

Case Reports

## A Case of Thyroid Cancer Involving the Trachea: Treatment by Partial Tracheal Resection and Repair with a Latissimus Dorsi Musculocutaneous Flap

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A 65 year-old man had undergone left thyroidectomy for thyroid cancer. The cancer had directly invaded the cervical esophagus and trachea and the patient was referred to our hospital for radical resection and reconstruction. Cervical computed tomography showed a mass at the left-posterior wall of the trachea. Cervical esophagectomy, resection of the left half of the trachea (6 × 3 cm) including seven rings and cervical lymph node dissection were performed. The tracheal defect was covered by a latissimus dorsi musculocutaneous flap. The patient did not lose vocal function and remains alive and well 3 years after surgery without any evidence of recurrence. Latissimus dorsi muscle flap coverage of tracheal defects seems to be a useful technique in the combined resection of the trachea.

*Key words: latissimus dorsi musculocutaneous flap – thyroid cancer – tracheal resection – tracheal invasion*

### INTRODUCTION

Advanced thyroid cancers sometimes involve the trachea and cause hemoptysis or dyspnea (1). Patients with cancers extending to the trachea often die of hemorrhage or airway obstruction. Advances in surgical techniques have allowed bronchial reconstruction surgery and radical surgery with extended tracheal resection for advanced head and neck cancer, which at the same time preserves vocal cord function (2-5).

We report here a case of advanced thyroid cancer involving the trachea treated by partial tracheal resection and repaired with a latissimus dorsi musculocutaneous flap. The patient remains alive and well without vocal dysfunction 3 years after surgery.

### CASE REPORT

A 65-year-old male patient underwent left thyroidectomy for thyroid cancer. The cancer directly involved the cervical esophagus and tracheal membrane, which was not resectable.

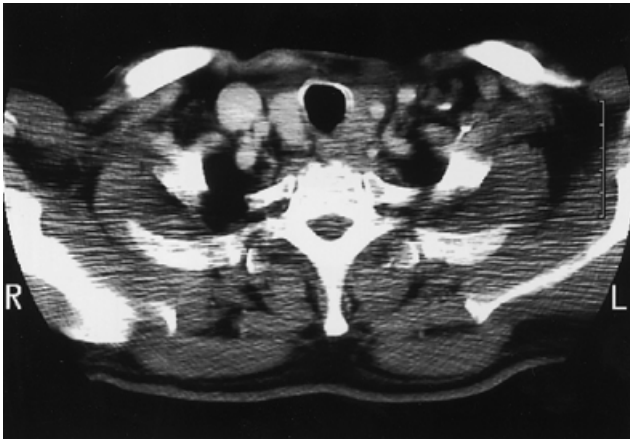
Therefore, the patient was referred to our hospital for radical resection and reconstruction. Histological findings of resected tumor specimens revealed well-differentiated papillary carcinoma of the thyroid.

There were no remarkable clinical findings except for a left neck incisional scar and small and soft enlarged left supraclavicular lymph nodes. There were no abnormal laboratory findings except for slight elevation of CEA and CA19-9.

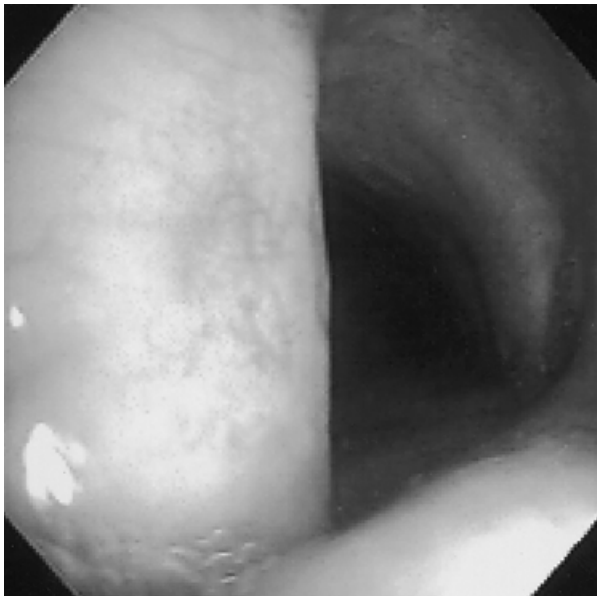
Cervical and chest computed tomography (CT) images demonstrated a mass on the left-posterior wall of the trachea and small lymph nodes in the left supraclavicular region (Fig. 1). Bronchoscopy revealed a tracheal shift to the right side caused by pressure which involved the region distal to the first ring and a whitish and flat elevated lesion at the tracheal membrane measuring 1 × 0.5 cm. The tumor did not invade the mucosal surface of the trachea. The vocal cords appeared normal (Fig. 2). Endoscopy showed a circumferential stenosis at 20 cm from the incisor teeth, without evidence of ulceration, erosion or congestion. A 2 × 1 cm submucosal mass with a slightly irregular and congested surface was noted, but the tumor did not penetrate the mucosa (Fig. 3).

