

Trends and Updated Statistics of Lung Cancer in Korea

Chan Kwon Park, M.D., Ph.D.^{1,2} and Seung Joon Kim, M.D., Ph.D.^{1,2}

¹Division of Pulmonology, Department of Internal Medicine, ²The Cancer Research Institute, College of Medicine, The Catholic University of Korea, Seoul, Korea

The clinical characteristics and prognostic factors of patients with lung cancer are expected to differ with respect to geographical differences from the past to the future. In the Republic of Korea, a few national lung cancer surveys have been conducted.

In 1997, Lee et al.¹ performed the first survey. Among 3,794 patients, they found that the most frequent symptom was cough (57.2%), and asymptomatic patients accounted for only 7.2% of all patients. Smokers, including current and ex-smokers, accounted for 76.5% (89.8% male and 25.4% female). Considering the high smoking rate, it is reasonable to think that the tumor was mainly located in the central lung region, and the major results of histopathological assessment were squamous cell carcinoma (44.7%) and small cell cancer (16.8%). Therefore, the principal diagnostic tool was bronchoscopic biopsy. In contrast, percutaneous needle biopsy was the main tool for the diagnosis of adenocarcinoma (27.9%), which usually occurred in the peripheral lung region. Advanced stages IIIB and IV disease were detected in 65.3% of patients with non-small cell lung cancer (NSCLC).

In 2005, In et al.² performed the second survey. Among the total of 8,788 patients, they found that cough (38.1%) was still the most frequent symptom, and 6.5% of the patients had no subjective symptoms. These asymptomatic patients were of

younger age, more often female, non-smokers, and more commonly had adenocarcinoma. These asymptomatic patients displayed significantly better prognosis from NSCLC as they exhibited earlier stage of disease (stage I–II, 61.3%; stage III, 22.1%; and stage IV, 16.6%) than symptomatic patients (stage I–II, 22.3%; stage III, 35.4%; and stage IV, 42.4%). Sixty percent of asymptomatic patients could undergo surgery, whereas only 19.3% of symptomatic patients could undergo surgical treatment.

In et al.² also reported that 40.5% of the patients were current smokers, followed by 30.6% former smokers and 28.9% never-smokers, whereas only 20.3% of female patients with lung cancer had a smoking history. Compared to the results of the first national survey, the proportion of female patients with lung cancer increased from 20.7% to 24.2%, and the incidence of never-smokers also increased from 23.5% to 28.9%.³

In contrast to the results of the first national survey, adenocarcinoma (36.1%) was the most common result of histopathological assessment, followed by squamous cell carcinoma (32.1%) and small cell carcinoma (13.5%). The leading histopathologic subtype had changed from squamous cell carcinoma to adenocarcinoma.

Shin et al.⁴ obtained data from the Korea Central Cancer Registry (1999–2012) and Statistics Korea (1983–2013). They reported that the Korean lung cancer mortality began to decrease in 2002. Among patients diagnosed between 1993–1997 and 2008–2012, the overall 5-year relative survival rates improved significantly from 11.2% to 19.3% in men and 14.7% to 28.2% in women, respectively.

Recently, Kim et al.⁵ conducted a pilot study using data of the Korean nationwide lung cancer registry. Among the 23,254 new patients with lung cancer enrolled in the Korea Central Cancer Registry in 2013, a total of 489 patients from 19 hospitals were evaluated in terms of clinical characteristics, histopathology, and prognostic factors. The clinical data including age, sex, body mass index, smoking history, symptoms, performance status, histopathologic type, clinical staging, epidermal growth factor receptor (*EGFR*) mutation status, initial treatment modality, and survival status were retrospectively analyzed until December 2015. They found that the

Address for correspondence: Seung Joon Kim, M.D., Ph.D.

Division of Pulmonology, Department of Internal Medicine, Seoul St. Mary's Hospital, The Cancer Research Institute, College of Medicine, The Catholic University of Korea, 222 Banpo-daero, Seocho-gu, Seoul 06591, Korea

Phone: 82-2-2258-6063, **Fax:** 82-2-599-3589

E-mail: cmcksj@catholic.ac.kr

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characteristics in Korean patients with lung cancer changed compared to those found in the previous two national lung cancer surveys. Lung cancer in Korea occurred predominantly in elderly patients, and the proportion of patients with adenocarcinoma (48.7%) further increased compared with those in the first survey in 1997 (27.9%) and second survey in 2005 (36.1%)³. They indicated that poor prognosis was exhibited by patients who were older, ever-smokers, malnourished, untreated, and advanced stage. They also identified that 13.1% of patients were asymptomatic and showed good prognosis in terms of mortality (hazard ratio, 0.265), which was compatible with the results of the second survey in 2005.

According to the Korean Statistical Information Service, lung cancer deaths in the Korean population have been increasing in both men and women since the early 1980s. Among the total of 17,980 deaths due to lung cancer in 2017, men accounted for 13,272 and women accounted for 4,708. Of a total of 24,267 incidences of lung cancer in 2015, men accounted for 17,015 and women accounted for 7,252. The never-smoker lung cancer incidence was estimated to increase in Korea⁶. Considering that the lung cancer incidence in Korean women was 3,592 in 2000, it increased by more than 2-fold in 15 years. However, after age-standardized adjustment, the lung cancer incidence has recently been decreasing in both men and women⁷. The reason for the decreasing incidence after the age adjustment could be growth in the Korean elderly population. In the United States, Henley et al.⁸ demonstrated that the female lung cancer incidence rate in 2015 increased with age, with the highest rate in those aged 75–79 years. Secondhand smoke, radon gas, air pollution, cooking oil fume, occupational exposure, and female sex hormones were regarded as risk factors of lung cancer^{9–15}.

The Korean Statistical Information Service indicated that the smoking rate in Korean women was 6.4% in 2016, which has remained stable since 1998. The passive smoking rate in non-smoking women was 7.9% in 2016, which has been decreasing since 2005. According to epidemiological, clinical, and biological characteristics, lung cancer in never-smokers is a different disease from lung cancer in smokers¹⁶.

A study from the Korean Association for Lung Cancer in 2014 investigated 743 of a total of 7,355 Korean female patients with lung cancer. Most Korean women who developed lung cancer in 2014 were never-smokers (87.6%). According to smoking status, female lung cancer characteristics such as symptoms, stage, histopathology, *EGFR* mutation positivity, and initial treatment modality were significantly different. Never-smoker female patients with lung cancer showed an increase in asymptomatic disease, stage I lung cancer, histology of adenocarcinoma, *EGFR* mutation positivity, and curative resection compared to ever-smoker female patients.

There are also trends in survival as well as in prognostic factor. Park and Jang⁶ indicated that the 5-year relative survival rate has increased from 11.3% (1993–1995) to 21.9% (2008–

2012). Furthermore, 10-year relative survival reached at 12.6% in 2001–2005. Absence of symptom at the initial diagnosis is an unchanged good prognostic factor between 2005 and 2013^{2,5}.

In conclusion, the trends in epidemiology and clinical characteristics of lung cancer in Korea have changed over time. Further research is needed to guide patient management, as well as future therapeutic strategies for lung cancer.

Conflicts of Interest

No potential conflict of interest relevant to this article was reported.

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