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A case of trans-sternal bilateral thoracotomy for bilateral lung cancer.

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Abstract

Trans-sternal bilateral thoracotomy was performed to resect the right upper lobe and the left S1 + 2 + S3, and to complete lymphadenectomy in a 35-year-old female case of lung cancer in whom multiple lesions were suspected. Trans-sternal bilateral thoracotomy was considered to be useful for one-stage surgery in patients in whom bilateral lung cancer is suspected or confirmed, because it provides a sufficient surgical field enabling the resection of lung and lymph nodes. This may be the first case report of trans-sternal bilateral thoracotomy to treat multiple primary lung cancer.

KEYWORDS: trans-sternal bilateral thoracotomy, lung cancer

A Case of Trans-Sternal Bilateral Thoracotomy for Bilateral Lung Cancer

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Trans-sternal bilateral thoracotomy was performed to resect the right upper lobe and the left $S^{1+2} + S^3$, and to complete lymphadenectomy in a 35-year-old female case of lung cancer in whom multiple lesions were suspected. Trans-sternal bilateral thoracotomy was considered to be useful for one-stage surgery in patients in whom bilateral lung cancer is suspected or confirmed, because it provides a sufficient surgical field enabling the resection of lung and lymphnodes. This may be the first case report of trans-sternal bilateral thoracotomy to treat multiple primary lung cancer.

Key words : trans-sternal bilateral thoracotomy, lung cancer

Conventional one-stage bilateral thoracotomy was mainly performed via 1) median sternotomy and 2) bilateral posterolateral incision. In recent years, one-stage bilateral thoracotomy via a trans-sternal incision has been employed to treat patients with bilateral metastatic lung tumors, bilateral simultaneous pneumothoraces and bilateral giant bullae (1). In our department, 8 patients underwent bilateral thoracotomy via trans-sternal incisions, which provided a large surgical field enabling multiple bilateral lesions to be resected in a one-stage procedure. We conducted trans-sternal bilateral thoracotomy in a patient with primary lung cancer in whom multiple occurrence was suspected.

Case Report

An abnormal shadow was detected on the mass screening chest roentgenogram of a 35-year-old non-smoking female. Detailed examinations led to diagnosis of lung cancer and the

patient was hospitalized for surgery. On admission, she had no symptoms or abnormal physical findings. There were no abnormal findings among main laboratory data and tumor markers.



Fig. 1 Chest tomography demonstrates tumor shadows in bilateral upper lung fields.

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Tomography of the chest (Fig. 1) and CT of the lung (Fig. 2) disclosed an irregularly shaped tumor shadow, 15 x 13 mm in size in the right upper lobe (S^2_b) and another tumor shadow of 8 x 8 mm in the left upper lobe (S^3_c). Lymph nodes in the hilum and mediastinum were not swollen. Bronchoscopic examination was performed and transbronchial lung biopsy revealed the tumor in the right S^2_b to be adenocarcinoma. To exclude the possibility of metastatic lung cancer, fluoroscopy of the upper and lower gastrointestinal tract, abdominal CT, abdominal ultrasonography, bone scintigraphy, thyroid ultrasonography, thyroid scintigraphy and gynecological examination were performed, none of which revealed abnormalities.

Respiratory function was FVC(%) 3.11L (111.5%) and FEV_{1.0} 2.65L (FEV_{1.0}% 85.2%). Predicted postoperative respiratory function on the basis of pulmonary perfusion scintigraphy suggested that resection of the right upper lobe and the left $S^{1+2} + S^3$ area would be well tolerated.

Based on a diagnosis of primary lung cancer (multiple cancer) of the upper lobes of both lungs following the above evaluation, patient underwent surgery on May 17, 1991. In this procedure, the patient is placed on the operating table in a supine position. The skin is incised below the submammary fold from the median axillary line of one side to the other side (Fig. 3). Thoracotomy was performed at the 4th intercostal site and the sternum was incised transversely after cutting and ligating the bilateral internal thoracic arteries. After a sufficient surgical field was attained (as shown in Fig. 3), the right upper lobe was resected. The left $S^{1+2} + S^3$ was also resected. Because the pathological examination of the frozen specimen during surgery showed that the lesion in the left upper lobe was an adenocarcinoma primarily arising from the lung, bilateral hilar and mediastinal lymphadenectomy was performed. As shown in Fig. 4, the surgical field in the right upper mediastinum was sufficient while that of left mediastinum was extensive.

