass with the help of biopsy forceps. After this, a flexible bronchoscope was passed through the rigid bronchoscope to allow suction of blood aspirate

and to instill adrenaline solution and injection tranexamic acid at the site of the cored tumor. Adequate hemostasis and patency of trachea was achieved and whole procedure took about 60 minutes for completion. All the vital parameters were maintained during this period and patient had no episodes of desaturation. ABG findings were within normal limits (did not reveal any hypoxia and hypercarbia). Bronchoscope was taken out and airway secured using cuffed endotracheal tube of size 7.5 mm ID and tube's cuff was positioned in a such a way so as to achieve tamponade effect of cuff over the excised mass. Patient was shifted to intensive care unit for elective ventilation. Airway extubation was done in ICU after 4 hours of admission and patient improved symptomatically, had no dyspnea in lying position or otherwise and was maintaining oxygen saturation of 98-99% on room air. Patient was then shifted to ward on second post operative day.



Fig 1: Chest x ray



Fig 2: HRCT chest revealed severe luminal narrowing. Emphysematous changes noted in both lungs with cyst in right middle lobe and a bulla in left lower lobe.



Fig 3: Negotiated bronchoscopes beyond the growth to visualize trachea lumen.

Discussion

Bronchoscopy is the mainstay of diagnosis and staging of tracheal neoplasms⁴. The potential complications associated with bronchoscopic procedures are hypoxemia, hypercarbia, cough, laryngospasm, bleeding, pneumothorax, endobronchial fire, injury to the glottic structures, loss of airway, tracheal rupture, pulmonary barotrauma and cerebral or cardiac air emboli. The incidence of such complications depends upon the skill

of the pulmonologist and ventilatory strategies used during the procedures. Rigid bronchoscope is preferred because it allows more secure control of the obstructed airway and control of any bleeding that may occur following biopsy. It allows “coring out” of an obstructing tumor. Contraindications of rigid bronchoscopy include cervical spine instability, facial trauma, laryngeal obstruction⁵.

The rigid bronchoscope is superior to the flexible bronchoscope in many situations. The rigid bronchoscope provides superior airway control, especially in cases of significant airway bleeding, and in removal of foreign bodies. For emergent central airway obstruction (CAO), rigid bronchoscopy is the airway stabilization procedure of choice¹.

A variety of methods are available for providing adequate oxygenation and ventilation during bronchoscopic procedures such as local anaesthesia, general anaesthesia under spontaneous ventilation or controlled ventilation, manual/high frequency jet ventilation, and tracheostomy.

In our patient stepwise approach for general anaesthesia was followed. After confirmation of adequate face mask ventilation, a short acting muscle - relaxant was given for the introduction of rigid bronchoscope. As and when the pulmonologist was able to negotiate the rigid bronchoscope beyond the growth and able to ventilate the lungs, intermediate acting muscle relaxant was given. Anaesthesia was maintained with inhalational agents along with boluses of propofol and fentanyl as ventilation was interrupted several times during the procedure making it difficult to achieve a certain MAC.

Previous reports on anesthetic management of intratracheal mass show that it is possible to negotiate a rigid bronchoscope beyond the growth and ventilate the patient

manually or with jet ventilation⁶. However, we should always be vigilant and prepared to deal with critical airway obstruction in the worst scenarios. Equipment for jet ventilation, and emergency tracheostomy should always be available. In our case, we had the provision for emergency tracheostomy.

Conclusion

We conclude that coring of mass using a rigid bronchoscope along with optimal hemostasis may be a life-saving procedure in patients with intratracheal tumor with severe respiratory distress. Careful preoperative evaluation of the site and degree of obstruction, intraoperative communication between the surgeon and anaesthetist, vigilant intraoperative hemodynamic monitoring with tailored anaesthetic management and postoperative care helps to avoid difficulties and complications associated with these cases.

Declaration and patient consent

The authors certify that they have obtained all informed written patient consent forms and patient has given his consent for publishing his clinical information and images in the journal.

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