Table 4. Response to NAC by Each Imaging Modality and Pathologic Response

	Pathologic PR	Pathologic CR	P-Value
CT			< 0.05
CR	7	8	
PR	17	3	
Ultrasound .			N.S
CR	3	3	
PR	21	8	
Mammogram			0.07
CR	0	2	
PR	23	7	
Not evaluated	1	2	

of the patients evaluated as CR by mammography also exhibited pCR.

Of the 35 cCR subjects, 15, 6, and 2 patients were diagnosed as CR by CT, ultrasonography, and mammography, respectively. In each imaging modality, the complete absence of marks was seen in only two patients. With the exception of these patients, in 13 and 4 patients classified as CR by CT and ultrasonography, respectively, the tumor location was barely identifiable, displaying small lesions recognized only when compared to the pre-NAC images, demonstrating that tumor localization could be identified in all patients using previous images in combination with these three imaging modalities.

One case was defined as CR by all three modalities (Fig. 2). Two cases classified as PR by all three imaging techniques achieved pCR. Pathologically, the observed masses consisted primarily of hyline fibrosis and foamy cells (Fig. 3). One case evaluated as CR by two independent images was shown to possess residual invasive components pathologically (Fig. 4).

The relationships between morphologic tumor type determined by CT before NAC and pathologic response are shown in Table 5. In the pCR group, eight tumors were of the localized type, while three were of the diffuse type. The localized type was more likely to achieve pCR than diffuse type (8).

Table 5. Morphologic Tumor Types on CT Before NAC and Pathologic Response

	Pathological PR[a]	Pathologic CR
Tumor type (pretreatment)		
Localized	10	8
Diffuse	12	3

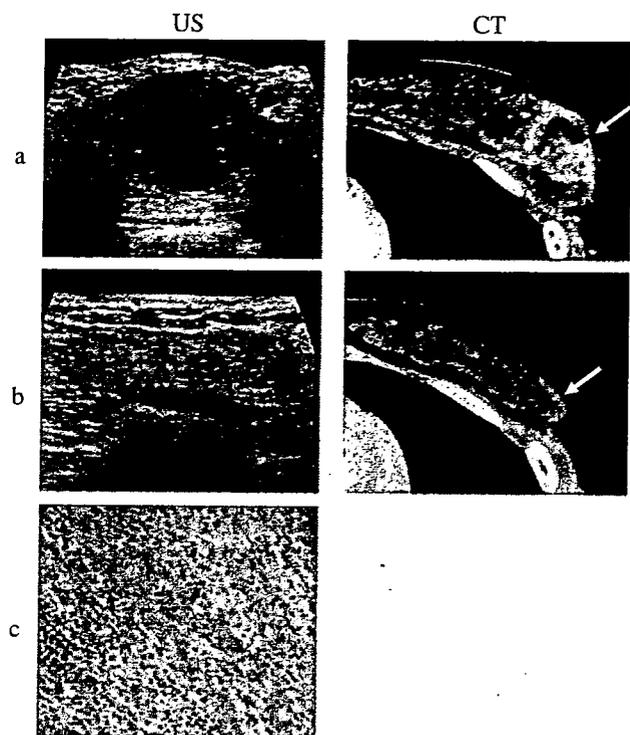[a]Two cases were excluded because a CT was not performed before chemotherapy.

Figure 2. Typical imaging findings for a 30-year-old female with CR. (a) A 5.5 cm × 5.0 cm circumscribed tumor was observed by ultrasonography and CT prior to NAC. (b) After NAC, complete reduction of the tumor was observed by each imaging modality. (c) Subsequent histologic analysis revealed that this case achieved pCR.

DISCUSSION

The determination of CR by CT significantly correlated with pCR. While all tumors or marks could be identified by at least one diagnostic modality to facilitate local excision, tumor size prior to NAC determined by all modalities did not predict pCR, similar to our previous report (2).

This study sought to define CR by diagnostic imaging. Even after the disappearance of all tumor cells, replacement by granuloma-like and/or fibrous tissue could be observed histopathologically. These types of lesions can be identified as low-echoic lesions by ultrasonography and weak-enhanced areas by CT, possibly resulting in false-positive detection of pCR by imaging examination. While these marks provide the important benefit of easy identification of tumor localization when local excision is necessary, the absence of disease signs did not always predict pCR. Of the two tumors lacking any faint shadows or marks identified by ultrasonography, only one achieved pCR. In the false-negative case, we could not distinguish the low-echoic mass surrounded by the aggressive mottled
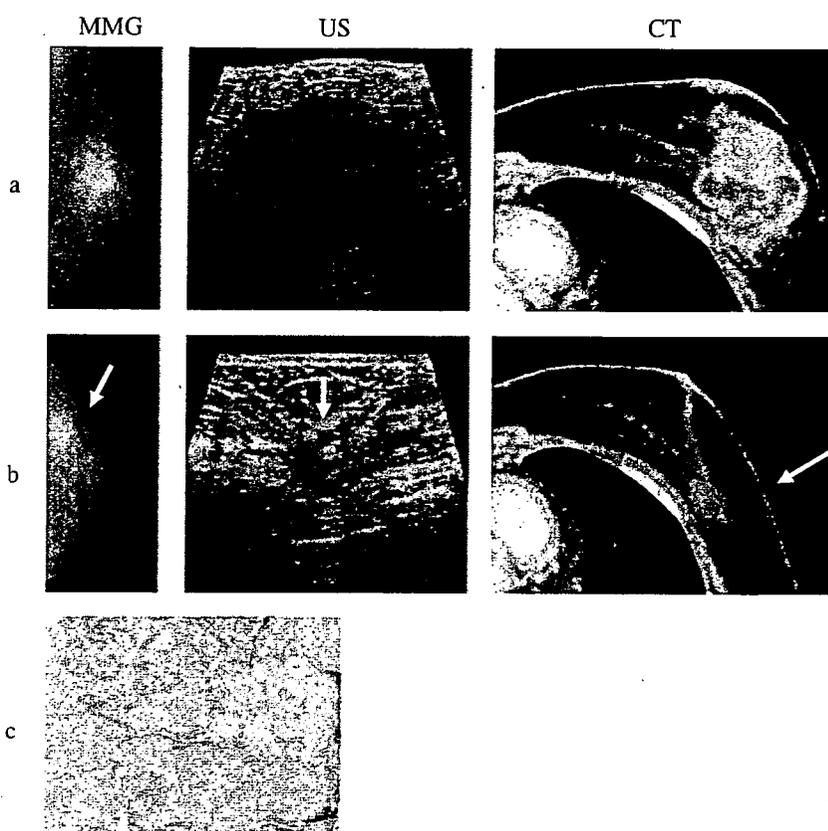
Figure 3. A patient, determined to exhibit PR by imaging, achieved pCR. (a) The localized tumor measured 6.5 cm in size before NAC. (b) After NAC, despite the absence of a palpable tumor, a 1.5 cm localized mass was observed by ultrasonography, CT, and mammography. (c) By histologic analysis, no malignant cells were observed, but hyaline degeneration was seen. This case achieved pCR.

pattern that resulted from fibrocystic changes. Of the two tumors without any enhancement or spiculated marks on CT, neither achieved pCR, instead exhibiting residual intraductal carcinoma. In patients not receiving NAC, the intraductal components of the noncomedo type or low histologic grade demonstrated weaker enhancement than that seen in comedo or high-grade tumors (9,10). These results suggest that low-grade intraductal components may not be well enhanced after NAC, explaining the decreased accuracy of imaging techniques evaluated in this study.

The rate of pCR reported is approximately one-third of the cCR cases (11). Of the few reports examining the role of surgery in patients achieving cCR after NAC, retrospective analysis demonstrated that in patients who achieved cCR after NAC, radiotherapy alone exhibited higher local recurrence rates than surgery (12). These studies suggest that CR defined by residual mass or parenchymal distortion on ultrasonography exhibits better local control in comparison with those lacking ultrasound-detected residual masses. Unfortunately, these patients were not evaluated by mammography, CT, or MRI. While this was not a randomized trial, there were no significant differences in

the survival rates following radiotherapy alone or surgery after cCR.

The classification of tumors into either localized or diffuse types using CT prior to NAC administration accurately predicts tumor shrinkage patterns and those tumors that are suitable candidates for BCT following NAC (8). This classification also predicts good pathologic responses (the disappearance of more than two-thirds of tumor cells). Essermann et al. (13) reported similar results using MRI. Of the five predominant MRI patterns, a circumscribed mass pattern significantly predicted good clinical responses to NAC. In this study, localized tumors more frequently achieved pCR. These results were not significant (p = 0.14), perhaps because the classification of tumors by diagnostic imaging is a predictor of good pathologic response rather than pCR. The limited number of cases evaluated in these studies, however, requires further evaluation of these imaging techniques as predictors of CR.

In conclusion, CR determined by CT was a significant predictor of pCR. The positive predictive value, however, was not large enough to avoid the necessity of surgical treatment. Further study is required to establish accurately the diagnosis of pCR.
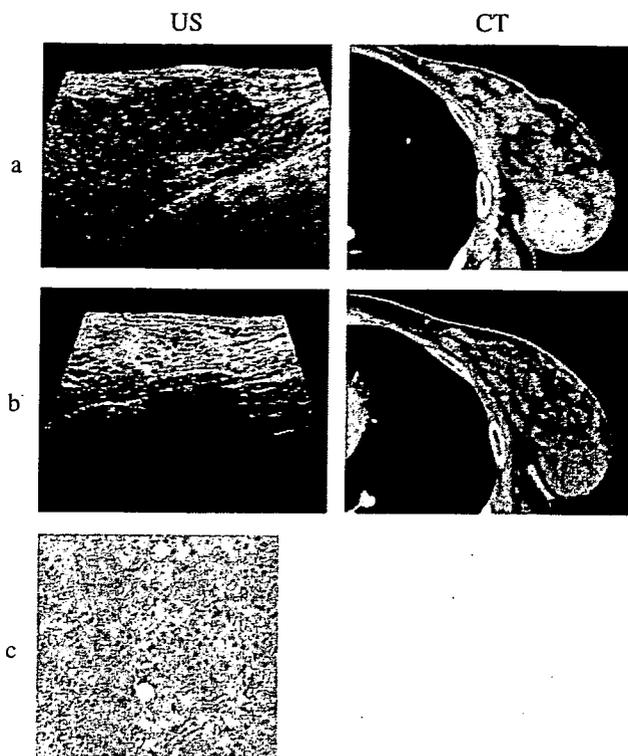
US   CT

Figure 4. Despite classification as CR by CT and ultrasonography, residual invasive components remained in the specimen by histologic examination. (a) The localized tumor measured 7.5 cm × 3.5 cm in diameter. (b) After NAC, no enhanced lesions were observed by CT. Only a low-echoic area, as low as fat tissue, could be observed by ultrasonography. (c) Invasive components could still be observed histologically.

