

## An individualized strategy for a large tracheal neurogenic tumor resection and carina reconstruction

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### Abstract

**Background:** Resection of large tracheal and carinal tumors requires well-designed strategies to reduce anastomotic tension and maintain the continuity of the normal respiratory track.

**Case information:** A 32-year-old man suffered from cough due to a 5 cm tracheal tumor. We removed the tumor completely and applied an individualized method to perform reconstruction.

**Conclusion:** Our surgical treatment in this case could be an optional method and a valuable reference for similar tracheal and carinal tumors in future.

**Keywords:** Tracheal Resection, Hybrid Schwannoma/Perineurioma, Anastomotic Tension

### Introduction

Tracheal and carinal tumors which cause the obstruction of the airway can be managed by endoscopic resection, chemo-radiotherapy, tracheal stent and surgical resection. However, surgical treatment is the major choice of the patients, which requires individualized strategies based on the location and the size of the tumor, as well as its extent of involvement [1-2]. The main principles include i) reducing anastomotic tension to avoid anastomotic leakage, ii) maintaining the continuity of the airway to preserve normal blood supply and ciliary function. iii) selecting appropriate materials to embed the anastomosis. Here, we report a case of resection of a large trachea tumor and airway reconstruction in our center.

### Case Report

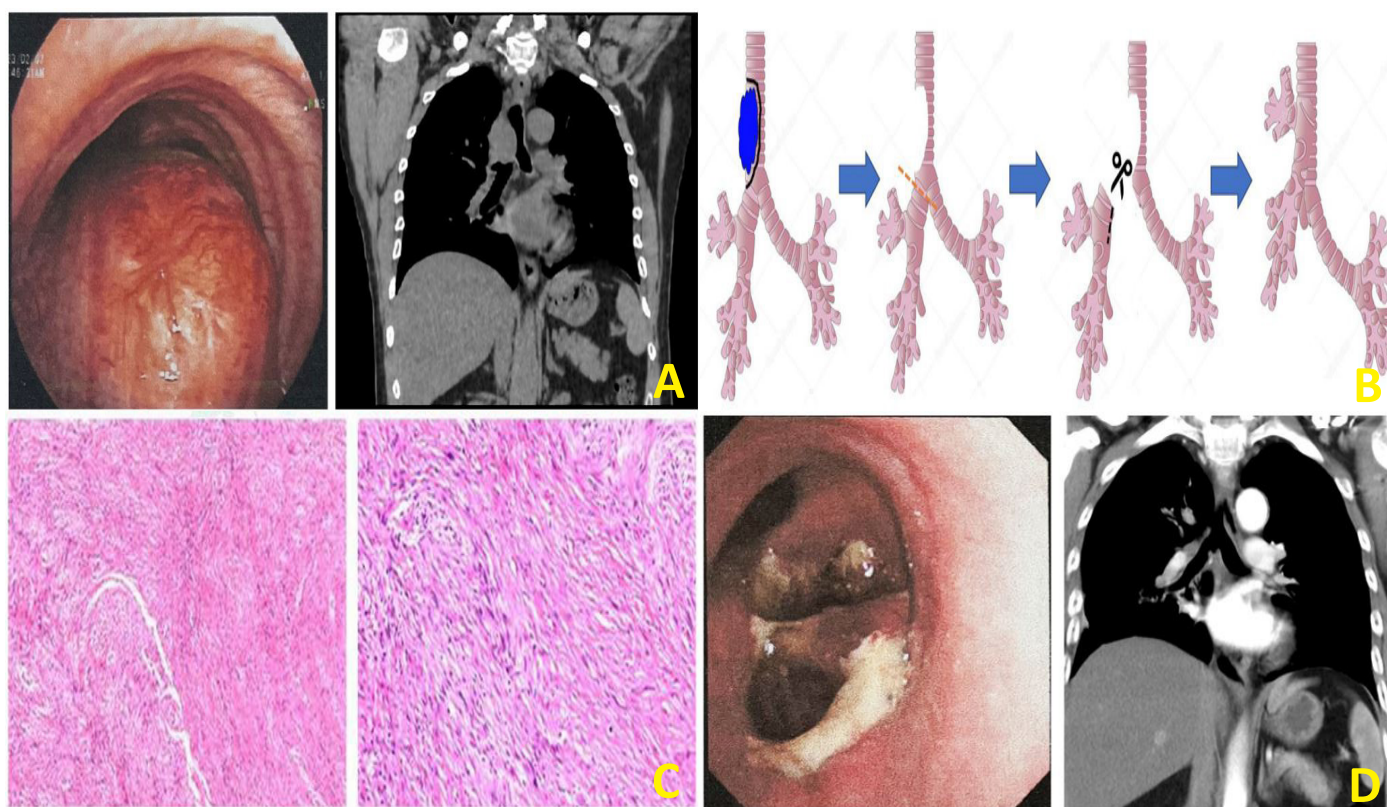
A 32-year-old male patient was admitted to the hospital due to cough for more than four years. Chest CT with three-dimensional reconstruction and fiberoptic bronchoscopy revealed a tumor with a length of 5 cm on the right side of the lower trachea near the carina, which almost blocked the opening of the right main bronchus (Figure 1 A). The esophagus was not involved by the tumor according to endoscopic ultrasound examination. Considering that the tumor only affected the right wall of the lower part of trachea, as well as the mobility of the

