

## Endotracheal Surgery for Leiomyoma of the Trachea

Masahiko Sugiyama, MD,<sup>1</sup> Ichiro Yoshino, MD,<sup>2</sup> Fumihiro Shoji, MD,<sup>1</sup> Motohiro Hamatake, MD,<sup>1</sup> Tomofumi Yohena, MD,<sup>1</sup> Atushi Osoegawa, MD,<sup>1</sup> and Yoshihiko Maehara, MD<sup>1</sup>

**A 61-year-old male was found to have a tracheal tumor, which was noted at the time of screening by a chest X-ray study. The tumor arose from the membranous portion 4 cm above the carina and was proven by biopsy to be a leiomyoma. Because the disease is a benign tumor, all methods for resection, including bronchoscopic techniques, were thus considered. We performed an endotracheal operation via a window made by an incision of the cartilaginous portion, and removed the tumor through an anterior approach. This type of endotracheal operation is one of the surgical procedures for the removal of benign tracheal tumors. (Ann Thorac Cardiovasc Surg 2009; 15: 206–208)**

**Key words:** tracheal tumor, surgery, mediastinoscope

### Introduction

Tumors of the trachea are relatively rare with a morbidity of 0.04 per 100,000 population, and 90% of tracheal tumors in adult U.S. citizens are malignant.<sup>1)</sup> Reports of tracheal leiomyoma are even less common and account for approximately 1% of all tracheal tumors.<sup>2–5)</sup> Because a bronchial leiomyoma is a benign entity that causes a critical condition, a tracheal sleeve resection is standard treatment. Alternatively, endoscopic extirpation is performed when the tumor is small. We herein present a novel technique for performing a tracheal tumor resection that minimizes the possible operative risk.

*From <sup>1</sup>Department of Surgery and Science, Graduate School of Medical Sciences, Kyushu University, Fukuoka; and <sup>2</sup>Department of Thoracic Surgery, Graduate School of Medicine, Chiba University, Chiba, Japan*

Received November 9, 2007; accepted for publication April 9, 2008

Address reprint requests to Masahiko Sugiyama, MD: Department of Surgery and Science, Graduate School of Medical Sciences, Kyushu University, 3–1–1 Maidashi, Higashi-ku, Fukuoka 812–8582, Japan.

©2009 The Editorial Committee of *Annals of Thoracic and Cardiovascular Surgery*. All rights reserved.

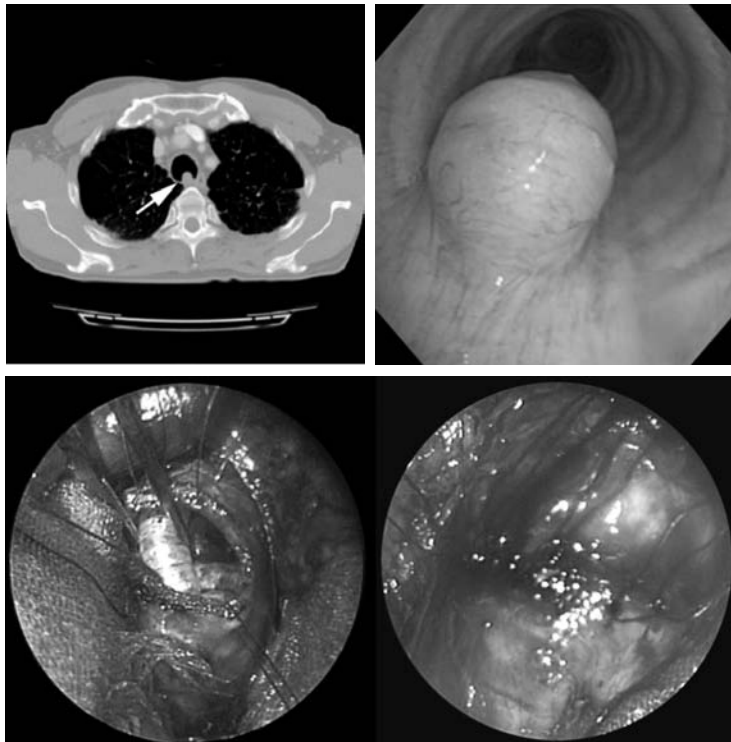
### Case Report

A 61-year-old male was found to have an abnormal chest X-ray during a screening examination, presented as an opacity in the trachea, and a chest computed tomography (CT) revealed a tracheal tumor measuring 16 mm. It was a smoothly shaped, well-margined, uniformly dense, and small contrast-enhanced mass, but it had a broad base at the membranous portion (Fig. 1A).

