

## A Case of Airway Management for Endotracheal Tumor Resection

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### Abstract

A 60-year-old man admitted with intermittent irritant cough and blood in phlegm for a month. CT revealed that the lower segment of the trachea was thickened with a tumor growing into the cavity. The tumor was located in the lower trachea, just 0.5 cm above the left main bronchial but did not block it. He was undergoing tracheal tumor resection or trachea sleeve resection under general anesthesia. The patient was intubated with a specially lengthened tracheal catheter (40 cm) with 6.5 mm inner diameter. When the operation began, as the patient's position changed, the tumor's position moved to the opening of the left bronchus, making the catheter difficult to enter the left bronchus through the tumor. Then the surgeons opened the lower trachea and attempted to retrograde lead the catheter through the trachea into the left bronchus, but still, it was unsuccessful. The management of anesthesia for tracheal tumor resection is difficult, because airway obstruction and bleeding induced aspiration can occur at any time during intubation and surgery. How to intubate and the choice of surgical approach depends on the tumor's location and the degree of tracheal stenosis. Airway management is the most significant challenge in clinical anesthesia.

**Keywords:** Tumor resection; Tracheal stenosis; Airway management; Dexmedetomidine

### Case Report

A 60-year-old man admitted with intermittent irritant cough and blood in phlegm for a month. He had no airway obstruction even doing exercises, so he did not receive any treatment before went here. The patient had no other medical history. Chest computed tomography (CT) revealed that the lower segment of the trachea was thickened with a tumor growing into the cavity. The largest level of the tumor was 18\*13 mm (IM19), and its length was 28 mm. While through the CT, we noticed that the narrowest part of the trachea was about 7 mm (Figure 1). Other laboratory tests were basically normal. The patient was undergoing tracheal tumor resection or trachea sleeve resection under general anesthesia. The permission for the case report has been gotten from the patient.

After entering the OR, the patient was monitored with non-invasive blood pressure, pulse oximetry, and electrocardiography, and took a left radial artery puncture to monitor arterial blood pressure and blood gas analysis. Dexmedetomidine was given at 0.4 µg/kg intravenously in 10 min, then followed with propofol 50 mg, and the patient breathed easily and had no airway obstruction after being given sedatives. Meanwhile, considering that the bottom of the tumor was wide and with no pedicle, general anesthesia was induced by IV sufentanil 20 µg, etomidate 15 mg, rocuronium 50 mg and propofol 50 mg, each administered in turn. The patient was then intubated with a specially lengthened tracheal catheter with 6.5 mm inner diameter (Figure 2), and the depth of intubation was 22 cm. To provide a better sedative condition, we administered dexmedetomidine during the operation [1].

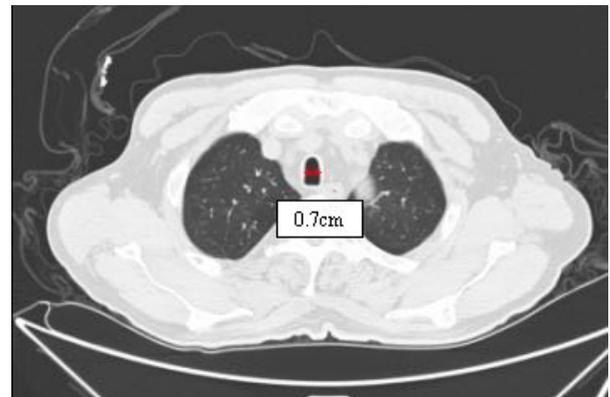


Figure 1: The narrowest part of the trachea.

Through the fiberoptic bronchoscope, we observed that the tumor, which was not easy to bleed, was growing into the soft texture cavity. It was located in the lower trachea, just 0.5 cm above the left main bronchial but did not block it (Figure 3). The bronchoscope was successfully introduced into the left bronchial when the patient was in the supine position. When the operation began, the patient was in the left lateral decubitus position. We used the bronchoscope to locate the tumor after right thoracotomy, and intended to feed the tracheal catheter into the left bronchus to avoid blood entering left lung. However, as the patient's posture changed, the tumor's position moved to the opening of the left bronchus (Figure 4), which making it difficult to enter the left bronchus through the tumor. After several attempts, we still failed to intubate, so the surgeons opened the lower trachea, attempting to retrograde lead the catheter through the trachea into the left bronchus, but it still failed. As oxygen began to leak form the opening trachea, the SpO<sub>2</sub> dropped, so the surgeons had to cover the