In the resected specimens, a 13 x 12 x 11 mm

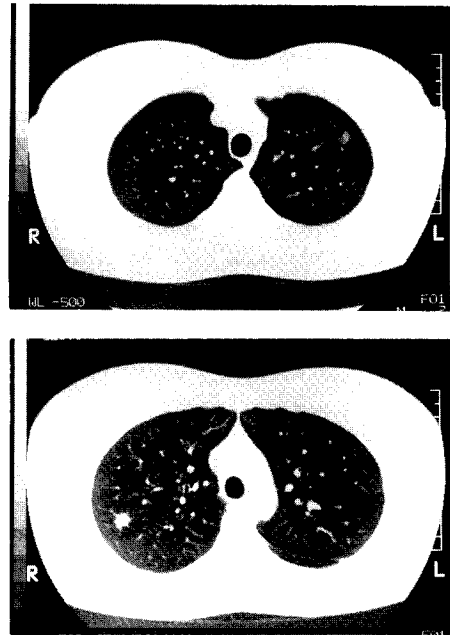


Fig. 2 Chest CT demonstrates tumor shadows in right S^2_b (top) and left S^3_c (bottom).



Fig. 3 The findings of bilateral trans-sternal thoracotomy.

tumor was identified in the right S^2_b , and an 8 x 6 x 6 mm tumor in the left S^3_c . In addition, a 6 x 5 x 3 mm tumor was also found in the right S^3_b .

Postoperative pathological examination (Fig. 5) showed that the three specimens had features of highly differentiated adenocarcinoma arising primarily from the lungs and that all had the same

histological picture. Neither lymph node metastasis nor pleural infiltration was detected.

Postoperative controlled respiration with a respirator was needed for one day, and the respirator was removed the day after surgery. The epidural block given to control pain caused the patient's respiration to improve markedly; the postoperative course thereafter was favorable. Pain disappeared two weeks after surgery, as in



Fig. 4 The surgical field of right upper mediastinum was sufficient for lymphadenectomy.

the patients who underwent median sternotomy. The patient is in good health, with no symptoms of recurrence 6 months after surgery.

Discussion

In this study, 3 tumors with diameters under 13mm that were evaluated as early stage lung cancers were identified in different regions of both lungs. All were diagnosed as adenocarcinoma with no lymphatic metastasis or distant metastasis. Martini and Melamed (2) proposed that when simultaneously occurring multiple lung cancers have identical tissue types, tumors should occur in different areas of the lung and should have no lymphatic metastasis or extrapulmonary metastasis. According to this criteria, the three tumors are likely multiple primary lung cancers, although the possibility that one of these tumors is an intrapulmonary metastasis of either of the two other tumors cannot be completely denied. In this case, prognosis may be good