A bronchoscopic examination showed a smooth sessile tumor arising from the membranous portion of the trachea located 9 cm below the vocal cord and 4 cm above the carina. Microvessels were noticed at the surface of the tumor (Fig. 1B). A biopsy revealed a leiomyoma.

Because of the usual history of a tracheal leiomyoma, namely, its tendency to grow rapidly until it occupies the entire trachea, and also the broad base of the tumor, a surgical resection was thus indicated.

Under general and epidural anesthesia, a flexible endotracheal tube was inserted, and the tip was placed just above the tumor under fiber-optic bronchoscopic guidance. A median incision was performed, followed by a median sternotomy. The left brachiocephalic vein was taped, and the anterior pericardium was then opened to dissect both the superior vena cava and the ascending



A	B
C	

**Fig. 1.** Radiological and endoscopic findings and intra-operating view.

**A:** Axial view of CT image showing the tracheal tumor (arrow) arising from the membranous wall of the trachea.

**B:** A bronchoscopic examination showed a smooth sessile tumor arising from the membranous wall of the trachea.

**C:** Mediastinoscope of the tracheal anastomosis findings. Left side, transfix cartilage closure from outside the trachea; right side, final view of the tracheal anastomosis.

aorta. The trachea was exposed after dissecting the paratracheal tissue. The esophagus was not compressed by either the tumor or the trachea.

At the beginning of the operation, a balloon cuff was placed at the proximal side of the tumor. Before opening the tracheal lumen, we pushed the tube forward to the side of the tumor, and a balloon cuff was then placed at the distal side of the tracheal tumor without injury to the tumor.

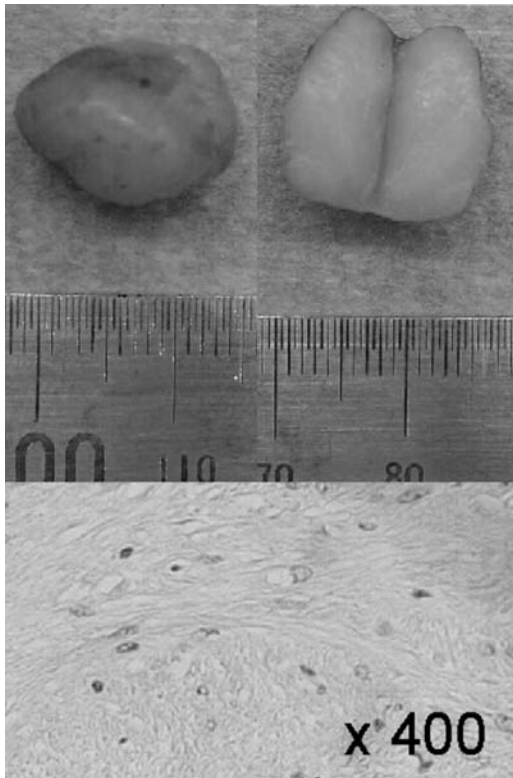
The cartilagenous portion of the trachea was incised transversely just above the tumor, approximately half of the cartilagenous portion in length, after ascertaining the tumor location by intraoperative bronchoscopy. The endotracheal tube was advanced to the carina before the resection was started. A mediastinoscope in the operative field provided a fine endotracheal view, which made the surgical procedures easy to perform. The tumor was extirpated via the cartilagenous window. The defect of the membranous portion was directly sutured with 6-0PDS. The incised tracheal cartilage was sutured by 4 interrupted sutures of 4-0PDS. After achieving adequate hemostasis and an airtight tracheal repair, we covered the anastomosis with a pedicled thymic graft. The thoracic wound was closed in layers with the opened sternum wired. The patient was extubated soon after the opera-

tion. Macroscopically, the tumor was well encapsulated and measured  $15 \times 8$  mm. Histopathology proved it to be a leiomyoma, which consisted of spindle-shaped cells proliferating in an interlacing pattern (Fig. 2).

