

Primary Adenocarcinoma of the Trachea Resected Using Percutaneous Cardiopulmonary Support (PCPS)

Hiroshige Nakamura, MD, PhD,¹ Yuji Taniguchi, MD, PhD,¹ Ken Miwa, MD, PhD,¹ Yoshin Adachi, MD,¹ Shinji Fujioka, MD,¹ Satoshi Kamihira, MD, PhD,² Shingo Ishiguro, MD, PhD,² and Yasushi Horie, MD, PhD³

We encountered one very rare case of primary adenocarcinoma of the trachea. The patient was a 72-year-old woman who was hospitalized immediately following significant dyspnea and mental confusion. A computed tomography scan of her chest revealed a 14×13×11 mm tumor in the trachea. After establishing artificial respiration, a tracheal tubular resection was immediately performed using percutaneous cardiopulmonary support (PCPS). A postoperative pathological examination led to the patient being diagnosed with primary adenocarcinoma of the trachea, and she was treated with adjuvant chemotherapy. Since then, for approximately 1 year and 6 months we have detected no relapse. (Ann Thorac Cardiovasc Surg 2007; 13: 338–340)

Key words: tracheal cancer, adenocarcinoma, percutaneous cardiopulmonary support

Introduction

Adenocarcinoma is extremely rare among tracheal cancers, and it is said to account for approximately 4–10% of the total cases of tracheal cancer.^{1–4} We experienced an emergency patient hospitalized with dyspnea as her major complaint, which turned out to be a case of tracheal adenocarcinoma for which we performed a tubular resection using percutaneous cardiopulmonary support (PCPS). We herein describe this case in relation to some bibliographic references.

Case Report

A 72-year-old woman who had been undergoing treatment for bronchial asthma was admitted to our hospital as an emergency inpatient with significant dyspnea and wheezing. She had been fighting diabetes for 40 years and had also suffered from colon cancer (noninvasive

carcinoma) 12 years previously. She had no history of smoking. A blood gas analysis showed a value of PCO₂ 72.1 torr, which confirmed hypercapnia, and the patient was also in a state of mental confusion. Thereafter we detected a 15 mm tumor on the right side of the tracheal wall, approximately 2 cm above the tracheal bifurcation and partially protruding outside the tracheal wall (Fig. 1). We immediately conducted endotracheal intubation and administered artificial respiration. We then performed a bronchoscopic examination, which showed the tumor to have an irregular surface, clear border, and a tendency to bleed easily; furthermore, the tumor was obstructing 90% of the trachea. A localized tracheal tumor was diagnosed that progressed over the tracheal wall, and emergency surgery as a radical treatment was performed. First, cannulation of the femoral artery and vein was performed in the right groin area, and after PCPS was prepared, a posterolateral incision was made in the lower-left decubitus followed by a thoracostomy of the fourth intercostal space; the azygos vein was then severed to expose the trachea. We detected no spreading of the tracheal tumor into surrounding areas. After the periphery was incised, a cannulation of the left bronchus was performed from the operative field; however, because hypoxemia by obstruction occurs, resulting from coagulation in the peripheral bronchi, we performed PCPS auxiliary circulation by re-

From ¹Division of General Thoracic Surgery, ²Second Department of Surgery, and ³Department of Clinical Laboratory Medicine, Tottori University Hospital, Yonago, Japan

Received December 4, 2006; accepted for publication July 2, 2007
Address reprint requests to Hiroshige Nakamura, MD, PhD:
Division of General Thoracic Surgery, Tottori University Hospital,
36-1 Nishi-cho, Yonago, Tottori 683-8504, Japan.

