

Bronchoplasties at the Segmental Level



Yasuhiro Tsutani, MD, PhD, Morihito Okada, MD, PhD*

KEYWORDS

- Bronchoplasty • Segmental resection • Sleeve segmentectomy • Extended sleeve lobectomy
- Segmental bronchial sleeve resection

KEY POINTS

- Sleeve segmentectomy and segmental bronchial sleeve resection can be performed for centrally located benign or low-grade malignant tumors.
- Extended sleeve lobectomy can be performed for advanced lung cancer at the hilum to avoid pneumonectomy.
- Confirmation of preoperative findings including extent of the tumor and lymph node status must be done first.
- The status of bronchial margins should be checked using intraoperative frozen section analysis.
- Thoracic surgeons must make every effort to avoid excessively large resections of lung tissue, such as lobectomy or pneumonectomy.

INTRODUCTION

Bronchoplasty was originally designed for patients with compromised lung function who are unable to tolerate pneumonectomy. The main reason for performing bronchoplastic procedures is to spare as much healthy lung tissue as possible to preserve the patients' well-being postoperatively. Because sleeve lobectomy has yielded survival results at least equal to those of pneumonectomy, as well as better functional results, it has become an acceptable procedure as a means of sparing healthy lung parenchyma for both malignant and benign disease.¹⁻⁶ Several investigators have reported that bronchoplastic procedures can be performed with low morbidity and mortality even after induction therapy.^{7,8} On the other hand, other types of bronchoplasty with segmental resection or anastomosis between a segmental bronchus and main bronchus with resection of both the invaded segment and the burdened lobe have seldom been discussed.⁹ Here the authors review some

types of bronchoplastic procedures performed at the segmental level.

SLEEVE SEGMENTECTOMY

Sleeve segmentectomy is performed for low-grade malignant tumors and early lung cancer at the hilum. The most common type of bronchoplasty consists of S6 (superior) segmentectomy, followed by resection of the lingular or upper segment.⁹ Typical schemas of sleeve segmentectomies are shown in **Fig. 1**.

Preoperative bronchoscopic examination is crucial in revealing the location and extent of the tumor because most of the tumors cannot be viewed or palpated from outside the bronchus during the operation.

The standard surgical technique is used for segmentectomy until the bronchus is encountered.^{10,11} One of the major concerns about sleeve segmentectomy is the potentially increased rate of local recurrence, although no local recurrence occurred in a previously reported case

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Department of Surgical Oncology, Hiroshima University, 1-2-3 Kasumi, Minami-ku, Hiroshima 734-8551, Japan

* Corresponding author.

E-mail address: morihito@hiroshima-u.ac.jp

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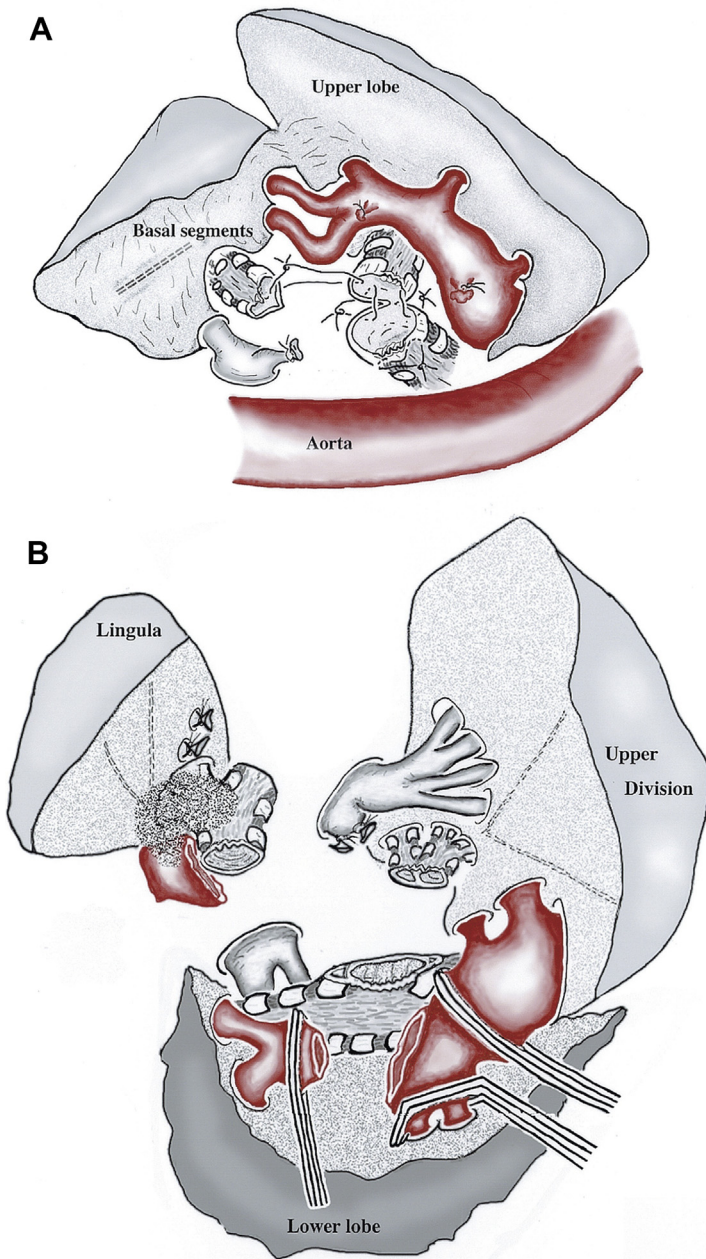


Fig. 1. Two representative cases of sleeve segmentectomy. (A) Left sleeve S6 (superior segment of lower lobe) segmentectomy with additional deep wedge resection of the second carina caused by involvement of the lesion. (B) Left sleeve lingulectomy (S4 + 5) with a side-to-end anastomosis between the left main and the cut end of the upper division of the bronchi, and sleeve resection of the pulmonary artery with subsequent reconstruction using a pericardial patch. (From Okada M, Nishio W, Sakamoto T, et al. Sleeve segmentectomy for non-small cell lung carcinoma. *J Thorac Cardiovasc Surg* 2004;128:423; with permission.)

series.¹² There are some disadvantages associated with skills required for this procedure. The line of resection must be carefully determined with multiple quick sections for pathologic examination, especially in cases of squamous cell carcinoma, even if it is radiographically occult. This type of cancer tends to invade proximally in the submucosal layer to a greater degree than expected.

Bronchial anastomosis is performed with interrupted sutures and full-thickness bites using 4-0

or 5-0 monofilament absorbable material, which is placed and tied in order from the deepest point to a lateral direction. There is generally a difference between the proximal diameter of the bronchus and the distal bronchus, which is quite thin and frail. However, careful placement of sutures can compensate for this discrepancy. A few shortening stitches in the membranous part of the larger stump can help make the anastomosis simpler to perform at the level of the

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