



Clinicopathological characteristics and surgical results of lung cancer patients aged up to 50 years: The Japanese Lung Cancer Registry Study 2004



Masayoshi Inoue^{a,*}, Meinoshin Okumura^{a,1}, Noriyoshi Sawabata^{a,1}, Etsuo Miyaoka^{b,1}, Hisao Asamura^{c,1}, Ichiro Yoshino^{d,1}, Hirohito Tada^{e,1}, Yoshitaka Fujii^{f,1}, Yoichi Nakanishi^{g,1}, Kenji Eguchi^{h,1}, Masaki Mori^{i,1}, Hideo Kobayashi^{j,1}, Kohei Yokoi^{k,1}

^a Department of General Thoracic Surgery, Osaka University Graduate School of Medicine, Osaka, Japan

^b Department of Mathematics, Science University of Tokyo, Tokyo, Japan

^c Division of Thoracic Surgery, National Cancer Center Hospital, Tokyo, Japan

^d Department of General Thoracic Surgery, Chiba University Graduate School of Medicine, Chiba, Japan

^e Division of General Thoracic Surgery, Osaka City General Hospital, Osaka, Japan

^f Department of Oncology, Immunology and Surgery, Nagoya City University Graduate School of Medical Science and Medical School, Nagoya, Japan

^g Department of Clinical Medicine, Research Institute for Diseases of the Chest, Faculty of Medical Sciences, Kyushu University, Fukuoka, Japan

^h Department of Medical Oncology, Teikyo University School of Medicine, Tokyo, Japan

ⁱ Department of Pulmonary Medicine, Sapporo-Kosei General Hospital, Hokkaido, Japan

^j Division of Respiratory Disease, National Defense Medical College, Tokorozawa, Japan

^k Department of Thoracic Surgery, Nagoya University Graduate School of Medicine, Nagoya, Japan

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ABSTRACT

Objective: The clinicopathological characteristics and surgical results of young lung cancer patients were investigated.

Materials and methods: Seven hundred and four (6.0%) patients with lung cancer, aged up to 50 years, were enrolled from among the 11,663 patients registered in the Japanese Lung Cancer Registry Study 2004, and their clinical data were compared with those of 10,959 patients older than 50 years. This epidemiological study is based on the single year registration of surgically treated patients in the major institutes in Japan.

Results: The 5-year overall survival rate (5Y-OS) and the 5-year lung cancer-related survival rate was 79.2%/69.0% ($p < 0.001$) and 81.3%/76.6% ($p = 0.005$) in the young/old groups, respectively. In the young/old groups, lobectomy and pneumonectomy was performed in 76.9%/78.0% and 5.7%/3.2%, respectively; adjuvant therapies were given preoperatively in 10.4%/4.7% ($p < 0.001$) and postoperatively in 31.4%/24.5% ($p < 0.001$). The proportions of patients with p-stage IIIA (18.2%) and adenocarcinoma histology (78.7%) were higher in the young group. The 5Y-OS was 94.8%/86.2% for p-stage IA ($p < 0.001$), 87.0%/73.2% for p-stage IB ($p = 0.001$), 61.0%/61.6% for p-stage IIA ($p = 0.595$), 71.0%/48.4% for p-stage IIB ($p = 0.003$), 49.6%/39.4% for p-stage IIIA ($p = 0.020$), and 80.0%/24.8% for p-stage IIIB ($p = 0.012$); it was 83.5%/80.7% for females ($p = 0.106$) and 75.1%/62.3% for males ($p < 0.001$) in the young/old groups. The postoperative survival was significantly better with all operative procedures in the young group. The 5Y-OS after recurrence was 17.9%/13.4% in the young/old groups ($p = 0.016$). In the young group, the 5Y-OS was better in females (83.5%) than in males (75.1%, $p = 0.002$), and for patients with adenocarcinoma (80.3%) than for those with squamous cell carcinoma (68.5%, $p = 0.013$). Age up to 50 years was identified as an independent better prognostic factor on multivariate analysis.

Conclusions: The postoperative survival in lung cancer patients aged up to 50 years was better than that in patients older than 50 years.

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* Corresponding author at: Department of General Thoracic Surgery, Osaka University Graduate School of Medicine, L5-2-2 Yamadaoka, Suita-city, Osaka 565-0871, Japan. Tel.: +81 6 6879 3152; fax: +81 6 6879 3164.

E-mail address: mi@thoracic.med.osaka-u.ac.jp (M. Inoue).

¹ For the Japanese Joint Committee of Lung Cancer Registry.

1. Introduction

Lung cancer is a leading cause of malignancy-related death. The American Cancer Society estimates that 226,160 people will be diagnosed and 160,340 patients will die of lung cancer in the United States in 2012 [1]. Lung cancer occurs mainly in older people, and fewer than 2% of all cases are found in people younger than 45 years in the USA [1]. The Ministry of Health, Labor, and Welfare, Japan, reported that 69,813 people died of lung cancer in 2010 in Japan, and the number is still increasing. According to the Japanese Lung Cancer Registry Study, the number of patients younger than 50 years ranged from 5.0% to 8.2% of all resected cases since 1994 [2]. Because of the small size of the young population, the clinical features of young lung cancer patients remain unclear.

