Segmentectomy of the left superior segment (S⁶) 4 years after segmentectomy of the left dorsobasal segment (S¹⁰)

Kimihiro Shimizu, MD, Seshiru Nakazawa, MD, Akira Mogi, MD, and Hiroyuki Kuwano, MD, Maebashi, Japan

From the Division of General Thoracic Surgery, Integrative Center of General Surgery, Gunma University Hospital, Maebashi, Japan.

Disclosures: Authors have nothing to disclose with regard to commercial support.

Received for publication June 17, 2017; revisions received Aug 10, 2017; accepted for publication Aug 25, 2017; available ahead of print Oct 3, 2017.

Address for reprints: Kimihiro Shimizu, MD, Gunma University Hospital, 3-39-22 Showa-machi, Maebashi, Gunma, 371-8511, Japan (E-mail: kmshimizu@gmail.com).

J Thorac Cardiovasc Surg 2018;155:1302-4

0022-5223/\$36.00

Copyright © 2017 by The American Association for Thoracic Surgery

<https://doi.org/10.1016/j.jtcvs.2017.08.119>

Before (left) and after (right) S6 segmentectomy.

Central Message

Repeated segmentectomy in the same lobe was a feasible procedure to preserve residual lung volume and function.

See Editorial Commentary page 1305.

▶ Video clip is available online.

To date, repeated segmentectomy in the same lobe has not yet been reported. Here we report the technical details of a left superior segment (S⁶) segmentectomy 4 years after left dorsobasal segment (S¹⁰) segmentectomy.

CLINICAL SUMMARY

A patient underwent right upper lobectomy for an adenocarcinoma (p-stage IB) harboring exon 19 deletion mutation (Ex19del) of the gene for epidermal growth factor receptor (*EGFR*). At 1 year and 7 months postoperatively, multiple pulmonary metastases (PMs) appeared, and the patient underwent gefitinib therapy. Tumors showed complete response. At 3 years and 5 months after gefitinib therapy, 3 PMs localized in the left dorsobasal segment

(S¹⁰) increased in size. We performed left S¹⁰ segmentectomy. The 2 large tumors (1.4 × 1.3 and 1.2 × 1.1 cm) were PMs; however, the smallest tumor (1.2 × 0.6 cm) was a double primary adenocarcinoma. Mutational analysis revealed that the 2 large tumors had both Ex19 del and threonine at residue 790 replaced by methionine (T790M) *EGFR* mutations, whereas the smallest tumor was *EGFR* wild type (Figure 1). Two more pulmonary metastasectomies were performed: a right ventrobasal segment (S⁸) wedge resection and a right superior (S⁶), laterobasal (S⁹), and S¹⁰ trisegmentectomy. The resected tumors were PMs harboring both Ex19 del and T790M *EGFR* mutations. After this, 2 nodules were detected in

FIGURE 1. Three-dimensional computed tomographic findings (A) and intraoperative photograph after S¹⁰ segmentectomy (B).

FIGURE 2. A and B, Radiologic images before S⁶ segmentectomy. C and D, Intraoperative photographs before S⁶ segmentectomy. C, Arrowheads indicate the border between S⁶ and S⁹ segments. D, Arrowhead indicates B¹⁰ stump.

the left S⁶ at 7 years and 5 months after gefitinib therapy (Figure 2, A and B). We therefore decided to perform left S⁶ segmentectomy. We used the previous surgical scar for thoracotomy. First, we isolated the inferior pulmonary vein, and identified the B¹⁰ stump between V⁶ and V⁹ veins (Figure 2, C and D). V⁶ vein was dissected and resected. By dissecting the B¹⁰ stump toward a central direction, we identified and resected B⁶. A⁶ was isolated and resected. The intersegmental planes between the S⁸, S⁹, and S⁶ segments were dissected (Video 1). Pathologic examination of the smaller nodule revealed that it was a PM harboring both Ex19 del and T790M *EGFR* mutations, whereas the larger nodule was a caseating granuloma. No postoperative complications were observed, and the chest drainage tube was removed on postoperative day 2; however, a right pleural dissemination was detected at 1 year and 2 months after left S⁶ segmentectomy. We therefore prescribed

osimertinib instead of gefitinib, and the tumor showed complete response. At 1 year and 6 months after S⁶ segmentectomy, the postoperative forced expiratory volume 1.0 had increased relative to values before S⁶ segmentectomy (1330 mL before S⁶ segmentectomy vs 1350 mL after S⁶ segmentectomy).

DISCUSSION

Segmentectomy has become an acceptable treatment option for early lung cancer or PMs, and the number of procedures is likely to increase.¹⁻⁴ If a resectable metachronous noninvasive lung cancer or a PM develops in the same lobe as the previous segmentectomy, completion lobectomy or repeated segmentectomy is the best choice to preserve lung function. Although completion lobectomy after segmentectomy is a challenging procedure,⁵ repeated segmentectomy after previous segmentectomy is an even more challenging procedure, because it requires mobilization of the hilar tissue that has already been divided and manipulated during the previous segmentectomy. We believe, however, that previous S¹⁰ segmentectomy is an indication for sequential S⁶ segmentectomy. This is because the previous S¹⁰ segmentectomy allows a good view of the remaining hilum. For example, we could easily identify the intersegmental plane between S⁶ and S⁹ (Figure 2, C), or V⁶, V⁹, and the B¹⁰ stump (Figure 2, D), which are structures that are used as landmarks for S⁶ segmentectomy. Furthermore, we could isolate the A⁶ artery relatively easily, because it had not been divided and manipulated during the previous S¹⁰ segmentectomy.

VIDEO 1. A left (Lt) S⁶ segmentectomy 4 years after left S¹⁰ segmentectomy. PVI, Inferior pulmonary vein. Video available at: [http://www.jtcvsonline.org/article/S0022-5223\(17\)31894-9/fulltext](http://www.jtcvsonline.org/article/S0022-5223(17)31894-9/fulltext).

References

1. Tsutani Y, Miyata Y, Nakayama H, Okumura S, Adachi S, Yoshimura M, et al. Oncologic outcomes of segmentectomy compared with lobectomy for clinical stage IA lung adenocarcinoma: propensity score matched analysis in a multicenter study. *J Thorac Cardiovasc Surg*. 2013;146:358-64.

2. Fan J, Wang L, Jiang GN, Gao W. Sublobectomy versus lobectomy for stage I non-small-cell lung cancer, a meta-analysis of published studies. *Ann Surg Oncol*. 2012;19:661-8.
3. Berry MF. Role of segmentectomy for pulmonary metastases. *Ann Cardiothorac Surg*. 2014;3:176-82.
4. Johnson BE, Cortazar P, Chute JP. Second lung cancers in patients successfully treated for lung cancer. *Semin Oncol*. 1997;24:492-9.
5. Omasa M, Date H, Takamochi K, Suzuki K, Miyata Y, Okada M. Completion lobectomy after radical segmentectomy for pulmonary malignancies. *Asian Cardiovasc Thorac Ann*. 2016;24:450-4.