Based on the above findings, the case was classified as T4N1M0, Stage III, and treated surgically. First, a pedicled musculocutaneous flap of the left latissimus dorsi was prepared in the manner of delay of graft placement. Radical

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**Figure 1.** Cervical and chest computed tomography (CT) images demonstrating a mass in the left-posterior wall of the trachea and small lymph nodes in the left supraclavicular region.



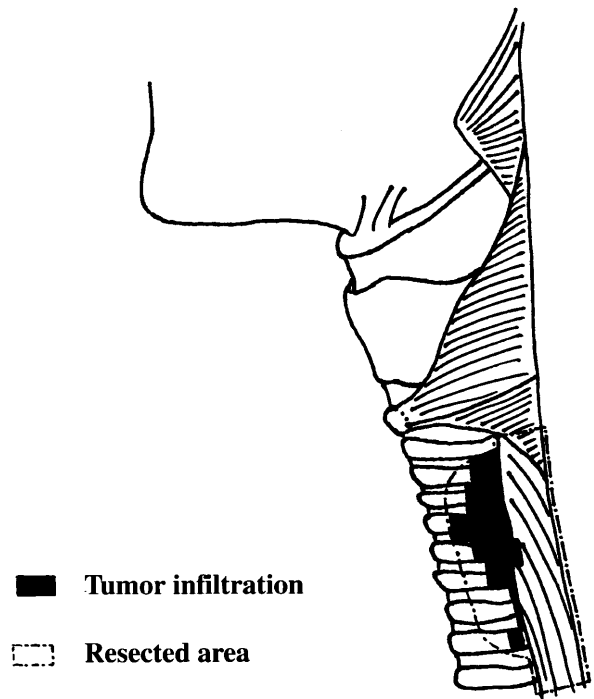
**Figure 2.** Bronchoscopy revealed a tracheal shift to the right side and a whitish plated elevation at the tracheal membrane.

operation was performed 1 week later. No macroscopic residual cancer could be found but intraoperative frozen sections of the trachea and esophagus revealed cancer infiltration. The right recurrent laryngeal nerve was preserved and the left half of the trachea (6 × 3 cm) was resected including seven rings together with the left recurrent laryngeal nerve (Fig. 4). Cervical esophagectomy and cervical lymph node dissection were performed and the esophagus was reconstructed using the right ileo-colon. The tracheal defect was covered with the musculocutaneous flap (Fig. 5). To avoid tracheal stenosis, the anterior side of the defect was left open and a stent tube was kept in place.

The tumor mass could not be detected macroscopically, even in the resected specimen (Fig. 6). Histopathological examina-