Acknowledgments

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Prognosis of Resected Non-Small Cell Lung Cancer Patients with Intrapulmonary Metastases

Kanji Nagai, MD, Yasunori Sohara, MD,† Ryosuke Tsuchiya, MD,‡ Tomoyuki Goya, MD,§ and Etsuo Miyaoka, PhD,‖ for The Japan Lung Cancer Registration Committee*

Background: In the current TNM staging system revised in 1997 for lung cancer, intrapulmonary metastases (PM) are classified into two categories: PM1 (in the same lobe of the primary tumor), designated as T4; and PM2 (in a different lobe), as M1. There have been no large-scale analyses on PM in non-small cell lung cancer (NSCLC) patients. We collected data nationwide in Japan for 7408 lung cancer patients undergoing surgical resection during a single year, 1994. We analyzed the long-term survival of NSCLC patients to evaluate the prognostic impact of PM in relation to other prognostic factors.

Method: Medical records of 6525 NSCLC patients undergoing surgical resection during a single year, 1994, were analyzed as a subset work of the Japanese Joint Committee of Lung Cancer Registry. The committee sent a questionnaire on outcome and clinicopathological profiles to 303 institutions.

Results: There were 6080 PM0 (no PM), 317 PM1, and 128 PM2 patients. The 5-year survival rates were 55.1% for PM0 patients, 26.8% for PM1, and 22.5% for PM2 patients, respectively. The differences in survival between patients with PM0 and PM1 and between patients with PM0 and PM2 were significant ($p < 0.001$, respectively); the difference in survival was not significant between patients with PM1 and PM2 ($p = 0.298$). In R0 and N0 patients, survival differences were similar for PM0, PM1, and PM2 patients. Significant survival difference was detected between T3 and PM1 ($p = 0.0317$) and between PM1 patients and T4 patients excluding PM1 ($p = 0.0083$). The 5-year survival rates of PM2 patients and M1 patients excluding PM2 were 22.5% and 20.5%, respectively, and there was no significant difference between the groups ($p = 0.434$).

Conclusion: There was no significant survival difference between NSCLC patients with PM1 and PM2. The survival of patients with PM1 was between that of the T3 and T4 patients excluding PM1.

*Department of Thoracic Oncology, National Cancer Center Hospital East, Kashiwa, Japan; †Department of Surgery, Jichi Medical School, Shimotsuke, Japan; ‡Division of Thoracic Surgery, National Cancer Center Hospital, Tokyo, Japan; §Department of Surgery, Kyorin University, Tokyo, Japan; and ‖Department of Mathematics, Science University of Tokyo, Tokyo, Japan.

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Address for correspondence: Kanji Nagai, MD, Department of Thoracic Oncology, National Cancer Center Hospital East, 6-5-1, Kashiwanoha, Kashiwa, Chiba, 277-8577, Japan; E-mail: knagai@east.ncc.go.jp

In 1989, Deslauriers et al.[1] described intrapulmonary metastasis (PM) in patients with non-small cell lung cancer (NSCLC) as satellite nodules, concluding that patients with these lesions should be classified as stage IIIA in the TNM staging system. In 1992, the Union Internationale Contre le Cancer (UICC [International Union Against Cancer]) and the American Joint Committee on Cancer revised the TNM classification, and the T factor of lung cancer with PM was upstaged as a local progression.[2,3] T factor was upgraded by a single unit if PM was located in the primary lobe, and it was classified as T4 if the PM was located in other lobes of the ipsilateral lung. When the TNM staging system was revised in 1997 for lung cancer, PM was designated as T4 if it was in the same lobe of the primary tumor (PM1) and as M1 if it was in a different lobe (PM2).[4]

Since then, there have been no large-scale survival analyses on NSCLC patients with PM. We collected data nationwide in Japan for 7408 lung cancer patients undergoing surgical resection during a single year, 1994.[5] We retrospectively analyzed the survival of these patients to evaluate the prognostic impact of PM in relation to other prognostic factors.

PATIENTS AND METHODS

As described previously,[5] the Japanese Joint Committee of Lung Cancer Registry sent a questionnaire in 1995 to 320 Japanese institutions, asking them to report outcomes and clinicopathological profiles for patients who underwent primary lung cancer resection in 1994. Data for 7408 patients were collected from 303 institutions. In 2001, the joint committee sent a questionnaire to these institutions to acquire clinicopathological profiles and outcome. The following 27 items were included in the questionnaire: gender, age, clinical (c-) T, c-N, c-M, c-stage, preoperative treatment, surgical procedure, extent of lymph node dissection, curability, residual tumor, primary site by lobe, tumor diameter, histology, organ invasion, pleural involvement, pleural dissemination, PM, pleural cytology, pathological (p-) T, p-N, p-M, p-stage, location of nodal metastasis, survival time recurrence, and cause of death. Recurrent or multiple lung cancers were not

TABLE 1A. Patient Characteristics

	PM0	PM1	PM2	M1 (excluding PM2)
No.	6080 (91.49%)	317 (4.8%)	128 (1.9%)	120 (1.8%)
Age	65 ± 10	65 ± 10	63 ± 10	60 ± 11
Sex				
Male	4257 (70%)	208 (65.6%)	69 (53.9%)	88 (73.3%)
Female	1792 (29.5%)	108 (34.1%)	59 (46.1%)	32 (26.7%)
DNA	31 (0.5%)	1 (0.3%)	—	—
Type of operation				
Pneumonectomy	512 (8.4%)	35 (11%)	26 (20.3%)	16 (13.3%)
Lobectomy	5208 (85.7%)	265 (83.6%)	84 (65.6%)	90 (75%)
Segmentectomy	157 (2.6%)	3 (0.9%)	8 (6%)	3 (2.5%)
Wedge resection	157 (2.6%)	11 (3.5%)	9 (7%)	9 (7.5%)
DNA	46 (0.8%)	3 (0.9%)	1 (1%)	2 (1.7%)
Curability				
R0	5529 (90.9%)	232 (73.2%)	77 (60.2%)	
R1	256 (4.2%)	34 (10.7%)	7 (5.5%)	
R2	187 (3.1%)	41 (12.9%)	38 (29.7%)	
RX	58 (1%)	7 (2.2%)	5 (3.9%)	
DNA	50 (0.8%)	3 (0.9%)	1 (0.8%)	

DNA, data not available.

TABLE 1B. Patient Characteristics

	PM0	PM1	PM2	M1 (excluding PM2)
No.	6080 (91.5%)	317 (4.8%)	128 (1.9%)	120 (1.8%)
Histology				
Adenocarcinoma	3522 (57.9%)	201 (63.1%)	101 (78.9%)	82 (68.3%)
Squamous cell carcinoma	2174 (35.8%)	93 (29.3%)	17 (13.3%)	21 (17.5%)
Large cell carcinoma	229 (3.8%)	10 (3.2%)	4 (3.1%)	9 (7.5%)
Adenosquamous carcinoma	155 (2.5%)	13 (4.1%)	6 (4.7%)	8 (6.7%)
pT				
0	4 (0.1%)	—	—	1 (0.8%)
1	2569 (42.3%)	0 (0%)	24 (18.8%)	22 (18.3%)
2	2513 (41.3%)	0 (0%)	62 (48.4%)	43 (35.8%)
3	702 (11.5%)	0 (0%)	12 (9.4%)	28 (23.3%)
4	287 (4.7%)	317 (100%)	30 (23.4%)	26 (21.7%)
DNA	5 (0.15%)	—	—	—
pN				
0	3882 (63.8%)	120 (37.9%)	38 (29.7%)	44 (36.7%)
1	802 (13.2%)	55 (17.4%)	19 (14.8%)	18 (15%)
2	1261 (20.7%)	124 (39.1%)	52 (40.6%)	48 (40%)
3	95 (1.6%)	12 (3.8%)	7 (5.5%)	5 (4.2%)
X	27 (0.4%)	5 (1.6%)	9 (7%)	1 (0.8%)
DNA	13 (0.2%)	1 (0.3%)	3 (2.3%)	4 (3.3%)

DNA, data not available.

included in this registry. There were replies from the 303 institutions for all 7408 patients.

This study focused on adenocarcinoma, squamous cell carcinoma, large cell carcinoma, and adenosquamous carcinoma patients, excluding small cell lung cancers, low-grade tumors, and other rare histologies, totaling 6644 patients. Because of incomplete data on PM status, 119 patients were excluded, and the remaining 6525 patients were enrolled in this study.