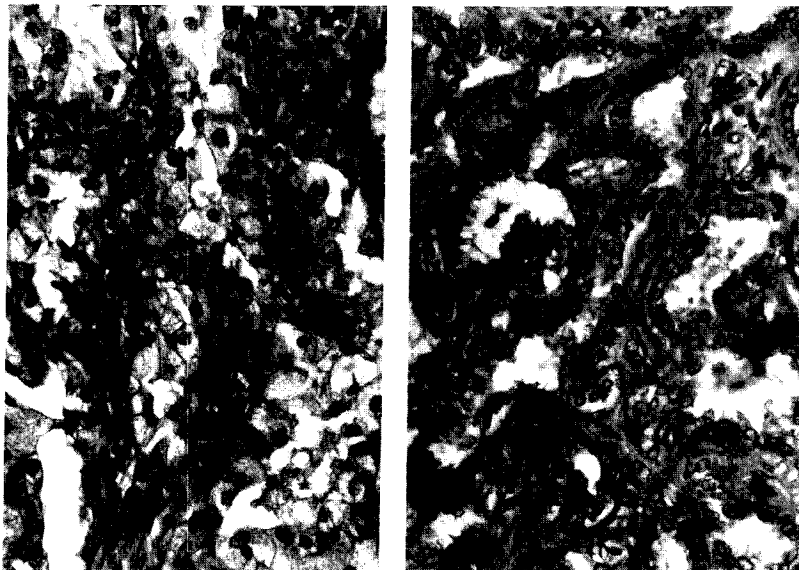


Fig. 5 Histology of the excised lung lesion (left : tumor in left S³_c; right: tumor in right S²_b). Both specimens were well differentiated tubular adenocarcinoma.

because the lymphadenectomy was done completely and there was no nodal metastasis or distant metastasis (3).

Surgical approaches to bilateral lung cancer include one-stage bilateral thoracotomy and two-stage thoracotomy. When the general condition and respiratory function permit, one-stage surgery which can yield better prognosis is preferable. Thoracotomy for malignant tumors, such as multiple lung cancer, requires that the following conditions should be satisfied: 1. the thoracic cavity and lungs can be completely examined with no dead space: 2. any method of pulmonary resection can be employed in both lungs: 3. lymphadenectomy is not difficult in the hilus and the mediastinum. To date, bilateral thoracotomy has been done via 1) median sternotomy or 2) bilateral posterolateral thoracotomy. Median sternotomy has been used more frequently for bilateral metastatic lung cancer (4, 5). However, the usefulness of trans-sternal bilateral thoracotomy has been attracting attention recently (1). We performed trans-sternal thoracotomy on 8 patients with metastatic lung cancer. This method provided an excellent surgical field, permitting surgical treatment in the S⁶ and S¹⁰ of the left lung; difficult areas to treat with median sternotomy. Henceforth we intend to use the trans-sternal method to treat bilateral metastatic lung cancer.

Though there was a report of synchronous bilateral thoracotomy by posterolateral skin incision (6), there have been no reports of trans-sternal thoracotomy requiring complete lymphadenectomy in patients with primary lung cancer. In this study, we resected the right upper lobe and the left S¹⁺² + S³, performing complete lymphadenectomy through trans-sternal bilateral thoracotomy at the 4th intercostal site. An excellent surgical field allowed surgical procedures to be easily conducted. A better surgical field could be attained by 1) laterally extending the skin incision and 2) hanging the thoracic wall to the head side. However, respiratory control may be required for a few days postoperatively because 1)

the operation is a bilateral thoracotomy and 2) early postoperative pain is relatively intense. Respiratory disorders seemed to be ameliorated when pain was controlled through periodic epidural block.

Our experience with trans-sternal bilateral thoracotomy in 9 patients, including those with metastatic lung cancer, shows that the method has advantages of inconspicuous surgical scarring and little pain 2 to 3 weeks after surgery.

Summarized below are the advantages of trans-sternal bilateral thoracotomy. Surgery is a one-stage procedure. One-stage surgery is preferable for malignant tumors. One-stage surgery is less expensive for the patient and hospitalization is shorter. A larger surgical field is available. It provides a surgical field sufficient for resecting any segment or lobe. The surgical procedure is easy even for lesions that infiltrate or adhere to the thoracic wall. Sufficient lymphadenectomy is possible. Cosmetically speaking, scarring is inconspicuous. Late postoperative pain is rare. On the other hand, disadvantages are summarized below. This method separates the bilateral internal thoracic arteries. Considering coronary surgery, this method is not suitable for benign disease. Early postoperative pain is relatively intense and early postoperative respiratory disorders may be relatively severe.

It should be pointed out that the trans-sternal bilateral thoracotomy is the most ideal approach for bilateral primary lung cancer as well as multiple bilateral metastatic lung cancer.

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