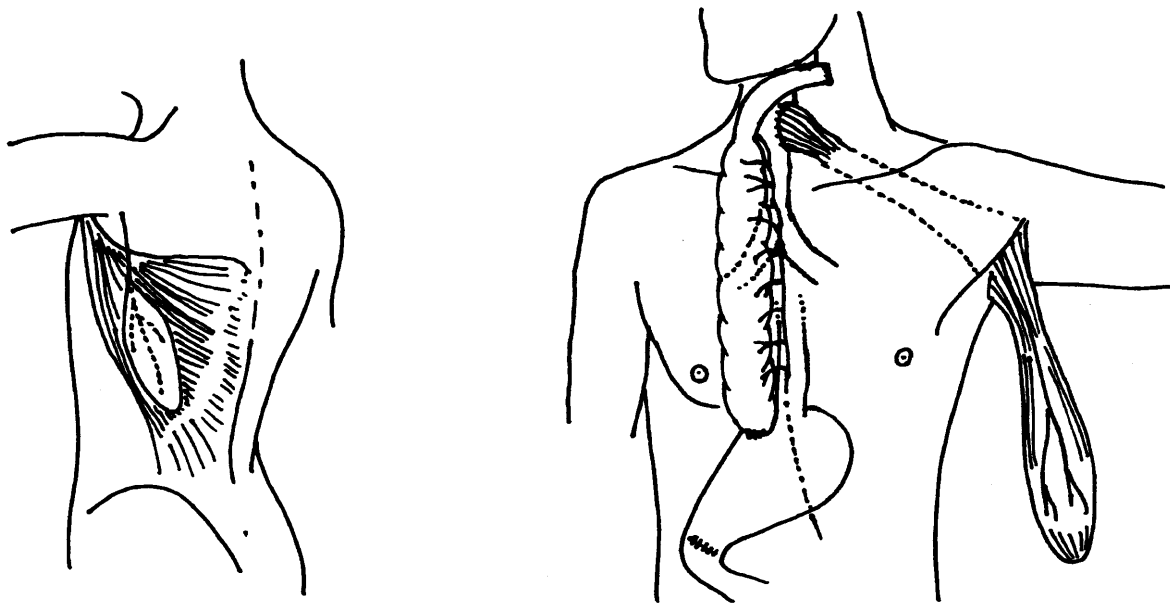


**Figure 3.** Endoscopy revealed a circular stenosis 20 cm from the incisor teeth. Note the presence of a submucosal mass with an irregular congested surface and the lack of mucosal invasion.

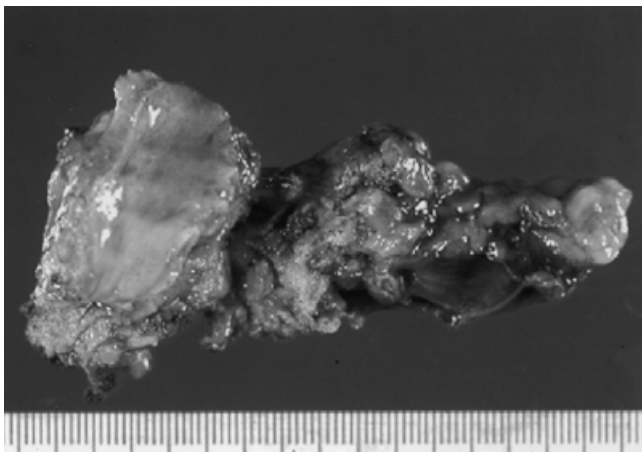


**Figure 4.** The right recurrent laryngeal nerve was preserved and the left half of the trachea (6 × 3 cm) was resected including seven rings, together with the left recurrent laryngeal nerve.

tion showed invasion of a papillary tumor into part of the resected esophagus (Fig. 7a), most of the resected trachea (Fig. 7b) and surrounding tissues. However, the edge of the specimen was free from cancer. Three of the five harvested paratracheal lymph nodes and one of eight upper medial deep



**Figure 5.** Cervical esophagectomy and cervical lymph node dissection were performed and reconstructed using the right ileo-colon. The tracheal defect was covered with the musculocutaneous flap.

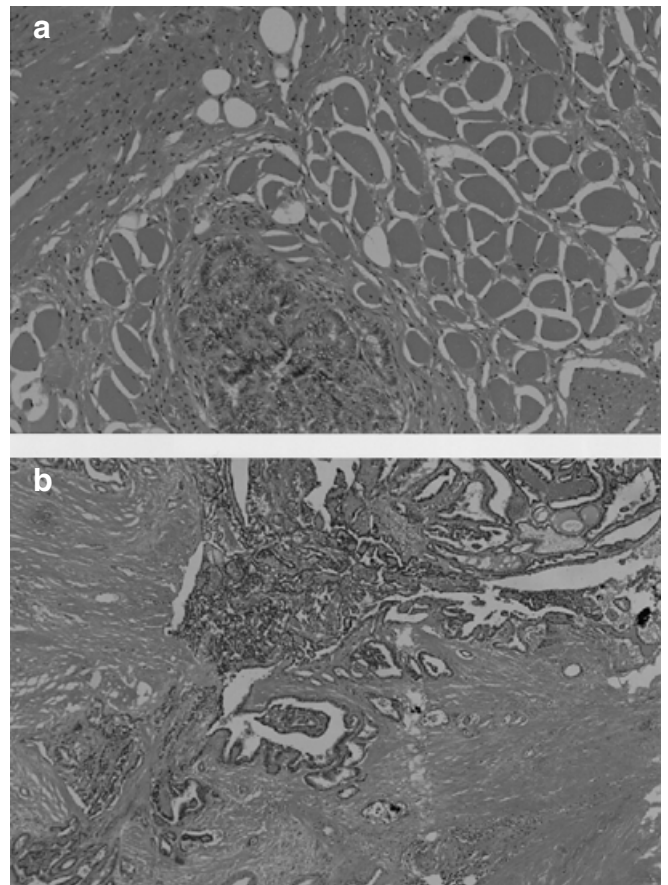


**Figure 6.** In the resected specimen, no tumor mass could be detected macroscopically.

cervical lymph nodes showed metastatic infiltration. Although respiratory support was required over a long period (42 days) after surgery, the patient recovered satisfactorily without laryngeal dysfunction. The remaining defect in the anterior of trachea was closed without any additional procedure. Post-operative bronchoscopy revealed a white-coated part in the tracheal mucosa but no stenosis (Fig. 8). The patient remains alive and well 3 years after surgery without any evidence of recurrence or complaints.