Statistical Analysis

Cumulative survival rates were calculated by Kaplan–Meier estimation, using the date of surgical resection as the starting point and the date of death from any cause or the last
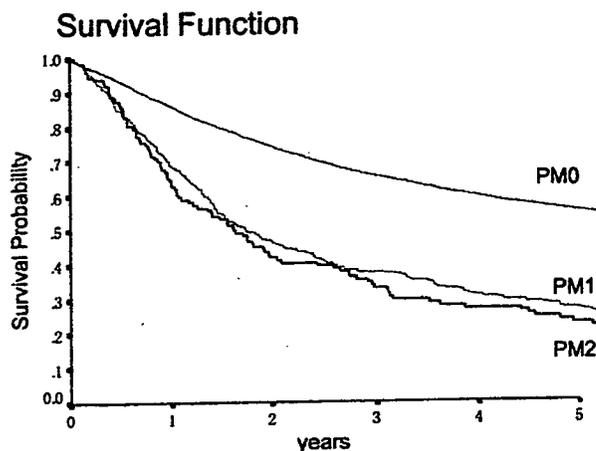
Survival Function

FIGURE 1. Survival curves of patients with PM0, PM1, PM2. The differences in survival between patients with PM0 and PM1 and between patients with PM0 and PM2 were significant ($p < 0.001$, respectively); the difference in survival was not significant between patients with PM1 and PM2 ($p = 0.298$).

Survival Function

FIGURE 2. Survival curves of patients according to pathological T status. There was a significant survival difference between T1 and T2 patients, between T2 and T3 patients ($p < 0.01$, respectively), between T3 and PM1 patients ($p = 0.032$), and between PM1 and T4 patients excluding PM1 patients ($p < 0.01$).

follow-up date as the endpoint. The difference in survival was determined by log-rank analysis. A p value of less than 0.05 was considered to indicate a statistically significant difference. All statistical analyses were performed using software packages (SAS version 8.2, SAS Institute, Inc., Cary, NC; and SPSS version 11.5, SPSS, Inc., Chicago, IL).

RESULTS

Table 1 shows the patient characteristics for each population. There were 6080 PM0 (93.2%), 317 PM1 (4.9%), and 128 PM2 (2.0%) patients. There were 505 (7.7%) patients lost to follow-up. There were 3164 (48.5%) deaths. Causes of deaths were recurrent lung cancer in 2282 (73.1%) patients, other cancer in 109 (3.5%) patients, noncancerous causes in 402 (12.9%) patients, and others in 371 (11.7%) patients.

The 3- and 5-year survival rates were 65.4% and 55.1% for PM0 patients, 37.5% and 26.8% for PM1 patients, and 33.0% and 22.5% for PM2 patients, respectively. There was no statistically significant difference between PM1 and PM2 patients ($p = 0.298$; Figure 1). Five-year survival rates were 72.1% for T1 patients, 46.4% for T2 patients, 34.0% for T3 patients, and 17.6% for T4 patients excluding PM1 patients (non-PM1 T4), respectively. The survival of patients with PM1 was between that of the T3 and T4 patients without PM1. Statistically significant survival differences were detected between T3 and PM1 patients ($p = 0.032$) and between PM1 and non-PM1 T4 groups ($p = 0.0083$; Figure 2).

The 5-year survival rates of PM2 patients and M1 patients excluding PM2 patients (non-PM2 M1) were 22.5% and 20.5%, respectively, and there was no significant difference between the groups ($p = 0.434$; Figure 3).

Five-year survival rates of PM1 patients with pathological N0, N1, and N2 node status were 45.8%, 25.3%, and 11.1%, respectively. Significant survival differences were detected between each N-status group (Figure 4). Five-year
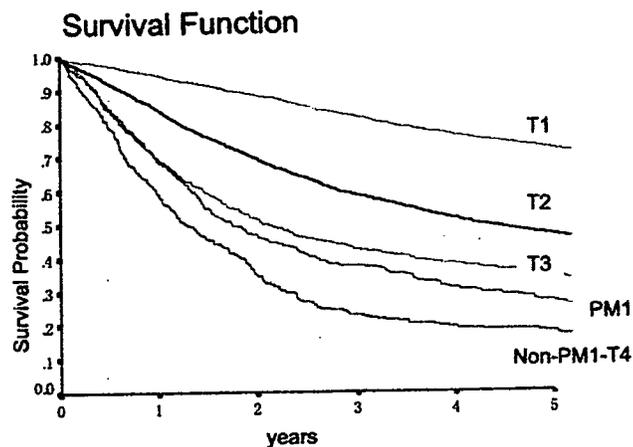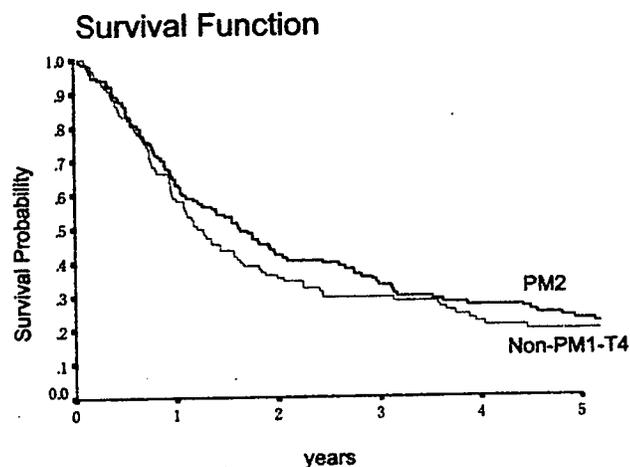
Survival Function

FIGURE 3. Survival curves of patients with PM2 and M1 excluding PM2 (non-PM2 M1). The difference in survival between patients with PM2 and non-PM2 M1 was not significant ($p = 0.434$).

survival rates of PM2 patients with pathological N0, N1, and N2 node status were 42.1%, 7.9%, and 10.0%, respectively. Significant survival differences were detected between N0 and N1 ($p = 0.0016$) and between N0 and N2 ($p = 0.0001$) groups, but there was no significant difference between N1 and N2 groups ($p = 0.644$) (Figure 5). Five-year survival rates of pathological N0 patients with PM0, PM1, and PM2 status were 68.0%, 45.8%, and 42.1%, respectively (Table 2). There were significant survival differences between PM0 and PM1 patients and between PM0 and PM2 patients ($p < 0.01$, respectively). There was no significant survival difference between PM1 and PM2 patients ($p = 0.8775$) (Figure 6). In completely resected (R0) N0 patients, the 5-year survival rates were 69.5% for PM0 patients, 47.3% for PM1 patients, and 46.2% for PM2 patients, respectively. Statistically sig-
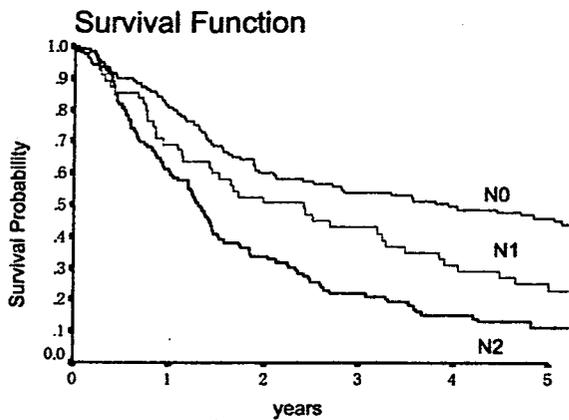
Survival Function

FIGURE 4. Survival curves of PM1 patients according to pathological N status. There were significant survival differences between N0 and N1 patients (p = 0.0176) and between N1 and N2 patients (p = 0.0114).
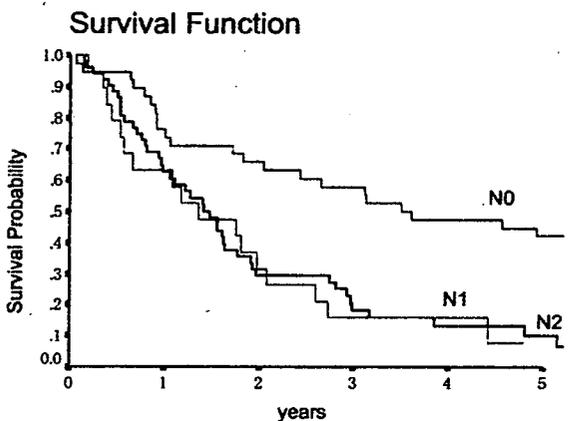
Survival Function

FIGURE 5. Survival curves of PM2 patients according to pathological N status. There were significant survival differences between N0 and N1 patients (p = 0.016) and between N0 and N2 patients (p = 0.0001). There was no significant survival difference between N1 and N2 patients (p = 0.644).

TABLE 2. Five-year Survival Rates of Intrapulmonary Metastasis (PM) and Lymph Node Metastasis

	PM0 (%)	PM1 (%)	PM2 (%)
0	68.0	45.8	42.1
1	44.6	25.3	7.9
2	26.2	11.1	10.2

nificant survival differences were detected between PM0 and PM1 patients (p < 0.01) and between PM0 and PM2 patients (p = 0.004). There was no significant difference between PM1 and PM2 patients (p = 0.922). In pathological N1 cases, there were significant survival differences between PM0 and PM1 patients and between PM0 and PM2 patients (p < 0.01, respectively). There was no significant survival difference between PM1 N1 and PM2 N1 patients (p = 0.0619). In N2
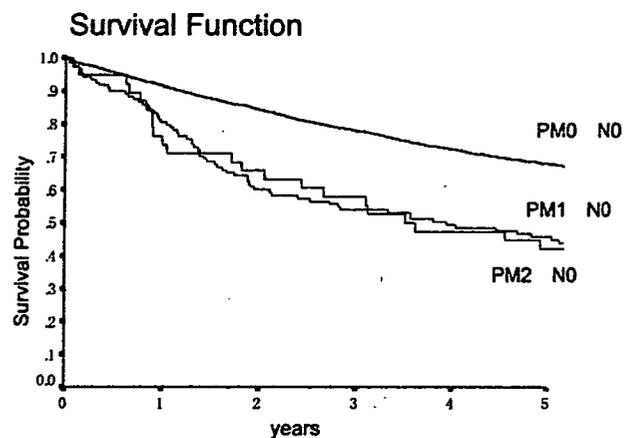
Survival Function

FIGURE 6. Survival curves of pathological N0 patients according to PM status. There were significant survival differences between PM0 and PM1 patients and between PM0 and PM2 patients (p < 0.01, respectively). There was no significant survival difference between PM1 and PM2 patients (p = 0.8775).

patients, there were significant survival differences between PM0 and PM1 patients and between PM0 and PM2 patients (p < 0.01, respectively). There was no significant survival difference between PM1 N2 and PM2 N2 patients (p = 0.998).