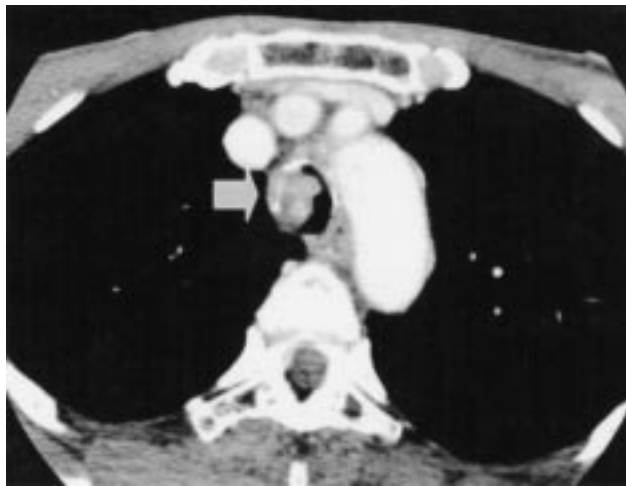


Fig. 1. Chest enhanced computed tomography showed an almost completely obstructive tracheal tumor with a heterogeneous enhancement. Mediastinal lymph node swelling was not detected.

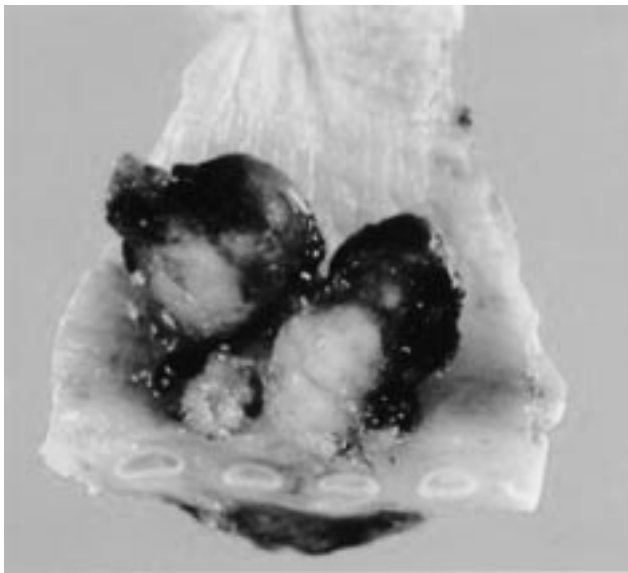


Fig. 2. The cut surface of the resected tumor specimens after formalin fixation. Bilateral surgical margins were negative based on microscopic findings.

moving blood from the femoral vein and conveying it to the femoral artery. The patient recovered from hypoxemia, and after we performed the tracheal tubular resection, the ends were anastomosed with 3-0 PDSII. Because there was no lymph node swelling in the operative findings, lymph node dissection was not performed. The resected portion of the trachea measured 2.0 cm, with 4.5 cartilaginous rings, and a tumor size of 14×13×11 mm (Fig. 2). Although the patient did have a history of

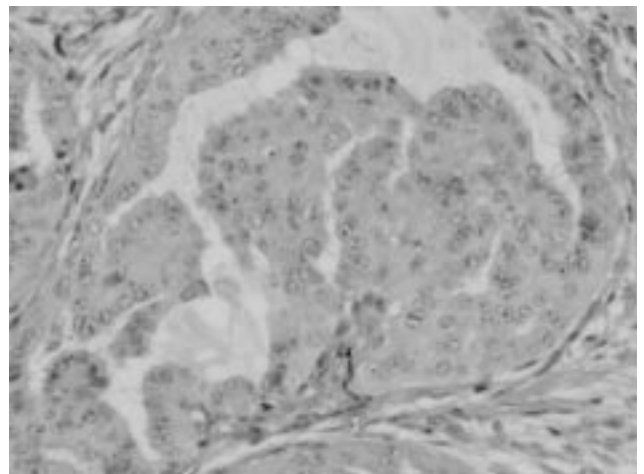


Fig. 3. Histopathologic findings showed primary tracheal adenocarcinoma (hematoxylin and eosin stain).

noninvasive colon carcinoma, a final pathological examination led to her being diagnosed with primary adenocarcinoma of the trachea because the cytoplasmic characteristics and breeding pattern were clearly different from her previous case, showing well-differentiated adenocarcinoma. The tumor cells had spread beyond the tracheal cartilage, but the resection stump was negative (Fig. 3). The postoperative prognosis was good, and there were no distant metastases on whole body examination. We treated her with adjuvant chemotherapy, and for approximately 1 year and 6 months we have detected no relapse.

