Main limitations of the present article include selection bias, which are unavoidable when considering a retrospective study like this, and the limited statistical sample, although few similar series have been reported in the literature so far, with most of published data referring to second contralateral tumors.⁵

Comparison with patients undergoing stereotactic body radiation therapy is often considered as a crucial point to assess the role of reoperations for ipsilateral metachronous lung cancer. However, caution should be used when comparing results of stereotactic body radiation therapy, especially because series of patients undergoing irradiation have not had pathological staging and have variable inclusion criteria, sometimes without a conclusive histologic diagnosis.^{4,6}

Anatomic parenchymal-sparing re-resection seems a promising route in this clinical setting. However, the benefit of sparing lung parenchyma with respect to CP may appear questionable in some particular cases, as that reported by Hattori and colleagues¹ of a right lower lobectomy after

previous ipsilateral upper lobectomy, leaving only the residual middle lobe. Therefore, further specific evaluation for each type of anatomic operation will be necessary to provide more precise and thorough indications for such interventions.

References

1. Hattori A, Matsunaga T, Watanabe Y, Fukui M, Takamochi K, Oh S, et al. Repeated anatomical pulmonary resection for metachronous ipsilateral second non-small cell lung cancer. *J Thorac Cardiovasc Surg.* 2021;162:1389-98.e2.
2. D'Andrilli A, Rendina EA. Should segmentectomy rather than lobectomy be the operation of choice for early-stage non-small cell lung cancer? Yes. *Chest.* 2018;153:590-2.
3. D'Andrilli A, Rendina EA. Rebuttals from Drs D'Andrilli and Rendina. *Chest.* 2018;153:595-6.
4. Spratt DE, Wu AJ, Adeseye V, Din SU, Shaikh F, Woo KM, et al. Recurrence patterns and second primary lung cancers after stereotactic body radiation therapy for early-stage non-small-cell lung cancer. Implications for surveillance. *Clin Lung Cancer.* 2016;17:177-83.e2.
5. Hamaji M, Ali SO, Burt BM. A meta-analysis of resected metachronous second non-small cell lung cancer. *Ann Thorac Surg.* 2015;99:1470-8.
6. Rosen JE, Salazar MC, Wang Z, Yu JB, Decker RH, Kim AW, et al. Lobectomy versus stereotactic body radiotherapy in healthy patients with stage I lung cancer. *J Thorac Cardiovasc Surg.* 2016;152:44-54.e9.

See Article page 1389.

Commentary: Not only safety but also efficacy is required in repeat pulmonary resection for second non-small cell lung cancer

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In this issue of the *Journal*, Hattori and colleagues¹ reviewed the records of 104 patients who underwent surgical resection for ipsilateral metachronous second non-small cell lung cancer. The authors found that 74% of the patients were diagnosed as second primary cases, for which the 3-year overall survival (OS) was 80.1%. The survival data were favorable in terms of oncologic effect. However, we need stronger data to support the concept of repeat resection

Ke-Neng Chen, MD, PhD

CENTRAL MESSAGE

We need stronger data to support the concept of repeat resection for second primary lung cancer. As well, other physicians need to understand the concept for it to be widely followed.

for second primary lung cancer after pulmonary resection. As well, physicians from many disciplines need to understand the concept for it to be widely followed by in addition to thoracic surgery. Two aspects of this topic require attention, discussed to follow.

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ONCOLOGY

Increased Detection Rates of Second Primary Lung Cancer

The incidence of second pulmonary conditions (second primary lung cancer/oligometastatic) after lung cancer surgery is gradually increasing for the following reasons: First, popularized lung cancer screening for high-risk/ordinary populations has led to unprecedented increased detection of early staged lung cancer compared with detection in the era of radiographs and sputum cytology screening. In addition, early detection and early treatment have improved the outcome of lung cancer, and lung cancer screening has reduced mortality by 20%.² Second, widespread adoption of minimally invasive thoracoscopic surgery has greatly improved lung cancer surgical safety, and the treatment experience of patients with early lung cancer is also being improved continuously.^{3,4} Moreover, strict and standardized postoperative follow-up has acquired greater importance. Therefore, there is an increased detection rate of patients with second primary lung cancer/oligometastasis after lung cancer surgery,⁵ which has become an issue that cannot be ignored in clinical practice. Because of a lack of high-level, evidence-based medicine, retrospective cohort studies are an important means to solve this clinical problem.

The Bias of Surgical Selection

There are 2 situations for second pulmonary conditions after lung cancer surgery: second primary lung cancer and pulmonary oligometastasis of lung cancer. The treatment of second lung cancer is affected by many factors, and treatment is still a controversial topic. Repeat surgery is one of the important choices. Questions that need answers are whether patients have opportunities for reoperation, whether they can re-experience the safety of the first operation, and whether they will have survival as good as from the first operation. According to retrospective data, reoperation is effective.⁵ However, physicians of other lung cancer subspecialties have not widely accepted this conclusion. The fundamental reason for lack of acceptance is that surgical cases always have “highly selected” bias, and other nonsurgical treatments, such as stereotactic body radiation therapy and ablation, do not have the equal opportunities to be chosen. Therefore, there is always a lack of data to compare nonsurgical methods and repeat surgery. In the study of Hattori and colleagues,⁶ 26% of patients had oligometastases, and there is more controversy regarding the necessity of repeat surgery for pulmonary oligometastasis after lung cancer operation. Generally, systemic treatment is the principal therapy for metastatic lung cancer; however, more and more evidence shows that reoperation as a component of comprehensive treatment can improve the cure rate of patients with oligometastasis.⁶