DISCUSSION

The current UICC TNM staging system for lung cancer was published in 1997.[4] The system classifies PM in the primary tumor lobe as T4, and PM in different lobes as M1. Several previous studies support the current UICC PM classification,[6-9] but these studies were based on small numbers of PM patients, ranging from 41 to 123. The present study has the greatest number of PM patients ever reported on.

Differentiating PM from synchronous multiple primary lung cancers is often difficult. The criteria proposed by Martini and Melamed[10] in 1975 are still the most practical and commonly used. Pathologists at almost all institutions involved in this study reported that they used these criteria.

Our analyses show a significant survival difference between patients with PM and those without, whereas there was no statistical difference between PM1 and PM2. When analyzing survival rates of pathological N0 patients according to PM status, there were significant survival differences between PM0 and PM1 patients and between PM0 and PM2 patients, but there was no significant survival difference between PM1 and PM2 patients. We conclude that PM is a sign of advanced disease and that PM1 and PM2 should be combined into a single PM category.

The 5-year survival rate was 34.0% for pathological T3 patients, 26.8% for PM1 patients, and 17.6% for non-PM1 T4 patients. PM1 patients fared significantly better than non-PM1 T4 patients. PM2 patients, whose survival curve almost overlapped that of PM1 patients, had almost the same outcome as non-PM2 M1 patients. These findings do not agree with the current UICC staging system,[4] in which M1 patients, including PM2 patients, are classified as stage IV, and in

which T4 patients, including PM1 patients, are classified as stage IIIB. This may be partly explained by the fact these non-PM1 T4 and non-PM2 M1 patients undergoing surgical intervention were highly selected, thus creating to a certain amount of bias. Further studies are necessary to decide the appropriate classification of PM in the TNM staging system revision that is scheduled for 2007.

Within the group of patients with PM1, there was a significant difference in survival in relation to pathological N status. In previous reports, there were no significant survival differences between the different pathological N statuses.[6,7,9] The large number of lung cancer patients with PM1 in the present study resulted in a survival difference in relation to N status being recognized.

In conclusion, there was no significant survival difference between NSCLC patients with PM1 and PM2. The survival of patients with PM1 was between that of the T3 patients and the T4 patients excluding PM1. Further studies are necessary to define PM classification in the TNM staging system.

ACKNOWLEDGMENTS

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Prognostic Factors in 3315 Completely Resected Cases of Clinical Stage I Non-small Cell Lung Cancer in Japan

Teruaki Koike, MD,* Ryosuke Tsuchiya, MD,† Tomoyuki Goya, MD,‡ Yasunori Sohara, MD,§ and Etsuo Miyaoka, PhD‖

Background: The objective of this retrospective study was to identify prognostic factors in completely resected clinical (c-) stage I non-small cell lung cancer cases.

Methods: In 2001, the Japanese Joint Committee of Lung Cancer Registry collected data on the outcome and clinicopathological profiles of 7408 patients who had undergone resection for primary lung cancer in 1994. They included 3315 c-stage I patients who underwent complete resection, and in this study attempted to identify prognostic factors in the c-stage IA and c-stage IB cases.

Results: The overall 5-year survival rate was 66.5%: 74.7% in the 2085 c-stage IA cases and 52.5% in the 1230 c-stage IB cases. The survival curve of the c-stage IA cases was higher than that of the c-stage IB cases. Multivariate analysis of the c-stage IA cases revealed six factors that predicted a significantly better outcome: age, gender, pathological (p-) T status, p-N status, nodal dissection, and tumor diameter (≤ 2 cm), and the same analysis of the c-stage IB cases revealed six factors: age, gender, p-T status, p-N status, operative procedure, and tumor diameter (<5 cm). The c-stage IA patients whose tumor diameter was 2 cm or less had a higher survival rate than the patients whose tumor diameter was more than 2 cm, and the c-stage IB patients whose tumor diameter was less than 5 cm had a higher survival rate than the patients whose tumor diameter was 5 cm or more.

Conclusion: Tumor size is an independent prognostic factor for postoperative survival in c-stage I patients.

Key Words: Clinical stage I lung cancer, Survival, Prognostic factor, Limited pulmonary resection, Maximum tumor diameter.

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L ung cancer is a major cause of cancer deaths worldwide. Because there is no comprehensive registration system for resected lung cancer, there have been only a few reports on the postoperative survival rate in series of 1000 or more patients.[1–6] The Japanese Joint Committee of Lung Cancer Registry, which was established by the Japan Lung Cancer Society and Japanese Association for Chest Surgery, conducted a retrospective study of the outcome and clinicopathological profiles of patients who had undergone resection for primary lung cancer in 1994. In 2001, the Committee sent out a questionnaire and obtained 7408 replies from 303 institutions. The data obtained was reported by Goya et al.[7] in 2005. In their report, the registered cases were classified by clinical stage, and 59% were clinical stage I. Most clinical stage I patients are treated surgically. Because physicians need prognostic factors to select the most appropriate operative procedure for lung cancer patients, this study attempted to retrospectively identify the prognostic factors in patients who had undergone complete resection.

PATIENTS AND METHODS

Patients

In 2001, the Japanese Joint Committee of Lung Cancer Registry accumulated data on 7408 primary lung cancer patients operated on at 303 institutions in 1994. Because a total of 11,227 patients had been operated on for primary lung cancer in Japan in 1994, the data accumulated represented 66% of the cases of resection for primary lung cancer that year.[8] The Committee mailed a questionnaire to the institutions and then collected them. The questionnaire contained 29 items, including questions concerning age; gender; clinical (c-) T, c-N, c-M, c-stage; operative procedure; extent of lymph node dissection; pathological (p-) T, p-N, p-M, p-stage; histological type; maximum tumor diameter; curability; and survival time. The classification of the lung cancer patients was according to the Union Internationale Contre Cancre staging system for lung cancer published in 1997.[9] In 1994, the T factor was assessed by plain chest radiography and computed tomography of the chest. The N factor was assessed by computed tomography of the chest, and the M factor was assessed by computed tomography of the chest, brain, and abdomen and bone scintigraphy. The 3315 subjects selected met the following criteria (1) clinical stage I, (2) non-small cell lung cancer, (3) complete resection, (4) no history of treatment, but cases of a death within 30 days after

*Division of Chest Surgery, The Japanese Joint Committee of Lung Cancer Registration, Niigata Cancer Center Hospital, Niigata, Japan; †Division of Thoracic Surgery, National Cancer Center Hospital; ‡Department of Surgery, Kyorin University; §Department of Surgery, Jichi Medical School; ‖Department of Mathematics, Science University of Tokyo, The Japanese Joint Committee of Lung Cancer Registration.
Disclosure: The authors declare no conflict of interest.
Address for correspondence: Teruaki Koike, MD, Division of Chest Surgery, Niigata Cancer Center Hospital, 2-15-3 Kawagishi-cho, Niigata, 951-8566 Japan, Telephone +81-25-266-5111, Fax +81-25-266-9385; E-mail: koike@niigata-cc.jp
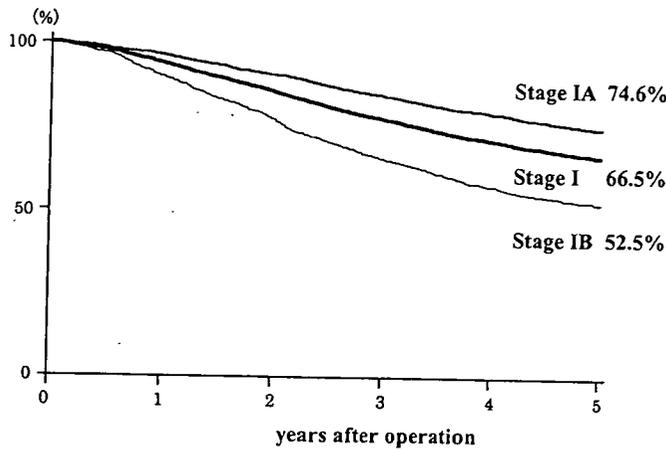
FIGURE 1. Postoperative survival curve. The survival curve of the clinical stage IA patients was significantly higher than that of the clinical stage IB patients ($p < 0.0001$).

TABLE 1. Overall 5-Year Survival Rates of the Clinical Stage I Patients According to Potential Prognostic Factors ($n = 3315$)

Variable	No. of Patients	5-yr Survival, %	p
Age			
<70 yr	2211	71.8	<0.001
≥70 yr	1104	56.0	
Gender			
Female	1236	73.7	<0.001
Male	2079	62.2	
Histology			
Squamous cell carcinoma	893	61.9	<0.001 (Sq vs. Ad)
Adenocarcinoma	2202	69.0	0.001 (Ad vs. other)
Other	220	60.5	0.704 (Sq vs. other)
Clinical T			
cT1	2085	74.7	<0.001
cT2	1230	52.5	
Pathological T			
pT1	1931	77.3	<0.001 (pT1 vs. pT2)
pT2	1183	53.0	<0.005 (pT2 vs. pT34)
pT3–4	201	42.1	<0.001 (pT1 vs. pT34)
Pathological N			
pN0	2627	73.9	<0.001 (pN0 vs. pN1)
pN1	310	45.1	<0.001 (pN1 vs. pN2)
pN2	378	32.8	<0.001 (pN0 vs. pN2)
Pathological M			
pM0	3284	66.8	<0.001
pM1	31	35.5	
Operative procedure			
Pneumonectomy or lobectomy	3140	66.7	0.063
Limited resection	175	63.0	
Nodal dissection			
ND 0–1	590	58.8	<0.001
ND 2	2725	68.2	

Limited resection, segmentectomy or wedge resection; ND, lymph node dissection; ND0, without lymph node dissection or lymph node sampling; ND1, intrapulmonary and hilar lymph node dissection; ND2, ND1 plus mediastinal lymph node dissection.

