

Bronchoplastic Lobectomy with Wide Wedge Resection for Lung Cancer with Long-Term Steroid Medication

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A 57-year-old man with erythrodermia, who was given 5–10 mg/day of prednisolone for 2.5 years, was admitted to our hospital for squamous cell lung carcinoma of the right upper lobe. A bronchoscopy revealed a tumor nearly obstructing the right upper lobe bronchus. A bronchoplastic lobectomy was performed with wide wedge resection of the main bronchus and truncus intermedius. A postoperative bronchoscopy revealed good healing of the anastomosis and a 3-dimensional construction of the bronchus with chest computed tomography demonstrated no stenotic change and no kinking change in the anastomosis. One year and 6 months after surgery, no local recurrence was seen in the region of bronchoplasty. Bronchoplastic lobectomy with wide wedge resection is a useful procedure in cases with risk factors of anastomotic dehiscence, such as after induction therapy or during long-term administration of adrenal cortical steroids. (Ann Thorac Cardiovasc Surg 2007; 13: 403–406)

Key words: lung cancer, bronchoplasty, wide wedge resection

Introduction

Recently, bronchoplastic lobectomy has become a common procedure for lung cancer treatment.¹⁾ However, following induction therapy there is an increased postoperative risk of anastomotic dehiscence, especially in sleeve lobectomy, which is the most standard method of bronchoplasty.²⁾ To maintain anastomotic perfusion, we performed wide wedge resection for lung cancer with a long-term medication of adrenal cortical steroids.

Case Report

A 57-year-old man with erythrodermia, who was given

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5–10 mg/day of prednisolone for 2.5 years, was admitted to our hospital because of an abnormal shadow of the right hilar region. Chest computed tomography (CT) revealed a tumor 37 mm in diameter, involving the lobar lymph node of the right upper lobe (Fig. 1). A bronchoscopy showed a severe stenosis of the right upper lobe bronchus (Fig. 2). The transbronchial biopsy diagnosed squamous cell carcinoma originating from the upper lobe bronchus. However, no extension of carcinoma cells was identified in the right tracheobronchial region, carina, bifurcation of truncus intermedius, or middle lobe bronchus. Preoperative staging was T3N1M0 lung cancer. A dermatologist diagnosed that the erythrodermia was unstable, judging from his clinical findings (skin redness, thickness, and peeling), and thus the preoperative dose of prednisolone could be reduced no more.

We initiated the operation under video-assisted thoracoscopic surgery and sampled the upper mediastinal lymph nodes. Because the frozen section of sampled lymph nodes showed no metastasis, the operation was converted to posterolateral skin incision and 5th intercostal thoracotomy preserving the pedicled intercostal muscular flap. The right upper pulmonary vein and artery were dissected and divided by the endoscopic sta-

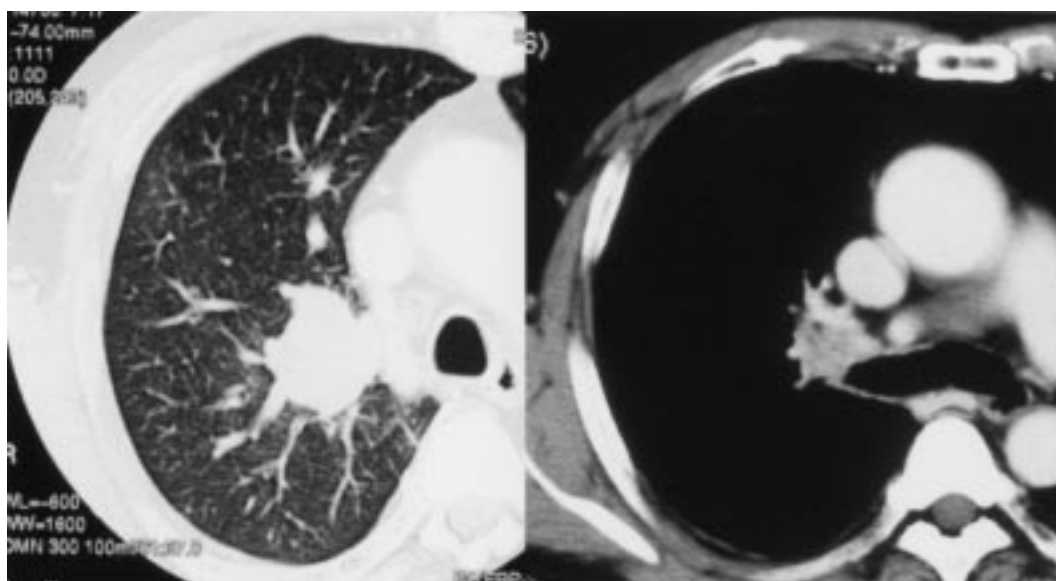


Fig. 1. Chest CT showing an irregular mass shadow in the right upper lobe.