The Low Citation Rate in Oncology

The Martini and Melamed standard⁷ is an important basis to distinguish second primary lung cancer or pulmonary metastasis from lung cancer. The important content of this standard is to exclude the metastasis of the shared drainage lymph nodes of the 2 lesions. In short, the premise for the diagnosis of second primary lung cancer is that both (twice) lung cancers are early staged. Therefore, it is crucial to record the N stage before and after the first operation, especially the mediastinal lymph node stage. Greater consideration should be given to the possibility of metastasis in patients with advanced, first-time lung cancer (N+). As to the second lung cancer after surgery, for relatively advanced lung cancer, repeat surgery should be avoided. In this study, 9.6% and 9.0% of the patients were diagnosed as stage IIIA after the first and the second operation, respectively. For this group of patients, repeat surgery should not be the first choice. Therefore, it is particularly important to distinguish these patients as having second primary lung cancer or metastatic lung cancer. Because a second surgery entails more risks than the first operation, more attention should be paid to the evaluation of systemic metastasis. In this regard, preoperative positron emission tomography/computed tomography has an irreplaceable function in excluding systemic metastasis. In sum, the neglect of mediastinal lymph node evaluation and the lack of multidisciplinary data for advanced-stage patients are partial reasons for the low citation rate of surgical data.

SURGERY

First, the mortality of pneumonectomy is greater than that of lobectomy or sub-lobectomy. Therefore, for peripheral lesions, segmentectomy/lobectomy should be selected. For central lesions, sleeve bronchoplasty/angioplasty should be the main choice, and pneumonectomy/resection of residual lung tissues should be avoided as far as possible. For pneumonectomies, the left and right lung are responsible for 45% and 55% of pulmonary functions. Therefore, the mortality of right pneumonectomy is higher with worse 3-year OS.

For the evaluation of pulmonary function, in addition to forced expiratory volume in 1 second, diffusing capacity for carbon monoxide, and other laboratory indicators, it is necessary to assess by computed tomography the volume of lung/thoracic cavity on both sides and the quality of the remaining lung tissue. In addition, the tolerance of cardiopulmonary exercise should not be ignored, and the changes of arterial blood gas indexes before and after exercise can also help to judge cardiopulmonary endurance. Hattori and colleagues also confirmed that surgery was safer for patients with better pulmonary function before the second operation, and these patients had better long-term

survival. Finally, more focus should be given to the great influence of surgical procedures on pulmonary function. Video-assisted thoracoscopic surgery has a unique role in preserving pulmonary function; therefore, it should be adopted in both operations. At the same time, evaluation of other important organs is critical for the safety of surgery. The authors also pointed out that surgery for patients with lower preoperative Charlson comorbidity index was safer and the patients had better survival.

The authors stated that ground-glass opacity-like components on imaging is also a favorable, independent factor for OS. Previous data not only indicated that ground-glass opacity component is a sign of benign biology, but also the data reflected the low rate of lymph node metastasis, thereby becoming an indication for sub-lobectomy.⁸

Staging of mediastinal lymph nodes should be performed before the second operation because it will determine the curative effect of the operation and help avoid an unnecessary second operation.

References

1. Hattori A, Matsunaga T, Watanabe Y, Fukui M, Takamochi K, Oh S, et al. Repeated anatomical pulmonary resection for metachronous ipsilateral second non-small cell lung cancer. *J Thorac Cardiovasc Surg.* 2021;162:1389-98.e2.
2. National Lung Screening Trial Research Team. Reduced lung-cancer mortality with low-dose computed tomographic screening. *N Engl J Med.* 2011;365:395-409.
3. Whitson BA, Groth SS, Duval SJ, Swanson SJ, Maddaus MA. Surgery for early-stage non-small cell lung cancer: a systematic review of the video-assisted thoracoscopic surgery versus thoracotomy approaches to lobectomy. *Ann Thorac Surg.* 2008;86:2008-18.
4. Flores RM, Park BJ, Dycoco J, Aronova A, Hirth Y, Rizk NP, et al. Lobectomy by video-assisted thoracic surgery (VATS) versus thoracotomy for lung cancer. *J Thorac Cardiovasc Surg.* 2009;138:11-8.
5. Wang Y, Yeung JC, Hanna WC, Allison F, Paul NS, Waddell TK, et al. Metachronous or synchronous primary lung cancer in the era of computed tomography surveillance. *J Thorac Cardiovasc Surg.* October 6, 2018 [Epub ahead of print].
6. Gomez DR, Blumenschein GR Jr, Lee JJ, Hernandez M, Ye R, Camidge DR, et al. Local consolidative therapy versus maintenance therapy or observation for patients with oligometastatic non-small-cell lung cancer without progression after first-line systemic therapy: a multicentre, randomised, controlled, phase 2 study. *Lancet Oncol.* 2016;17:1672-82.
7. Martini N, Melamed MR. Multiple primary lung cancers. *J Thorac Cardiovasc Surg.* 1975;70:606-12.
8. Chen KN. The diagnosis and treatment of lung cancer presented as ground-glass nodule. *Gen Thorac Cardiovasc Surg.* 2020;68:697-702.