TABLE 2. Multivariate Analysis of Survival in the Clinical Stage I Cases: Cox Proportional Hazard Model

Variable	HR (95% CI)	p
Age		
<70 yr	Reference	
≥70 yr	1.673 (1.491–1.978)	<0.001
Gender		
Female	Reference	
Male	1.395 (1.224–1.590)	<0.001
Histology		
Squamous cell carcinoma	Reference	
Adenocarcinoma	0.998 (0.872–1.141)	0.972
Other	1.190 (0.949–1.493)	0.132
Clinical T status		
cT1	Reference	
cT2	1.202 (1.030–1.403)	0.019
Pathological T status		
pT1	Reference	
pT2	1.805 (1.537–2.121)	<0.001
pT3–4	2.307 (1.853–2.871)	<0.001
Pathological N status		
pN0	Reference	
pN1	2.132 (1.806–2.516)	<0.001
pN2	3.443 (2.984–3.972)	<0.001
Pathological M status		
pM0	Reference	
pM1	1.591 (1.020–2.483)	0.041
Operative procedure		
Pneumonectomy or lobectomy	Reference	
Limited resection	1.410 (1.094–1.818)	0.008
Nodal dissection		
ND 0–1	Reference	
ND 2	0.734 (0.634–0.849)	<0.001

HR, hazard ratio; CI, confidence interval; Limited resection, segmentectomy or wedge resection; ND, lymph node dissection.

operation were excluded. The age distribution was 13 to 90 years, and the average age was 64.5 years. Sixty-three percent of the subjects were male, 63% were c-stage IA patients, and 37% were c-stage IB patients. Of the 3315 c-stage I patients, 2483 were p-stage I, accounting for 74.9% of the c-stage I patients. Of the 2085 c-stage IA patients, 1508 were p-stage IA (72.4%), and of the 1230 c-stage IB patients, 680 were p-stage IB (55.4%). Sixty-six percent had adenocarcinoma, 27% had squamous cell carcinoma, and 7% had other types. In 1994, the standard operative procedure for primary lung cancer in Japan was lobectomy plus mediastinal lymph node dissection (ND2); mediastinal lymph node dissection had not been performed in approximately 18% of cases. The reason why it has not been performed is unknown.

Statistical Analysis

Survival time was measured from the date of surgery to the date of the most recent follow-up examination. Survival was calculated by the Kaplan-Meier method, and differences in survival were assessed by log-rank analysis. Multivariate analysis for prognostic factors was performed according to

TABLE 3. Overall Survival Rates of the Clinical Stage IA Patients (*n* = 2085)

Variable	No. of Patients	5-yr Survival, %	*p*
Age			
<70 yr	1459	78.2	<0.001
≥70 yr	626	66.7	
Gender			
Female	872	80.7	<0.001
Male	1213	70.4	
Histology			
Squamous cell carcinoma	448	69.1	0.178 (Sq vs. Ad)
Adenocarcinoma	1511	76.8	<0.001 (Ad vs. others)
Other	220	60.5	0.360 (Sq vs. others)
Pathological T			
pT1	1771	78.5	<0.001 (pT1 vs. pT2)
pT2	243	55.0	0.560 (pT2 vs. pT34)
pT3–4	71	48.9	<0.001 (pT1 vs. pT34)
Pathological N			
pN0	1745	80.1	<0.001 (pN0 vs. pN1)
pN1	153	55.4	0.002 (pN1 vs. pN2)
pN2	187	40.3	<0.001 (pN0 vs. pN2)
Pathological M			
pM0	2072	75.0	<0.001
pM1	13	38.5	
Operative procedure			
Pneumonectomy or lobectomy	1930	75.2	<0.001
Limited resection	155	68.6	
Nodal dissection			
ND 0–1	394	66.2	<0.001
ND 2	1691	76.7	
Tumor diameter			
≤2 cm	1068	80.3	<0.001
>2 cm	1017	68.9	

Limited resection, segmentectomy or wedge resection; ND, lymph node dissection.

TABLE 4. Multivariate Analysis of Survival in the Clinical Stage IA Cases: Cox Proportional Hazard Model

Variable	HR (95% CI)	*p*
Age		
<70 yr	Reference	
≥70 yr	1.557 (1.319–1.838)	<0.001
Gender		
Female	Reference	
Male	1.479 (1.233–1.774)	<0.001
Histology		
Squamous cell carcinoma	Reference	
Adenocarcinoma	0.829 (0.680–1.011)	0.064
Other	0.885 (0.619–1.266)	0.503
Pathological T status		
pT1	Reference	
pT2	1.850 (1.493–2.292)	<0.001
pT3–4	2.281 (1.625–3.202)	<0.001
Pathological N status		
pN0	Reference	
pN1	2.168 (1.686–2.789)	<0.001
pN2	3.769 (3.053–4.653)	<0.001
Pathological M status		
pM0	Reference	
pM1	1.543 (0.752–3.166)	0.237
Operative procedure		
Pneumonectomy or lobectomy	Reference	
Limited resection	1.258 (0.938–1.687)	0.125
Nodal dissection		
ND 0–1	Reference	
ND 2	0.663 (0.542–0.810)	<0.001
Tumor diameter		
≤2 cm	Reference	
>2 cm	1.315 (1.108–1.561)	0.020

HR, hazard ratio; CI, confidence interval; Limited resection, segmentectomy or wedge resection; ND, lymph node dissection.

the Cox proportional hazard regression model. A *p* value less than 0.05 was considered statistically significant.

RESULTS

All deaths were included in the calculations of the postoperative survival rates. The overall 5-year survival rate was 66.5% in c-stage I (*n* = 3315), 74.7% in c-stage IA (*n* = 2085), and 52.5% in c-stage IB (*n* = 1230) (Figure 1). The survival curve of the c-stage IA patients was significantly higher than that of the c-stage IB patients (*p* < 0.0001). Nine factors affected postoperative survival in c-stage I disease: age, gender, tumor histology, c-T status, p-T status, p-N status, p-M status, operative procedure, and extent of lymph node dissection. Univariate analysis of the c-stage I cases revealed a significantly better outcome when positive for the following variables: younger than 70 years of age, female, adenocarcinoma, c-T1, p-T1, p-N0, p-M0, and mediastinal nodal dissection (Table 1). Multivariate analysis using these

nine prognostic factors demonstrated that age, gender, c-T status, p-T status, p-N status, p-M status, operative procedure, and extent of nodal dissection were significant prognostic factors (Table 2). Next we tested the nine prognostic factors in relation to the c-IA cases and the c-IB cases. The factor c-T status was excluded as a prognostic factor from the analysis of these groups, and maximum tumor size was added. Univariate analysis of the c-IA cases demonstrated the following factors as predictors of a good outcome: younger than 70 years of age, female, p-T1, p-N0, p-M0, pneumonectomy or lobectomy, mediastinal nodal dissection, tumor diameter of 2 cm or less in the resected specimen (Table 3). Multivariate analysis using these nine prognostic factors demonstrated that age, gender, p-T status, p-N status, extent of nodal dissection, and maximum tumor diameter were significant prognostic factors (Table 4). Univariate analysis of the c-IB cases demonstrated the following factors as predictors of a good outcome: younger 70 years of age, female, p-T1, p-N0, pneumonectomy or lobectomy, mediastinal nodal dissection, tumor diameter less than 5 cm (Table 5). Multivariate anal-

TABLE 5. Overall Survival Rates of the Clinical Stage IB Patients (n = 1230)

Variable	No. of Patients	5-yr Survival, %	p
Age			
<70 yr	752	59.3	<0.001
≥70 yr	478	41.7	
Gender			
Female	364	56.8	0.006
Male	866	50.7	
Histology			
Squamous cell carcinoma	445	54.7	0.461 (Sq vs. Ad)
Adenocarcinoma	691	51.9	0.747 (Ad vs. other)
Other	94	47.3	0.043 (Sq vs. other)
Pathological T			
pT1	160	64.3	0.004 (pT1 vs. T2)
pT2	940	52.5	0.001 (pT2 vs. T34)
pT3–4	130	38.4	<0.001 (pT1 vs. T34)
Pathological N			
pN0	882	61.5	<0.001 (pN0 vs. N1)
pN1	157	35.1	0.004 (pN1 vs. N2)
pN2	191	25.4	<0.001 (pN0 vs. N2)
Pathological M			
pM0	1212	52.8	0.212
pM1	18	33.3	
Operative procedure			
Pneumonectomy or lobectomy	1210	53.1	0.0005
Limited resection	20	20.0	
Nodal dissection			
ND 0–1	196	43.7	0.005
ND 2	1034	54.2	
Tumor diameter			
<5 cm	954	55.8	<0.001
≥5 cm	276	41.1	

Limited resection, segmentectomy or wedge resection; ND, lymph node dissection.

TABLE 6. Multivariate Analysis of Survival in the Clinical Stage IB Cases: Cox Proportional Hazard Model

Variable	HR (95% CI)	p
Age		
<70 yr	Reference	
≥70 yr	1.698 (1.444–1.997)	0.001
Gender		
Female	Reference	
Male	1.261 (1.043–1.525)	0.016
Histology		
Squamous cell carcinoma	Reference	
Adenocarcinoma	1.153 (0.960–1.383)	0.127
Other	1.428 (1.060–1.266)	0.019
Pathological T status		
pT1	Reference	
pT2	1.331 (1.018–1.740)	0.037
pT3–4	1.693 (1.204–2.380)	0.002
Pathological N status		
pN0	Reference	
pN1	2.106 (1.686–2.629)	<0.001
pN2	3.087 (2.536–3.758)	<0.001
Pathological M status		
pM0	Reference	
pM1	1.409 (0.791–2.510)	0.245
Operative procedure		
Pneumonectomy or lobectomy	Reference	
Limited resection	2.118 (1.252–3.583)	0.005
Nodal dissection		
ND 0–1	Reference	
ND 2	0.840 (0.675–1.046)	0.120
Tumor diameter		
<5 cm	Reference	
≥5 cm	1.460 (1.215–1.754)	<0.001

HR, hazard ratio; CI, confidence interval; Limited resection, segmentectomy or wedge resection; ND, lymph node dissection.

ysis using these nine prognostic factors demonstrated that age, gender, p-T status, p-N status, operative procedure, and maximum tumor diameter were significant prognostic factors (Table 6).