pler. After the azygos vein was resected, the hilar and superior mediastinal lymph nodes were dissected with the preservation of the tracheobronchial sheath. Both the right main bronchus and the truncus intermedius were V-shaped and resected at a distance of approximately 7 mm from each upper lobe bronchus. The frozen section of the bronchial stump showed a negative invasion of the tumor in the oral side, but positive in the peripheral side. Therefore the truncus intermedius was additionally resected at a distance of approximately 4 mm from the first resection margin. The frozen section of this additional resection margin showed no malignancy. The width of the wedge resection resulted in approximately 3 cm (Fig. 3). The bronchial anastomosis was constructed in the method of a so-called telescope style with 16 interrupted sutures by means of 4-0 PDS II (Ethicon Endo-Surgery, USA). And the anastomotic line overlapped with the pedicled intercostal muscular flap. Postoperative staging was T3N1M0. Postoperative bronchoscopy revealed good healing of the anastomosis (Fig. 4), and three-dimensional imaging of the bronchus with chest CT demonstrated neither a stenotic change nor a kinking change in the anastomosis (Fig. 5). The postoperative course was uneventful. One year after surgery, the tumor metastasized to the contralateral lung in the lingular segment. However, the bronchoscopy showed no local recurrence in the region of bronchoplasty 1.5 years after surgery.

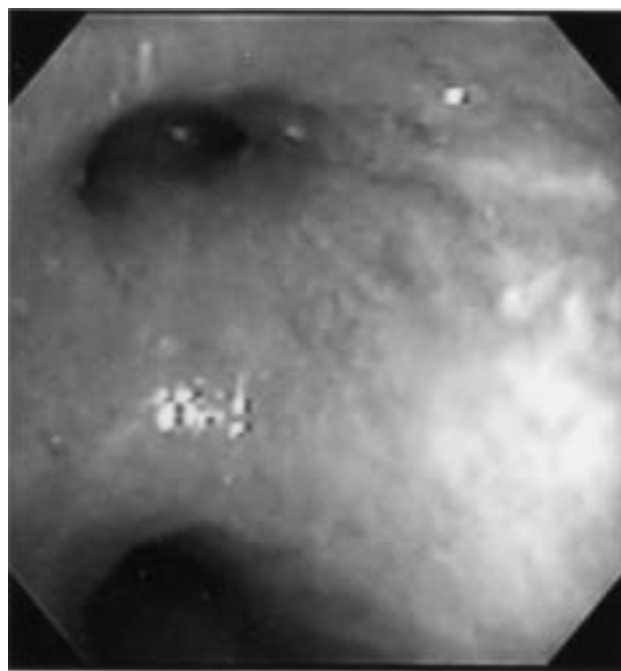


Fig. 2. Preoperative bronchoscopic findings showing the stenosis of the upper lobe bronchus.

Discussion

There is no specific definition that distinguishes a wide wedge resection of bronchus from a standard wedge resection. Massard et al.¹⁾ reported that wedge excisions were generously shaped in a way to reduce the bronchial bridge to less than 5 mm. Therefore we considered it ap-