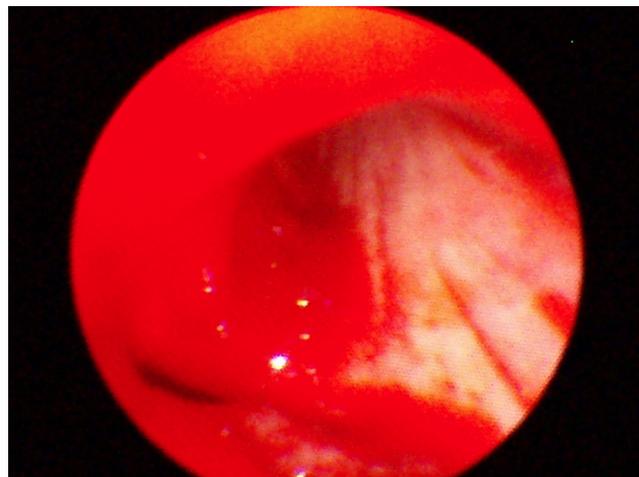
trachea to avoid oxygen leaking, and we began to ventilate the patient intermittently until SpO<sub>2</sub> elevated to a normal level. The surgeons then found that they could see the tumor through the opening of the trachea, and after several attempts, the surgeons successfully removed the tumor through the trachea. While using electrotome, we changed the oxygen to air ventilation. After the operation, the fiberoptic bronchoscope showed that the endobronchial wall was smooth and the tumor was fully removed. The catheter was removed after surgery and the patient returned to the general ward with no complications.



**Figure 2:** A specially lengthened tracheal catheter.



**Figure 3:** In the supine position, the tumor was not block the left bronchus.



**Figure 4:** In the left lateral decubitus position, the tumor moved to the opening of the left bronchus.

## Discussion

The management of anesthesia for tracheal tumor resection is difficult, carrying a high risk in clinical anesthesia. Airway obstruction and bleeding induced aspiration can occur at any time during intubation and surgery. As a result, the anesthetist should be prepared for effective ventilation and meet the surgeon's needs. How to intubate and the choice of surgical approach depends on the tumor's location and the degree of tracheal stenosis [2]. When the stenosis is less than 50%, the patient will be intubated regularly. In cases where it is more than 50%, intubation will depend on the tumor's position. If it is located in the upper trachea, a tracheal incision will be necessary. If it is located in the lower trachea, the catheter is intubated above the tumor [3].

We discussed the case with surgeons preoperatively. Considering that the tumor was located at a lower place, and tracheal stenosis was greater than 50%, we decided to observe the patient in the supine position after administering a light sedative. If any obstruction occurred, slow induction would be taken and the fiberoptic bronchoscope used to feed the catheter to the left bronchus. If this did not happen, as the bottom of the tumor was large and with no pedicle, there would be little chance to obstruct the trachea, furthermore, the patient did not show suffocated after sedation, so we intubated the catheter above the tumor to reduce the time of one-lung ventilation, and then lead the catheter into the left bronchus after opening the chest. Since the surgical approach might call for trachea sleeve resection, we prepared a second catheter for jet ventilation, just in case [4]. The reinforced tracheal catheter is flexible, so it steers around the tumor into the bronchus easily. However, one disadvantage is that the inner diameter did not change. We noticed that the narrowest part of the trachea was about 7 mm, and the consistency of the tumor was soft, so we used the tube with an inner diameter of 6.5 mm. The tube's length was about 30 cm, which was too short for bronchial insertion, so we made two specially lengthened catheters of 40 cm. Because IV dexmedetomidine improves patient's tolerance to bronchoscope, it was used during the operation [1].

The operation went well, with no complications. Even so, the management of the anesthesia had some shortcomings. Because of the muscle relaxants and loss of consciousness, rapid sequence induction was not the most suitable procedure for this patient. If the tumor had pedicle, once airway obstruction occur, we have limited time for airway reconstruction. It has been reported to do tracheal tumor resection under cardiopulmonary bypass [5]. Unfortunately, we were lacking of CPB machine, so we also asked the surgeons to operate carefully and try to avoid massive hemorrhage. Besides, we did suction from the catheter discontinuously to minimize the risk of lung soiling. Moreover, we did not consider the affection of changing the patient's position. In this case, the tumor was next to the knuckle and the opening of the left bronchial. When the patient changed into a lateral decubitus position, the fiberoptic bronchoscope was unable to guide the tube into bronchus. Although this did not affect ventilation, it had an adverse effect on the surgery and the management of anesthesia. In conclusion, airway management is the most significant challenge in clinical anesthesia.

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### Conflicts of Interest

The authors declare no conflict of interest.

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