DISCUSSION

The mass-screening program for lung cancer in Japan supported by the national government under the Health and Medical Service Law for the Aged was started in 1987.[10] After nationwide implementation of the program, sometimes in combination with computed tomography scanning of the chest, the number of resections for early-stage lung cancer began to increase.[11,12] In 2001, the Japanese Joint Committee of Lung Cancer Registry investigated the outcome and clinicopathological profiles of patients who had undergone resection for primary lung cancer in 1994.[7] The 5-year survival rate of all 6644 patients with non-small cell lung cancer was 52.6%. The 5-year survival rate was 66.5% for the com-

pletely resected c-stage I cases as a whole, with 74.7% for the c-stage IA cases and 52.5% for the c-stage IB cases.

There have been several reports on the postoperative survival of c-stage I cases (Table 7). Mountain[1] reported on the survival rate of patients treated between 1975 and 1988 and stated that the 5-year survival rate was 61% for the c-stage IA cases and 38% for the c-stage IB cases. These survival rates were lower, perhaps because the subjects in their report included patients treated by other modalities and not just by surgery. Conversely, the survival rates were higher in surgically resected c-stage I cases. Suzuki et al.[13] reported a 5-year survival rate was 66.5% for 365 c-I3 cases who were operated on between 1987 and 1994. The lowest 5-year survival rate for c-stage IA cases was 66.4%, and the highest was 77.1%, the lowest and highest rates c-stage IB cases were 44.0% and 53.8%, respectively.[3,13,14] Suzuki et al.[13] investigated the prognostic factors in c-stage I cases and reported that a multivariate analysis revealed clinical T2 status and preoperative high serum carcinoembryonic antigen level as independent predictors of a poor outcome. Multivariate anal-

TABLE 7. Survival Rates of the Clinical Stage I Patients

Author/Period	Clinical Stage	No. of Patients	Histology	Treatment Modality	5-yr Survival, %
Mountain[1]/1975–1988	c-IA	687	NSCLC	Unknown	61
	c-IB	1189	NSCLC	Unknown	38
Naruke et al.[3]/1964–1997	c-IA	786	All	Surgery	70.8
	c-IB	759	All	Surgery	44.0
Suzuki et al.[13]/1987–1994	c-I	365	NSCLC	Surgery	66.5
	c-IA	198	NSCLC	Surgery	77.1
	c-IB	167	NSCLC	Surgery	53.8
Yoshino et al.[14]/1979–1999	c-IA	347	NSCLC	Surgery	66.4
	c-IB	298	NSCLC	Surgery	48.3
This study/1994	c-I	3315	NSCLC	Surgery	66.5
	c-IA	2085	NSCLC	Surgery	74.7
	c-IB	1230	NSCLC	Surgery	52.5

c-I, clinical stage I; c-IA, clinical stage IA; c-IB, clinical stage IB; NSCLC, non-small cell lung cancer.

yses of all factors except serum carcinoembryonic antigen and serum squamous cell carcinoma antigen levels showed that clinical T2 status and age 70 years or older were significant prognostic factors for a poor outcome (Table 8). Iizasa et al.[15] reported that age younger than 70 years, female gender, and p-T1 were significant prognostic factors for a good outcome based on a multivariate analysis of p-stage I cases in which a complete resection with lobectomy had been performed. Takeda et al.[16] reported age and tumor size as significant prognostic factors for non-small cell lung cancer cases in which complete resection had been performed and there were no lymph node metastases. Kawai et al.[17] reported finding that age, gender, and performance status were significant prognostic factors. Based on the above reports, it can be concluded that age, gender, and tumor size are significant prognostic factors for completely resected stage I lung cancer cases.

Recently many surgeons had been debating the operative procedure for stage I lung cancer. Pneumonectomy was the standard surgical procedure when the first successful surgical resection of lung cancer was reported.[18,19] However, in the 1950s, lobectomy was reported to provide postoperative survival comparable with pneumonectomy, and it has been the standard surgical procedure ever since.[20,21] Limited pulmonary resection has recently been a attracting increasing attention for the treatment of peripheral-type small-size lung cancers. Many investigated the correlation between postoperative survival and tumor size in surgically treated stage I lung cancer cases.[5,6,22,23] Therefore, tumor size is a major prognostic factor for stage I cases and is an important factor for determining whether limited surgery is indicated.

In conclusion, the Japanese Joint Committee of Lung Cancer Registry collected the data on outcome and the clinicopathological data of 7408 patients who underwent resection for primary lung cancer in 1994. There were 3315 patients with c-stage I non-small cell lung cancer, and their overall 5-year survival rate was 66.5%: 74.7% for the 2085 c-stage IA and 52.5% for 1230 c-stage IB. The survival curve

TABLE 8. Prognostic Factors in Resected Non-small Cell Lung Cancer Cases

Author/Period	Stage/Operative Procedure	No. of Patients	Significant Factor in Multivariate Analysis
Suzuki et al.[13]/1987–1994	c-I/lobectomy	365	Clinical T status (c-T1 vs. c-T2), age[a] (≥70 yr vs. <70 yr), serum CEA (≥5.0 ng/ml vs. <5.0 ng/ml)
Iizasa et al.[15]/1985–1997	p-I/lobectomy	402	Age (≥70 yr vs. <70 yr), sex, tumor size (p-T1 vs. p-T2)
Takeda et al.[16]/1992–1996	p-N0/lobectomy or pneumonectomy	603	Age (≤60 yr vs. >60 yr), tumor size (>50 mm vs. ≤50 mm)
Kawai et al.[17]/1992–1996	p-IA/all procedures	3082	Age (≤70 yr vs. >70 yr), sex, PS (0 vs. ≥1)
This study/1994	c-I/all procedures	3315	Age (≥70 yr vs. <70 yr), sex, c-T status, p-T status, p-N status, p-M status, operative procedure, nodal dissection
	c-IA/all procedures	2085	Age, sex, p-T status, p-N status, modal dissection, tumor size (≤2 cm vs. >2 cm)
	c-IB/all procedures	1230	Age, sex, p-T status, p-N status, operative procedure, tumor size (<5 cm vs. ≥5 cm)

[a] Multivariate analysis using all factors except serum carcinoembryonic antigen (CEA) and serum squamous cell carcinoma antigen (SCC) levels.

c-I, clinical stage I; p-I, pathological stage I; p-N0, pathologically lymph-node negative; c-T, clinical T status; p-T, pathological T status; p-N, pathological N status; PS, performance status; p-M, pathological M status.

of the c-stage IA cases was higher than that of the c-stage IB cases. Multivariate analysis of the c-stage I cases revealed eight factors that predicted a significantly better outcome: age (younger than 70 years old), gender (female), c-T1, p-T1, p-N0, p-M0, operative procedure (pneumonectomy or lobectomy), and nodal dissection (mediastinal lymph node dissection).

Multivariate analysis of the clinical stage IA cases revealed six factors that predicted a significantly better outcome: age, gender, pathological T status, pathological N status, nodal dissection, and maximum tumor diameter (≤2 cm), and the same analysis of the clinical stage IB cases revealed six factors that predicted a significantly better outcome: age, gender, pathological T status, pathological N status, operative procedure, and maximum tumor diameter (<5 cm). The factors that predicted a better outcome that were common to the completely resected clinical stage I, IA, and IB cases were age, gender, pathological T status, and pathological N status.

The clinical stage IA patients whose maximum tumor diameter was 2 cm or less had a higher survival rate than the patients whose maximum tumor diameter was more than 2 cm, and the clinical stage IB patients whose maximum tumor diameter was less than 5 cm had a higher survival rate than the patients whose maximum tumor diameter was 5 cm or more. Thus, tumor size was the major prognostic factor for postoperative survival.

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1999 年肺癌外科切除例の全国集計に関する報告

肺癌登録合同委員会
日本肺癌学会会長　　　　下方　薫
日本呼吸器外科学会会長　　蘇原泰則

要　約

　日本肺癌学会および日本呼吸器外科学会では，肺癌登録合同委員会を共同で運営し，2002 年に報告された 1994 年の肺癌切除症例の全国集計に引き続き，1999 年に切除された肺癌症例についての全国集計を 2006 年に行った．症例数は 13344，全体の 5 年生存率は 61.6% であった．男性（8878 例）の 5 年生存率は 55.4%，女性（4344 例）では 74.2% であった．c-STAGE 別の 5 年生存率は IA（n＝5939）：77.0%，IB（n＝3242）：60.1%，IIA（n＝226）：53.8%，IIB（n＝1304）：43.6%，IIIA（n＝1723）：38.0%，IIIB（n＝567）：33.6%，IV（n＝211）：27.0% であった．p-STAGE 別の 5 年生存率は IA（n＝5007）：83.3%，IB（n＝2803）：66.4%，IIA（n＝400）：60.1%，IIB（n＝1388）：47.2%，IIIA（n＝1944）：32.8%，IIIB（n＝1179）：30.4%，IV（n＝397）：23.2% であった．組織型別 5 年生存率は腺癌 67.3%，扁平上皮癌 52.5%，大細胞癌 45.5%，小細胞癌 48.1%，腺扁平上皮癌 42.1% であった．術死は 123 例（0.9%），在院死は 146 例（1.1%）に認められた．本登録は個人を特定できる情報を除いて行われており，集計成果は世界に類を見ない大規模かつ詳細なものと考える．今後予定されている 2004 年切除例登録への参加有資格施設の積極的な取り組みを期待したい．（肺癌．2007;47:299-311）

Lung Cancer in Japan :
Analysis of Lung Cancer Registry for Resected Cases in 1999