Better survival of lung cancer patients in the middle-aged group (45–60 years) as compared to the young (<45 years) or old group (>60 years) was reported by a multicenter study [3]. Several previous studies also revealed better postoperative survival rate in the young lung cancer patients [4–6], while other reports showed equivalent survival outcome to the old patients [7,8]. So, the survival superiority of the young patients is still controversial in lung cancer. Active treatment with multiple modalities was recommended in young patients in association with these results, while the study cohort included all lung cancer patients treated with surgery, chemotherapy, and irradiation [3]. However, the clinicopathological characteristics and surgical results of young patients with lung cancer have not yet been identified. Recent developments in chemotherapy and molecular targeted therapy might contribute to prolonged survival and improvement of results with multimodality management, especially in young patients, who are expected to be able to tolerate active treatments.

Patients aged up to 50 years extracted from the Japanese Lung Cancer Registry Study 2004 who underwent surgical resection were evaluated in order to clarify their clinicopathological characteristics and the results of surgical intervention in the present study [2].

2. Materials and methods

2.1. Patients

A total of 704 lung cancer patients aged up to 50 years were extracted from among the 11,663 patients listed in the Japanese Lung Cancer Registry Study 2004, which was conducted as a multicenter surveillance study of patients who underwent surgery by the Japanese Joint Committee of the Lung Cancer Registry (JJCLCR) [2]. JJCLCR is officially authorized by The Japan Lung Cancer Society, The Japanese Association for Chest Surgery, The Japanese Respiration Society, and The Japan Society for Respiratory Endoscopy. Of the 605 teaching hospitals certified by the Japanese Board of General Thoracic Surgery, 253 participated in this registry. All patients analyzed in the present study underwent surgery in 2004 and the single year registration included the following data: (1) demographic background (age and sex), (2) preoperative status (Eastern Cooperative Oncology Group performance status (ECOG PS), preoperative comorbidity, smoking status, tumor markers), (3) clinical TNM, (4) induction therapy, (5) operative procedure, (6) postoperative morbidity, (7) tumor histology, (8) adjuvant therapy, (9) pathological TNM. The clinicopathological characteristics and the results of surgical intervention in patients aged up to 50 years were analyzed in detail and compared to those of 10,959 patients older than 50 years. The data collected using the UICC-TNM staging system (version 6) were converted to the UICC-TNM staging system (version 7) to assess the extent of lung cancer [9].

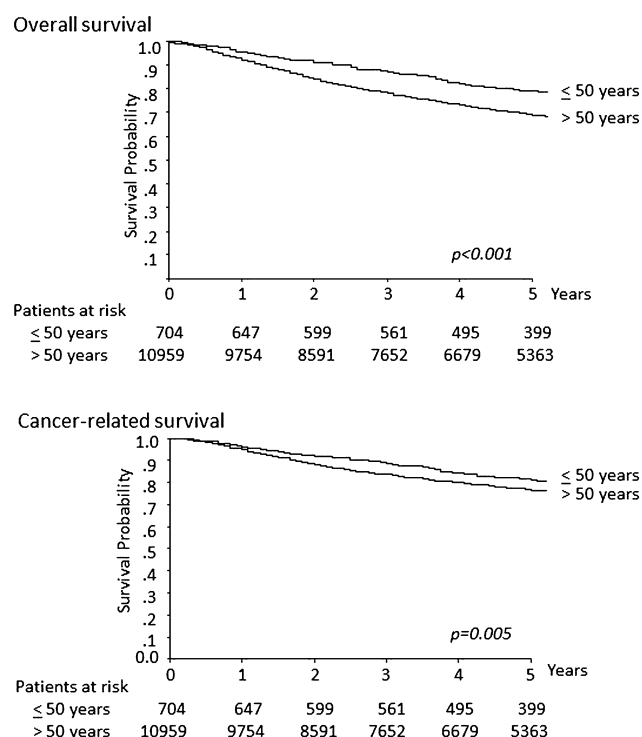


Fig. 1. The overall and lung-cancer related survival rates for patients aged up to and older than 50 years with surgical intervention. The postoperative survival rate was significantly better in the young group.

2.2. Statistical analyses

All data were extracted and analyzed by a JJCLCR member biostatistician (EM). Survival after pulmonary resection was estimated according to the Kaplan–Meier method, and survival differences were tested using the log-rank test. The prognostic effect of variables on survival was analyzed using the multivariate Cox regression model with variables of sex, ECOG-PS, smoking history, comorbidity, operative procedure, p-stage, histology, adjuvant chemotherapy. The χ^2 -test was used to compare the rates between groups. A *p* value less than 0.05 was considered significant.

3. Results

Patients' characteristics, with a comparison of patients aged up to 50 years and older than 50 years, are shown in Table 1. The proportion of females was significantly higher in the young group than in the old group ($p < 0.001$). Performance status (ECOG) was significantly better in the young group ($p < 0.001$). Smoking history and preoperative comorbidity were significantly more frequent in the old group ($p < 0.001$). The operative procedure was significantly different ($p = 0.013$) and the rate of pneumonectomy was higher in the young group. The distribution of p-stage showed the significant difference, and the proportion of p-stage IB and IIA was lower and that of locally advanced disease with p-stage IIIA was higher in the young group as compared to the old group. The proportion of histopathology was significantly different ($p < 0.001$) and the rate of adenocarcinoma was higher in the young group. Young patients received both preoperative and postoperative adjuvant therapy more frequently than old patients.

The 5-year overall survival rate (5Y-OS) was 79.2% and 69.0% in the young and old groups, respectively ($p < 0.001$), as shown in Fig. 1. The 30-days mortality was 1/704 (0.1%) and 47/10959 (0.4%), and the hospital mortality was 2/704 (0.3%) and 134/10959 (1.2%) in the young and old groups, respectively. The morbidity was

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