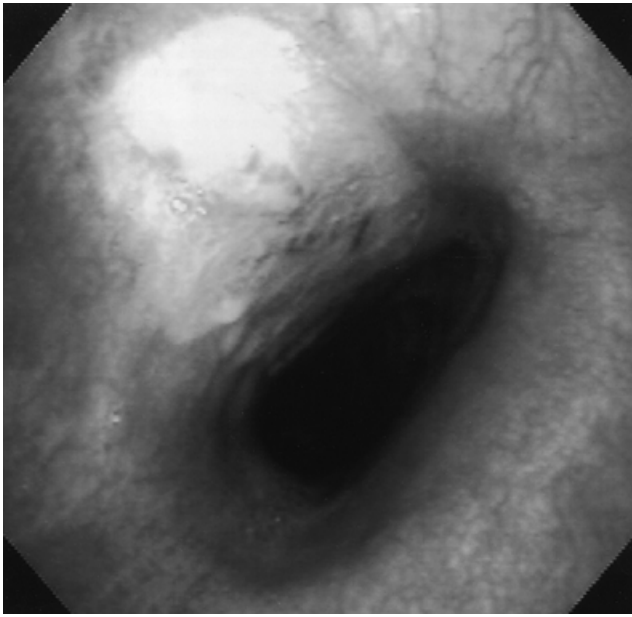
**DISCUSSION**

The frequency of laryngotracheal invasion by thyroid cancer is approximately 7–10% (6) and the main cause of death from thyroid cancer is tracheal obstruction (7). The management of locally invasive well-differentiated carcinoma of the thyroid



**Figure 7.** Histopathological findings showing invasion of papillary carcinoma into part of the resected esophagus (a) and most of the resected trachea (b).

has been controversial. In several studies, no significant differences in survival rates were noted between patients treated by radical surgery and those treated by less extensive procedures



**Figure 8.** Postoperative bronchoscopy revealed white-coated part in the tracheal mucosa.

(1,8,9). Therefore, for many years, palliative surgery had been the most common surgical procedure used for the treatment of patients with thyroid carcinoma invading the trachea (8,10). Recently, however, it has been reported that the shaving-off procedure is often inadequate (9,11,12) and the postoperative survival rate was much worse in patients undergoing incomplete resection than in those undergoing complete resection (11,13,14). Therefore complete resection must always be attempted whenever possible.

The methods of repair for combined resection of the trachea in cases of thyroid cancer include one of the following procedures: (1) segmental resection of the trachea and end-to-end anastomosis; (2) partial resection of the trachea and direct suturing; (3) partial resection of the trachea and repair by a musculocutaneous flap; (4) total laryngectomy and permanent tracheotomy. Various types of repair have been used to close small defects of the trachea. Fascia, skin, pericardium and phrenic membrane have been used for the repair of partial defects of the trachea.

Vocal function is lost by total laryngectomy and therefore the larynx should be preserved as much as possible. In the treatment of thyroid cancer invading the trachea, we considered partial resection of the trachea with a musculocutaneous flap reinforcement, since this approach is less stressful than segmental resection of the trachea and is useful for preservation of the vocal cords.

In dog experiments, Fujita et al. (15) reported that when the defect exceeded the posterior half of the trachea or was located

at the anterior wall, marked stenosis and a tracheomalacia-like tracheal movement occurred following muscle flap coverage. However, a musculocutaneous flap is suitable for the tracheal defect because the muscle can provide support for respiratory movement, while a cutaneous flap is too thin and not reliable.

Although a pedicled pectoralis major musculocutaneous flap can be used for tracheal reconstruction, the latissimus dorsi musculocutaneous flap was selected in our case because its removal leaves very little visible defect, its functional loss is minimal, its anatomy allows easy transfer to the tracheal defect and it can be used with great reliability and versatility. Moreover, the pedicled flap transfer is a faster and easier method than free flap transfer.

We have demonstrated in this case that latissimus musculocutaneous flap coverage of tracheal defects is a useful technique for the combined resection of the trachea in cases of thyroid cancer and may provide a long palliative period associated with no symptoms and good quality of life.

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