Japanese Joint Committee of Lung Cancer Registry

Kaoru Shimokata　President, The Japan Lung Cancer Society

Yasunori Sohara　President, The Japanese Association for Chest Surgery

Summary

　The Japan Lung Cancer Society and the Japanese Association for Chest Surgery jointly established the Japanese Joint Committee of Lung Cancer Registry. Following the analysis of lung cancer registry for resected cases in 1994, an analysis of resected cases for 1999 was made in 2006. Lung cancer cases (13344 cases) that were surgically resected during 1999 were registered and collected for analysis by the committee. The survival rate for the total cases was 61.6%. The 5-year survival rate was 55.4% in male (n＝8878) and 74.2% in female (n＝4344). The 5-year survival rates by c-STAGE were: c-STAGE IA (n＝5939): 77.0%; IB (n＝3242): 60.1%; IIA (n＝226): 53.8%; IIB (n＝1304): 43.6%; IIIA (n＝1723): 38.0%; IIIB (n＝567): 33.6%; IV (n＝211): 27.0%. The 5-year survival rates by p-STAGE were: p-STAGE IA (n＝5007): 83.3%; IB (n＝2803): 66.4%; IIA (n＝400): 60.1%; IIB (n＝1388): 47.2%; IIIA (n＝1944): 32.8%; IIIB (n＝1179): 30.4%; IV (n＝397): 23.2%. The 5-year survival rates by histological type were: adenocarcinoma: 67.3%; squamous cell carcinoma: 52.5%; large cell carcinoma: 45.5%; small cell carcinoma: 48.1%; adenosquamous carcinoma: 42.1%. Operative deaths amounted to 123 cases (0.9%), hospital deaths to 146 cases (1.1%). The results of this

　著者連絡先：奥石義彦，肺癌登録合同委員会，杏林大学医学部呼吸器外科，〒181-8611　東京都三鷹市新川 6-20-2（e-mail: kyorin-surg2@mvd.biglobe.ne.jp）.
　Correspondence: Yoshihiko Koshiishi, Japanese Joint Committee of Lung Cancer Registry, Department of Surgery, School of Medicine, Kyorin University, 6-20-2 Shinkawa, Mitaka, Tokyo 181-8611, Japan (e-mail: kyorin-surg2@mvd.biglobe.ne.jp).

analysis is one of the most enormous and detailed one ever made .(*JJLC.* 2007;47:299-311)

はじめに

　日本肺癌学会・日本呼吸器外科学会で運営している肺癌登録合同委員会の活動の一環として，2002年に1994年切除例の集計結果を報告した.[1] その目的は，①登録参加施設での肺癌症例の把握，②年齢別・性別頻度，③組織型別頻度，④c-TNM と p-TNM 各因子の集計，⑤それぞれの病期別の生存率を求めること，とされた．これらの基本資料は学会員に提示されるとともに，治療成績について英文でも報告された.[2,3]

　今回も前回同様に肺癌に関する基礎資料を収集することを目的に集計を行ったので，報告する.

Table 1. Age Distribution and Sex

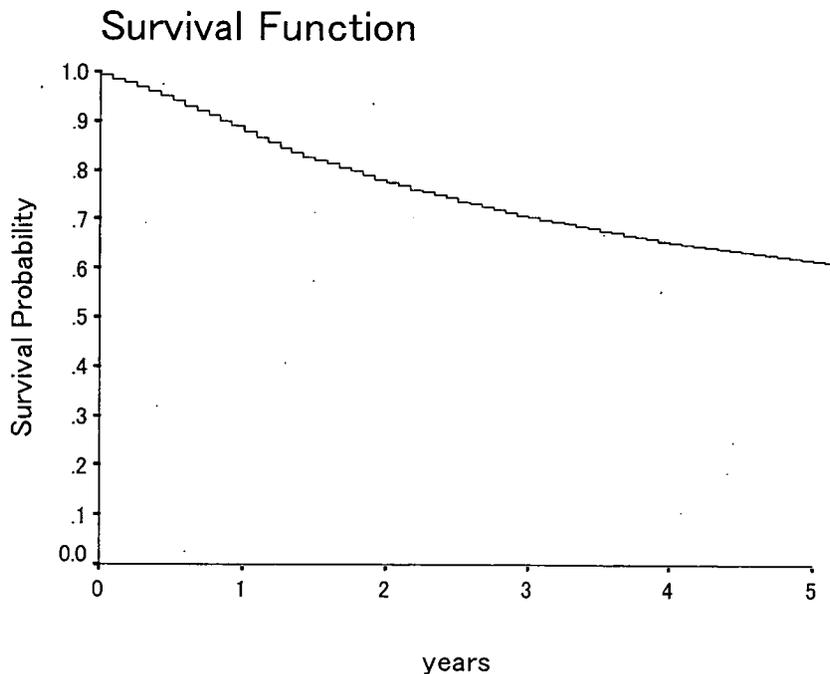| Age	Sex		Number
	Male	Female	
10 ～	1	7	8
20 ～	9	6	15
30 ～	72	49	121
40 ～	457	269	726
50 ～	1386	912	2298
60 ～	3102	1475	4577
70 ～	3389	1389	4778
80 ～	388	206	594
90 ～	3	1	4
Total	8807	4314	13121

(Default: 223)

Survival Function

Figure 1. Survival function of overall cases.

Table 2. Overall Survival Rate

① 1999

Year	1 Y (%)	2 Y (%)	3 Y (%)	4 Y (%)	5 Y (%)
Survival rate	87.9	77.5	70.3	65.3	61.6

(Number of cases: 13344)

② 1994

Year	1 Y (%)	2 Y (%)	3 Y (%)	4 Y (%)	5 Y (%)
Survival rate	84.1	71.3	62.3	56.1	51.9

(Number of cases: 7238)

Table 3. Survival Rates According to Sex

① 1999

Sex	Cases	1 Y (%)	2 Y (%)	3 Y (%)	4 Y (%)	5 Y (%)
Male	n = 8878	85.0	73.1	65.2	59.6	55.4
Female	n = 4344	93.7	86.4	80.9	77.1	74.2

Log rank statistic analysis; female vs. male (significance; p = 0.0000). (n = 13222)

② 1994

Sex	Cases	1 Y (%)	2 Y (%)	3 Y (%)	4 Y (%)	5 Y (%)
Male	n = 5029	81.2	67.9	58.6	52.4	48.2
Female	n = 2150	91.0	78.8	71.0	65.0	61.0

(n = 7179)

Table 4. Survival Rates According to c-STAGE

c-STAGE	Cases	1999					1994
		1 Y (%)	2 Y (%)	3 Y (%)	4 Y (%)	5 Y (%)	5 Y (%)
IA	5939	95.6	89.5	84.4	80.4	77.0	71.5
IB	3242	88.5	77.9	70.3	64.8	60.1	50.1
IIA	226	88.1	77.5	64.8	57.3	53.8	47.8
IIB	1304	78.6	63.2	53.6	47.3	43.6	40.4
IIIA	1723	75.3	57.7	46.9	41.0	38.0	34.6
IIIB	567	70.1	54.6	45.8	38.6	33.6	27.6
IV	211	64.9	41.3	36.3	28.8	27.0	19.9
Total	13212						7168

Log rank statistic analysis revealed that there were no significant differences between IB vs. IIA (p = 0.0780) and IIIA vs. IIIB (p = 0.1163) in 1999.

調査対象と集計方法

対象施設は 2005 年時点での日本呼吸器外科学会の認定施設 (226 施設), 関連施設 (275 施設) および日本肺癌学会評議員勤務施設で上記以外の施設 (13 施設) とした. 登録参加施設は 386 施設で, 不参加は 80 施設, 1999 年当時肺癌切除を行っていなかった施設は 47 であった. 登録方法はエクセルシートを用いた登録票を作成, 各施設に郵送し (2005 年 6 月), 施設内で連結可能匿名化を行った上で情報入力をお願いし, 郵送で回収した (2005 年 12 月).

内容は「資料編」に掲載されている (1) 性別以下 (32) 術後合併症までの 32 項目である. 2002 年報告との主な相違は前回最終項目「リンパ節転移および郭清」を削除し, 新たに (3) PS, (5) T4 の根拠, (15) 合併切除部位, (31) 併存疾患, および (32) 術後合併症を追加した点で

Survival Function

Figure 2. Survival function according to sex.