The postoperative course was uneventful. To protect the trachea, neck extension was restricted until postoperative day 7. A bronchoscopic inspection on that day revealed satisfactory conditions of both wounds of the cartilagenous and membranous portions of the trachea. The patient was discharged and allowed to go home on postoperative day 12. He is doing well and has no complications at 11 months after surgery.

## Discussion

Among the tracheal neoplasms, a tracheal leiomyoma is a rare disease.<sup>6)</sup> Clinically, the patients often complain of dyspnea, wheezing, stridor (symptoms of upper-airway obstruction), cough, and hemoptysis resulting from mucosal irritation and ulceration. Frequently, patients are initially diagnosed to have either asthma or chronic bronchitis. The bronchial leiomyoma usually arises from smooth muscle cells of the membranous portion of the trachea. In general, drug treatments have not been effective. A resection of the tumor, including an endoscopic



**Fig. 2.** Macroscopic and microscopic findings of the tumor. Macroscopically, the tumor was well encapsulated, measuring 15 × 8 mm (upper). Histopathology of the mass proved it to be a leiomyoma consisting of spindle-shaped cells proliferating in an interlacing pattern (lower).

resection, is the only aim of this treatment, since a bronchial leiomyoma results in a critical condition. To date, several different approaches, such as tracheal sleeve resection, carinal resection, endoscopic resection, electrocoagulation, cryotherapy, and Nd-YAG laser ablation,<sup>7,8)</sup> have been reported.

In this case, the tumor was relatively small and asymp-

tomatic, though it had a broad base at the membranous portion. Therefore endoscopic approaches were avoided. We developed the present approach to minimize operative risk and to achieve satisfactory curability, since a standard tracheal sleeve resection has a risk of anastomotic failure, such as dehiscence or stenosis. An endoscopic resection and ablation of the tumor may also be indicated; however, these approaches are accompanied by such complications as perforation, positive surgical margin, lost removed tumor, and occasionally an intratracheal explosion. In conclusion, we advocate that the endotracheal approach is a safe and effective procedure for a resection of benign tracheal tumors.

## References

1. Macchiarini P. Primary tracheal tumors. *Lancet Oncol* 2006; **7**: 83–91.
2. Borski TG, Stucker FJ, Grafton WD, Nathan CO. Leiomyoma of the trachea: a case report and a novel surgical approach. *Am J Otolaryngol* 2000; **21**: 119–21.
3. Tamura M, Murata T, Kurumaya H, Ohta Y. Leiomyoma of an accessory tracheal bronchus. *Ann Thorac Surg* 2004; **78**: 2163–5.
4. Sagawa M, Inoue K, Sato M, Matsumura Y, Kubo H, et al. Successful resection of endotracheal papillary adenocarcinoma by endoscopic electrocautery using a new snare: report of a case. *Surg Today* 1999; **29**: 570–2.
5. Gaissert HA, Grillo HC, Shadmehr MB, Wright CD, Gokhale M, et al. Uncommon primary tracheal tumors. *Ann Thorac Surg* 2006; **82**: 268–73.
6. Grillo HC. Primary tracheal tumors: treatment and results. *Ann Thorac Surg* 1990; **49**: 69–77.
7. Hooper RG, Jackson FN. Endobronchial electrocautery. *Chest* 1985; **87**: 712–4.
8. Homasson JP, Renault P, Angebault M, Bonniot JP, Bell NJ. Bronchoscopic cryotherapy for airway strictures caused by tumors. *Chest* 1986; **90**: 159–64.