Extrapleural pneumonectomy for lung cancer with carcinomatous pleuritis

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Carcinomatous pleuritis in patients with lung cancer is usually found to accompany frank malignant pleural effusion and is associated with short-term survival.¹ However, this condition is sometimes discovered, with or without a small amount of pleural effusion, at thoracotomy in patients with resectable non-small cell lung cancer. The incidence is reported as 3.2%,² and in such patients surgical treatment has been applied in some institutions, with long-term survival in selected cases. We report here the results of extrapleural pneumonectomy for patients with lung cancer with carcinomatous pleuritis and discuss surgical treatment for this disease.

Patients and Methods

Between January 1988 and December 1999, a total of 602 patients underwent exploration for the resection of primary lung cancer at our hospital. Among the patients, 11 (1.7%) underwent an extrapleural pneumonectomy with lymph node dissection because of carcinomatous pleuritis. Extrapleural pneumonectomy was performed in patients who had pleural disseminated tumors with or without a minimal effusion (<300 mL) and an adequate cardiopulmonary reserve. Patients with massive malignant pleural effusions were excluded from surgical candidacy. All the patients gave written informed consent for the operation. The details of the operative procedure were described in our previous case report.³ All patients underwent excision of the pericardium and complete removal of the hemidiaphragm. The pericardium and diaphragm were usually reconstructed with synthetic membranes. Data are reported as means $\pm$ SD. Survival was measured from the operation until death or the last date of follow-up (April 30, 2001), and the data are reported as means and 95% confidence intervals (CI) for the mean. The Kaplan-Meier method was used to calculate actuarial survival.

Results

The demographics of these 11 patients (9 women and 2 men) are shown in Table 1. The mean age at operation was 50.8 ± 10.9 years (range, 33-70 years). The most common symptoms were chest pain in 3 patients and cough, dyspnea, and general fatigue in 1 patient each. Five patients were free of symptoms. Histologic examination, cytologic examination, or both, of the specimen obtained from the intrapulmonary mass with a fiberoptic bronchoscope or by percutaneous transthoracic needle biopsy showed adenocarcinoma in 10 patients. Only the eleventh patient, whose pulmonary nodule was undetectable before the operation, underwent pleural biopsy, but it was not known whether the lesion originated from lung adenocarcinoma or malignant pleural mesothelioma. All patients underwent chest computed tomographic scanning to determine clinical staging. Carcinomatous pleuritis was suspected preoperatively in 7 patients; pleural disseminated nodules were observed on computed tomographic scanning in 5 patients, and malignant pleural effusion was detected in 2 patients. However, the remaining 4 patients were given diagnoses of T1, T2, or T3 tumors, and their disease conditions were found at thoracotomy. Preoperative chemotherapy was performed in only the fourth patient with N2 disease.

In all patients pathologic examination, including immunohistochemical analysis of the resected specimen, revealed that the primary tumor was lung adenocarcinoma, and the

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TABLE 1. Patients with lung cancer who underwent an extrapleural pneumonectomy for carcinomatous pleuritis

Patient No. (age [y], sex)	Stage		Operation		Recurrence	Survival after operation (mo)	
	Clinical	Pathologic	Time (min)	Blood loss (g)		Disease free	Overall
1 (44, F)	T2 N0	T4 N1	430	1300	—	149	149; alive without disease
2 (41, F)	T1 N0	T4 N0	510	323	—	87	87; alive without disease
3 (58, M)	T4 N2	T4 N2	495	980	Pericardial effusion	6	79; died of disease
4 (49, F)	T4 N2	T4 N2	520	600	Supraclavicular lymph nodes	14	25; alive with disease
5 (62, F)	T2 N0	T4 N0	470	700	Unknown	Unknown	20; died of disease
6 (49, F)	T4 N0	T4 N0	464	297	—	20	20; alive without disease
7 (49, F)	T4 N0	T4 N0	361	452	—	20	20; alive without disease
8 (70, F)	T4 N0	T4 N2	407	539	Skin	7	19; died of disease
9 (33, M)	T4 N0	T4 N2	535	896	Bone	4	11; died of disease
10 (61, F)	T3 N2	T4 N1	473	660	—	6	6; died of other cause
11 (43, F)	T4 N0	T4 N2	445	850	Unknown	Unknown	6; died of disease

pleural disseminated nodules were compatible with the intrapulmonary lesion. The operation time was 464.5 ± 51.7 minutes, and blood loss during the operation was 690.6 ± 300.3 g. The final pathologic stage was T4 N0 in 4 patients, T4 N1 in 2 patients, and T4 N2 in 5 patients. All patients survived the operation and were discharged from the hospital. Complications were intrathoracic hemorrhage and empyema without bronchopleural fistula in 1 patient each. Postoperative radiotherapy was performed in the third and tenth patients, and chemotherapy was performed in the first patient. Follow-up data were complete for all patients. The 5-year and 10-year survivals of all the patients were 54.5% (95% CI, 25.1%-84.0%) and 36.4% (95% CI, 1.3%-71.5%), respectively. Among the 6 patients with pathologic N0-1 disease, 4 patients are alive without disease 20 to 146 months after operation, and the 5-year survival was 66.7% (95% CI, 28.9%-100%). Of the 5 patients with N2 disease, all had recurrent disease, and there was only 1 long-term survivor in whom malignant pericardial effusion developed 6 months after the operation.

Discussion

Non-small cell lung cancer with carcinomatous pleuritis is generally considered to be a contraindication for surgical treatment and is associated with a poor outcome.¹ However, some surgeons have continued to perform a resection for selected patients with the disease.²⁻⁴ The Japan Clinical Oncology Group reported that the 5-year survival of patients undergoing resection for minimal carcinomatous pleuritis was 22.8%, and being female and having a clinical N0 stage were significantly good prognostic factors.²

Extrapleural pneumonectomy has been used by thoracic surgeons in the treatment of diffuse malignant pleural mesothelioma, as well as other pleural diseases, such as tuberculous empyema. The efficacy of this procedure has been suggested in managing patients

with malignant pleural mesothelioma localized in the hemithorax.⁵

In this study our patients had lung adenocarcinoma and pleural disseminated nodules with or without a small amount of malignant effusion, which was compatible with minimal disease described by the Japan Clinical Oncology Group² and might be a localized disease in the hemithorax. Extrapleural pneumonectomy with lymph node dissection was performed safely in all patients and resulted in a good long-term survival, especially in female patients without pathologic N2 disease. Our results indicate that carefully selected patients with carcinomatous pleuritis may be candidates for extrapleural pneumonectomy for cure. Nevertheless, the ultimate value of this surgical treatment should be ascertained in a prospective study with a large number of patients because our results may have been affected by the nature of the tumors, such as the slow-growing tumor noted in the third patient.

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