Comments

The percentage of primary tracheal cancers among malignant cancers of the airway is less than 0.2%,²⁾ and within this 0.2% it is reported that 18–33% of such cases are squamous carcinoma, 3–55% are adenoid cystic carcinoma, and 4–10% are adenocarcinoma.¹⁻⁵⁾ The percentage of patients who are smokers is high at 79–86%, and though the correlation between smoking and primary tracheal cancer has been pointed out,^{3,4)} in this case the patient was a nonsmoker. Since the symptoms include a narrowing of the airway, many patients suffer from dyspnea, which is intensified especially at night and in the decubitus position.¹⁻⁵⁾ It was also reported that in 22 of 107 cases (21%),⁵⁾ patients had progressive bronchial asthma and were undergoing treatment, as in the present case; therefore, precautions may need to be taken. It is also recommended that a computed tomography (CT) scan be performed where dyspnea and wheezing is apparent, since it is difficult to detect the affected area by chest radiography. When primary tracheal cancer is being treated, radiation therapy,⁶⁾ a surgical resection,⁷⁾ and endoscopic laser stents⁸⁾ are usually employed. There have been several studies reporting that radiation therapy is effective for squamous carcinoma; however, the effectiveness of this treatment for adenocarcinoma remains unknown. Long-term survival of patients has been reported only when surgical resection was possible,⁹⁾ and this suggests that at this time a surgical resection is the most effective treatment compared with the palliative endoscopic therapy and that, as in this case, aggressive resection is significant. In terms of surgical techniques, a tracheal tubular resection is performed, and when patients suffer hypoxemia or hypercapnia, a use of the PCPS support system is considered relatively simple and safe.¹⁰⁾ One disadvantage of PCPS is bleeding because of sys-

tematic heparinization; however, with established techniques such as tracheal reconstruction, bleeding is not an issue, and we suggest that it is important to perform surgery in a stabilized respiratory state. Primary adenocarcinoma of the trachea is a disease with a poor prognosis; however, it is crucial to carry out therapy involving a combination of modalities, primarily including an early diagnosis through chest CT and a surgical resection.

References

1. Li W, Ellerbroek NA, Libshitz HI. Primary malignant tumors of the trachea. A radiologic and clinical study. *Cancer* 1990; **66**: 894–9.
2. Hajdu SI, Huvos AG, Goodner JT, et al. Carcinoma of the trachea. Clinicopathologic study of 41 cases. *Cancer* 1970; **25**: 1448–56.
3. Gelder CM, Hetzel MR. Primary tracheal tumours: a national survey. *Thorax* 1993; **48**: 688–92.
4. Licht PB, Friis S, Pettersson G. Tracheal cancer in Denmark: a nationwide study. *Eur J Cardiothorac Surg* 2001; **19**: 339–45.
5. Houston HE, Payne WS, Harrison EG Jr, et al. Primary cancers of the trachea. *Arch Surg* 1969; **99**: 132–40.
6. Fields JN, Rigaud G, Emami BN. Primary tumors of the trachea. Results of radiation therapy. *Cancer* 1989; **63**: 2429–33.
7. Grillo HC. Surgical approaches to the trachea. *Surg Gynecol Obstet* 1969; **129**: 347–52.
8. Shapshay SM, Dumon JF, Beamis JF Jr. Endoscopic treatment of tracheobronchial malignancy. Experience with Nd-YAG and CO₂ lasers in 506 operations. *Otolaryngol Head Neck* 1985; **93**: 205–10.
9. Gaissert HA. Primary tracheal tumors. *Chest Surg Clin N Am* 2003; **13**: 247–56.
10. Phillips SJ, Zeff RH, Kongtahworn C, et al. Percutaneous cardiopulmonary bypass: application and indication for use. *Ann Thorac Surg* 1989; **47**: 121–3.