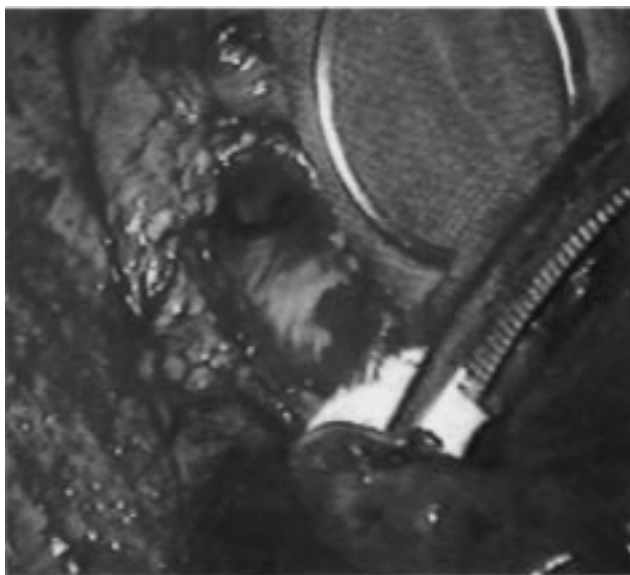


Fig. 3. The operative findings showing a wide wedge resection of the right main bronchus and truncus intermedius.

appropriate that (1) an excision 8 mm or longer (about 1.5-fold of 5 mm) from the bronchial bridge on both the proximal and distal sides, or (2) an excision 10 mm or longer (2-fold of 5 mm) from the bronchial bridge on either the proximal or distal side, is defined as a wide wedge resection. In our case, the right main bronchus and truncus intermedius were V-shaped and resected from the upper lobe bronchus at distances of approximately 7 mm and 11 mm, respectively. Therefore we called our procedure a wide wedge lobectomy. So far only a few reports on wide wedge lobectomy have been published. Nishimura et al.³⁾ also reported a successful case of wide wedge lobectomy for the right upper lobectomy without stenotic change or recurrence.

The methods for bronchoplasty are either sleeve lobectomy or wide wedge lobectomy. Sleeve lobectomy may have anastomotic disruption as an early complication and anastomotic stricture as a late complication.²⁾ It is speculated that bronchial ischemia leads to these anastomotic complications following sleeve lobectomy.¹⁾ On the other hand, wedge lobectomy can result in kinking at the anastomosis site and anastomotic stricture.⁴⁾ However, Maehara et al.²⁾ reported that within 23 cases, there was no single case of bronchostenosis following wedge lobectomy. We also had concerns about kinking at the anastomosis site. Therefore we took a sufficient bite for the suture of the deep V-shape region.

In our research, no recent reports showed that a locoregional recurrence rate increased by wedge lobec-

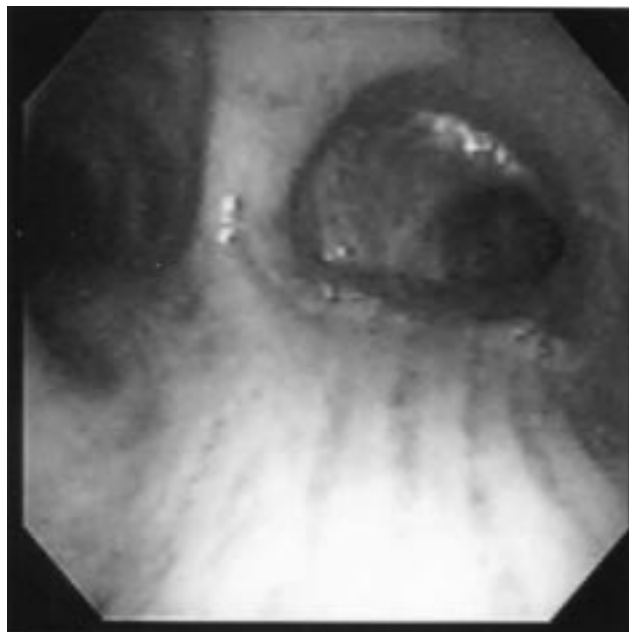


Fig. 4. Bronchoscopic findings showing good healing of the anastomosis 4 weeks after the operation.