left main bronchus was limited, we adopted an individually designed airway reconstruction method (Figure 1B), which could balance completed tumor removal and feasible anastomotic tension.

After the general anesthesia, the patient lied on the left side. A 15 cm incision was made through the fifth intercostal space. Then, the azygos vein was severed, the lower lung ligament was dissociated, and the right hilum was fully freed in the pericardium. The tumor was excised on the premise of ensuring completed resection with preservation of the left wall of the trachea. The right main bronchus was severed at the carina and cut along the direction of the middle segment of the bronchus to match the tracheal defect. We used interrupted horizontal mattress eversion sutures to anastomose the formed right main bronchus and trachea to reduce anastomotic tension, then applied continuous sutures to reinforce the anastomosis. Then, the autogenous pericardium was used to embed the surface of the anastomosis. At last, the incision was sutured. The patient was hospitalized for 10 days after the surgery without any complications. Postoperative pathology showed a neurogenic tumor called hybrid Schwannoma/perineurioma (Figure 1C). After 3 months of follow-up by CT and bronchoscopy, the anastomosis was unobstructed, without tumor recurrence (Figure 1D).

The postoperative complication rate and mortality rate are high after trachea and carina reconstruction surgery, and a

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**Figure 1:**

A. Reoperative images of bronchoscopy (left) and 3D reconstruction of CT scan (right).

B. Schematic diagram of reconstruction.

C. HE stained sections of the tumor (10 $\times$ ).

D. Postoperative images of bronchoscopy (left) and 3D reconstruction of CT scan (right).

reasonable surgical plan is crucial [3]. The patient visited several hospitals in last two years, but none of them provided him a feasible surgical plan due to the excessive tension at the anastomosis which might make it difficult to complete airway reconstruction after long-segment tracheal resection. In our case, fully releasing the right hilum in the pericardium let the right lung be lifted completely to reduce the anastomotic tension [4]. In addition, interrupted horizontal mattress eversion was used to suture trachea and bronchi which had uneven thickness, to reduce the tension at the anastomosis. Meanwhile, we used continuous sutures to make the anastomosis more secure. The left wall of the lower trachea and the left main bronchus retain complete continuity in this case, which not only ensures blood supply and avoids denervation, but also preserves the normal ciliary function of the trachea to promote expectoration. [5] Autogenous pericardium, which even could be used for tracheal defect closure [6], covered around the anastomosis was applied to prevent anastomotic leak and avoid serious complications. Hybrid schwannoma/perineurioma is a type of benign nerve sheath tumors, which always distributes in the subcutaneous tissue of the extremities and the trunk [7]. Tracheal hybrid schwannoma/perineurioma was firstly reported in our case.

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