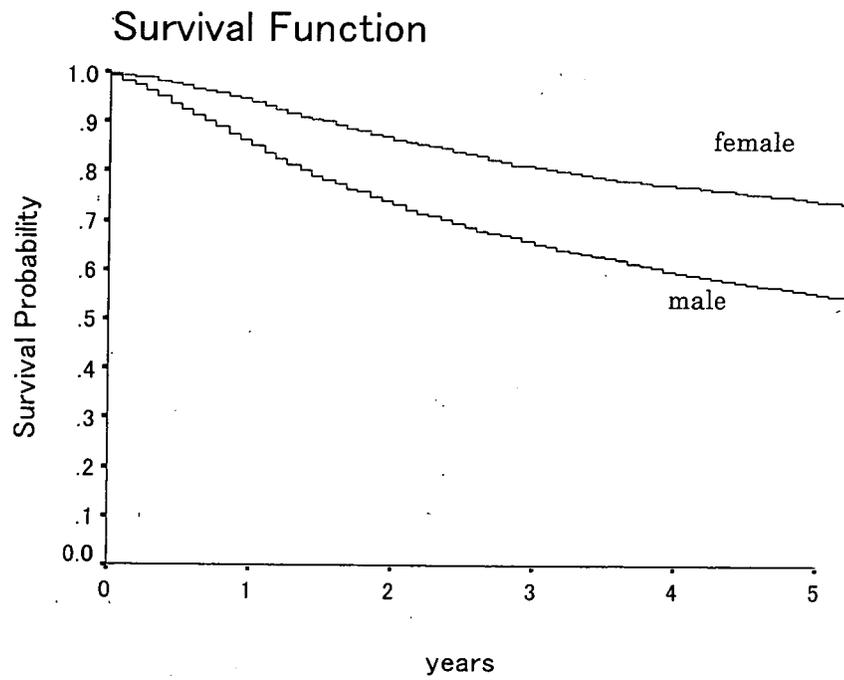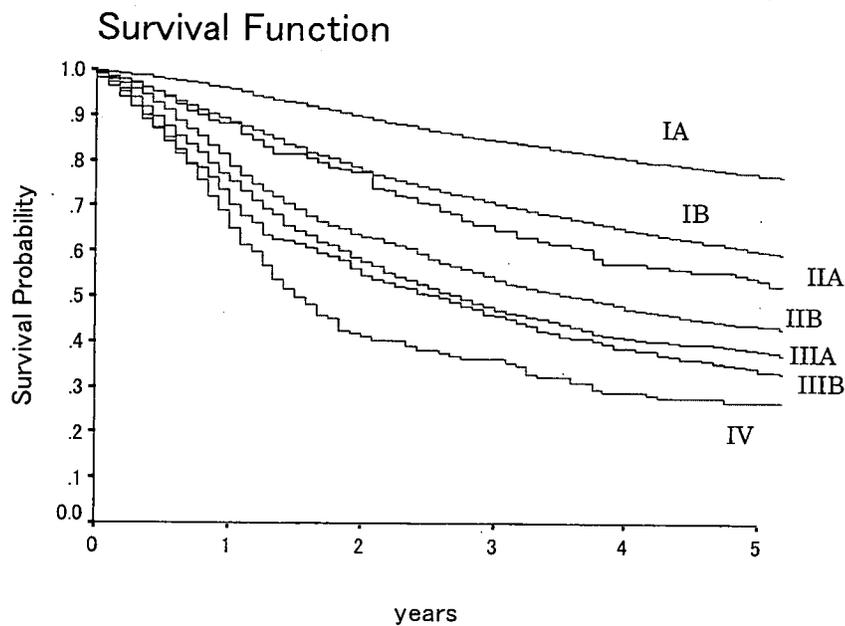## Survival Function

Figure 3. Survival function according to c-STAGE.

ある.

統計処理は前回同様に行い，必要な変数の欠損は集計・解析から除外し，生存時間分布関数は手術月から最終生死確認月を生存期間，最終生死確認月における死亡をイベント，生存を打ち切りとし，Kaplan-Meier 法に

よって推定した．予後項目の不明は打ち切り症例とした.

結 果

集計症例数は前回より大幅に増加し，13344 例となった．欠損値が多かった項目は (3) PS，(9) 術前治療，

Table 5. Survival Rates According to p-STAGE

p-STAGE	Cases	1999					1994
		1 Y (%)	2 Y (%)	3 Y (%)	4 Y (%)	5 Y (%)	5 Y (%)
IA	5007	97.0	93.2	89.5	86.2	83.3	79.2
IB	2803	91.1	82.6	76.0	71.0	66.4	60.1
IIA	400	91.8	80.3	69.9	63.8	60.1	58.6
IIB	1388	81.5	66.0	57.7	51.2	47.2	42.2
IIIA	1944	77.9	58.3	45.5	37.3	32.8	28.4
IIIB	1179	72.0	53.6	41.1	34.1	30.4	20.2
IV	397	61.9	39.2	31.7	26.1	23.2	19.3
Total	13118						7047

Log rank statistic analysis revealed that there were significant differences between all stages. The largest p-value (0.0245) was observed between IIIA and IIIB in 1999.

Table 6. Survival Rates According to Histologic Type (n = 13010)

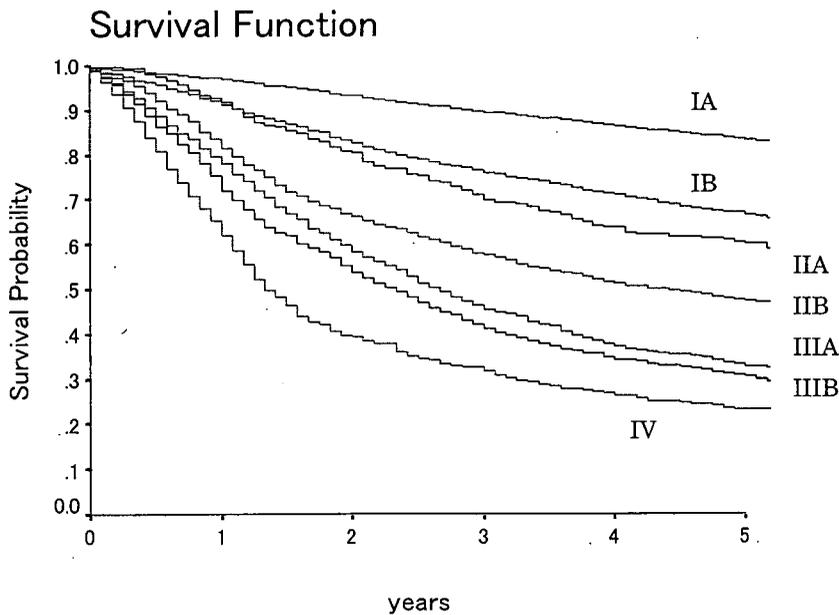| Histologic type	Cases	1 Y (%)	2 Y (%)	3 Y (%)	4 Y (%)	5 Y (%)
Small cell carcinoma	390	82.1	65.8	54.2	50.8	48.1
Squamous cell carcinoma	3700	83.3	70.5	62.3	56.7	52.5
Adenocarcinoma	8239	91.2	82.4	75.8	70.8	67.3
Large cell carcinoma	474	74.4	61.6	55.0	49.9	45.5
Adenosquamous carcinoma	207	77.7	60.5	53.2	46.8	42.1
Total	13010					

Survival Function

Figure 4. Survival function according to p-STAGE.

(14) 手術根治度, (20) 胸水細胞診, (21) 最大径, (22) p-TNM_T, (25) p-STAGE, および (27) 病理学的腫瘍遺残であった. 1994 年切除例の集計の際よりやや増加した理由として, 前回は欠損値について再三事務局から確認を行ったのに対し, 今回は基本的に欠損値に対する補完の依頼を行わなかったためと考えている. 残る 24 項目

Survival Function
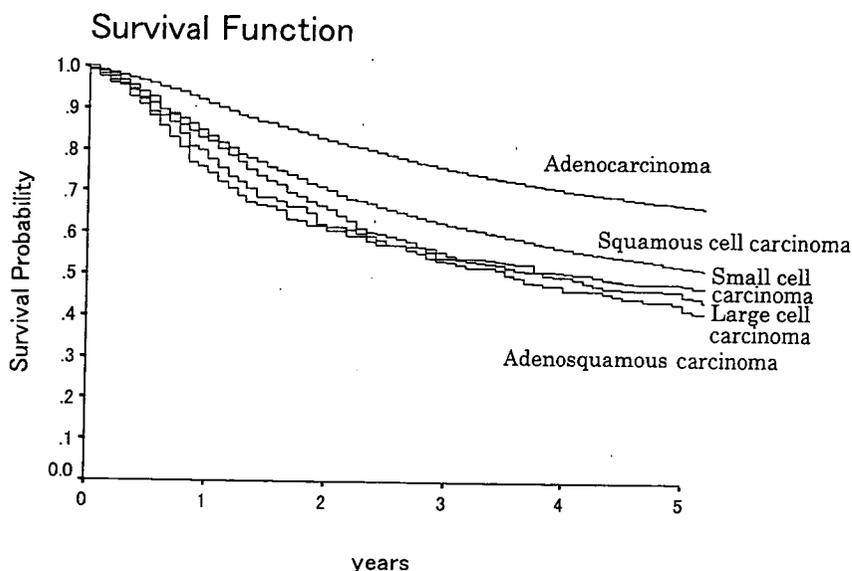
Log rank statistic analysis revealed that there were significant differences between adenocarcinoma and other all histologic types (p = 0.0000). There were also significant differences between squamous cell carcinoma and large cell carcinoma (p = 0.0002) and adenosquamous carcinoma (p = 0.0026).

Figure 5. Survival function according to histologic type.

の欠損値は 1% 以下であった.

統計結果：性別は男性 8878, 女性 4344 で, 各々の年齢構成は Table 1 に示す. 最小 13 歳, 最高 91 歳, 平均は 65.8 歳, 標準偏差は 9.8 (資料編：記述統計量：年齢) であった. 前回調査と比較し, 女性の比率が約 3.1% 増加し年齢は 1.3 歳増加していた. 予後の判明率は 90.5% で, 前回を 0.9% 下回った (資料編 (28) 予後). 全体の 5 年生存率は 61.6% で, 前回を 9.7% 上回った (Figure 1, Table 2). 男女別では前回同様女性の生存率が有意差をもって良好であった (Figure 2, Table 3). 前回との比較でも 5 年生存率の改善は女性が 13.2% であり, 男性の 7.2% を上回っていた.

臨床病期別の症例数, 生存率を Table 4, Figure 3 に示す. 5 年生存率は各病期とも前回を上回っており, 特に IB では 10% 向上した. 各病期間の有意差検定では, IB と IIA, IIIA と IIIB の間に有意差が見られなかった.

病理病期別の症例数, 生存率を Table 5, Figure 4 に示す. 病理病期でも 5 年生存率は各病期で前回を上回っており, 特に IIIB 期では 10% 以上の改善を認めた. 各病期間の有意差検定では各病期間に有意差を認めた.

組織型別の頻度は資料編 (26) 組織型に示す. 腺癌が 6.0% 増加し, 扁平上皮癌は 5.3% 減少していた. 組織型別の生存率を Table 6, Figure 5 に示す. 腺癌の生存率が他の組織型と比較して有意に良好であったほか, 前回集計と異なり, 扁平上皮癌と大細胞癌および腺扁平上皮

癌との間にも有意差が認められた.

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本肺癌登録に貢献した研究者

肺癌登録合同委員会：委員：土屋了介, 蘇原泰則, 淺村尚生, 森 雅樹, 中西洋一, 江口研二, 宮岡悦良
：協力者：安元公正, 祖父江友孝, 加藤治文, 坪井正博
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