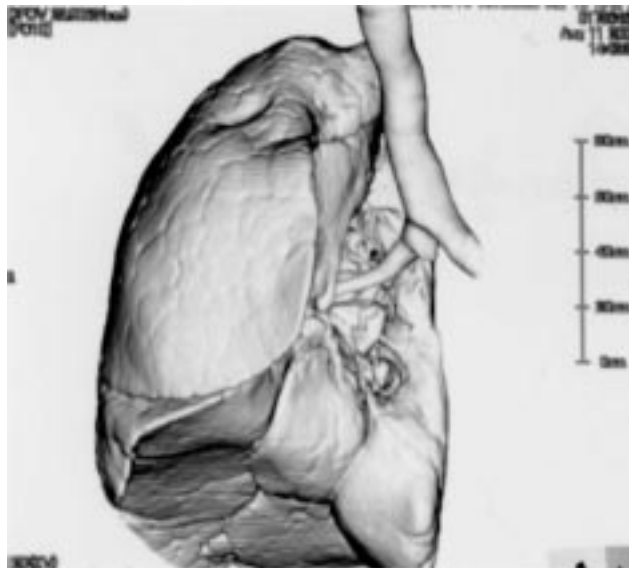


Fig. 5. 3D-CT showing no stenotic change and no kinking change in the anastomosis 4 weeks after the operation.

tomy compared to sleeve lobectomy. Tsubota⁵⁾ reported that the advantage of wedge resection lies in the ability to maintain bronchial perfusion and to obtain good results. Furthermore, steroid therapy prevented the healing of anastomosis in terms of postoperative complications.⁶⁾ Previous steroid therapy was related with a high risk of bronchopleural fistula.⁷⁾ However, it is unknown in what

steroid dose or dosing period the danger increases, such as wound-healing retardation and infectious tendency. Moro et al.⁸⁾ reported that in a preoperative case, a steroid dosing period of 4 months or more or a steroid dose of 5 or more mg/day is a devising operative technique and perioperative management in the cardiac surgery. Therefore we preferred wedge lobectomy over sleeve lobectomy. A sleeve lobectomy would increase the potential of anastomotic dehiscence.

Many materials, such as intercostal pedicled flap and others, including omentum, pleural, pericardium, thymic, and mediastinal tissue flaps, have been used to buttress the anastomotic site after bronchoplasty. Rendina et al.⁹⁾ reported that the intercostal pedicled flap for encircling bronchoplastic anastomoses is simpler, faster, and more sufficient in length, width, consistency, and vascularization, and compared with other methods has caused neither extra surgical trauma nor complications. Therefore in this case the intercostal pedicled flap was adapted for bronchoplastic anastomosis.

We concluded that the wide wedge lobectomy may be a useful procedure when there is a risk of anastomotic disruption, such as in cases with induction therapy and chronic steroid therapy. Several problems, however, remain to be addressed, such as an evaluation of operative indication, postoperative complications, and the application of conversion to sleeve resection.

References

1. Massard G, Kessler R, Gasser B, et al. Local control of disease and survival following bronchoplastic lobectomy for non-small cell lung cancer. *Eur J Cardiothorac Surg* 1999; **16**: 276–82.
2. Maehara T, Ishiwa N, Yamada K, et al. Evaluation of cases with bronchoplasty for primary lung cancer—sleeve lobectomy vs. wedge lobectomy— (Eng abstr). *Kikanshi Gaku* 2000; **22**: 246–50.
3. Nishimura O, Araki T, Shimamura M. Right upper lobe lung cancer treated by right upper lobectomy with wide wedge resection of the trachea, right main bronchus, and truncus intermedius; a case report. *J Nihon Univ Med Ass* 1999; **58**: 281–6.
4. Khargi K, Duurkens VAM, Versteegh MMI, et al. Pulmonary function and postoperative complications after wedge and flap reconstructions of the main bronchus. *J Thorac Cardiovasc Surg* 1996; **112**: 117–23.
5. Tsubota N. Atlas of Pulmonary and Upper Airway Resection (in Japanese). Tokyo: Igaku-Shoin, 2003; pp 80–90.
6. Matsusue S, Walser M. Healing of intestinal anastomoses in adrenalectomized rats given corticosterone. *Am J Physiol* 1992; **263**: R164–8.
7. Algar FJ, Alvarez A, Aranda JL, et al. Prediction of early bronchopleural fistula after pneumonectomy: a multivariate analysis. *Ann Thorac Surg* 2001; **72**: 1662–7.
8. Moro H, Hayashi J, Okazaki H, et al. Open heart surgery in patients with systemic disease requiring steroid treatment (Eng. Abstr.). *J Jpn Assn Thorac Surg* 1996; **44**: 493–8.
9. Rendina EA, Venuta F, Ricci P, et al. Protection and revascularization of bronchial anastomoses by the intercostal pedicle flap. *J Thorac Cardiovasc Surg* 1994; **107**: 1251–4.