

Lung Cancer Incidence in Erzurum City

Erzurumda Akciğer Kanseri İnsidansı

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Abstract

Objective: Known as an uncommon disease at the beginning of the 20th century, lung cancer has been the most frequent cause of cancer-related deaths in males since the 1950s and in females in the last two decades. The aim of this study was to determine the lung cancer incidence in Erzurum; its clinical properties, cancer subtypes, and application phases; the relationships of tumors with parameters of cigarette smoking and nutrition; radiological properties of the tumors; and the methods of diagnosis.

Materials and Methods: This study analyzed data from a prospective database. The study included the patients who applied in 2005 to the Chest Disease, Chest Surgery, Medical Oncology or Radiation Oncology section of Research Hospital, Faculty of Medicine, Ataturk University; the Erzurum Nihat Kitapçı Chest Diseases Hospital; or the Palandöken State Hospital and were diagnosed with lung cancer. A standard questionnaire was used to obtain information about the patients. The figures of the 2005 census issued by the State Institute of Statistics were used for incidence calculations.

Results: During the study period, 255 patients with a lung cancer diagnosis were accepted, 220 of whom were male (86.3%) and 35 were female (13.7%). The mean age of the patients was 63±1 years. The lung cancer incidence in Erzurum according to the data given by the hospitals that can diagnose lung cancer was determined to be 14.4/100.000. Lung cancer frequency increased with age, it was observed in males six times more frequently than females, and histopathologically non-small cell lung cancer and advanced phase lung cancer were more frequent.

Conclusion: The lung cancer incidence for Erzurum was not different from that reported in other studies carried out both in the region and the whole country, and the lung cancer diagnosis was related to advanced age, male sexuality, active smoking and low socioeconomic state.

Key Words: Erzurum, Incidence, Lung cancer

Özet

Amaç: Yirminci yüzyıl başlarında nadir bir hastalık olarak bilinen akciğer kanseri, 1950'li yılların başında erkeklerde, son 20 yılda da kadınlarda olmak üzere kansere bağlı ölümlerin en sık sebebi olmuştur. Bu çalışma ile bölgemizde akciğer kanseri insidansı, klinik özellikleri, kanser alt tipleri, başvuru evreleri, tümörün içilen sigaranın cinsi ve beslenme ile ilişkisi, tümörün radyolojik özellikleri ve tanı konulma şekilleri gibi birtakım özellikler tespit edilmeye çalışıldı.

Gereç ve Yöntem: Bu çalışma prospektif elde edilen verilerden analiz edilerek yapıldı. Çalışmaya 2005 yılında Atatürk Üniversitesi Tıp Fakültesi Araştırma Hastanesi Göğüs Hastalıkları, Medikal Onkoloji, Radyasyon Onkolojisi, Göğüs Cerrahisi bölümlerine; Erzurum Nihat Kitapçı Göğüs Hastalıkları Hastanesi ve Palandöken Devlet Hastanesine başvuran ve akciğer kanseri tanısı almış olan hastalar alındı. Hastalara ait bilgileri elde etmek için standart bir anket formu kullanıldı. İnsidans hesaplamasında Devlet İstatistik Enstitüsü'nün 2005 yılına ait nüfus sayımı verileri kullanıldı.

Bulgular: Çalışma süresi içerisinde akciğer kanseri tanısı alan 255 hasta tespit edildi. Bunlardan 220'si erkek (%86.3) 35'i kadın (%13.7) idi. Hastaların yaş ortalaması 63±1 idi. Erzurum'da akciğer kanseri tanısı koyabilen hastanelerin verilerine göre Erzurum iline ait akciğer kanseri insidansı 14.4/100.000 olarak belirlendi. Kanser sıklığı yaş ilerledikçe arttığı, erkeklerde kadınlara göre yaklaşık 6 kat fazla görüldüğü, histopatolojik olarak küçük hücreli dışı akciğer kanseri ve ileri evre akciğer kanserinin fazla görüldüğü tespit edildi.

Sonuç: Bu çalışmada bulunan Doğu Anadolu Bölgesi ve özellikle Erzurum için akciğer kanseri insidansının, geçmiş yıllarda hem bölgemizde hem de ülke genelinde yapılan diğer çalışmalardan farklı olmadığı, ileri yaş, erkek cinsiyet, aktif sigara içimi düşük sosyoekonomik durum ile ilişki tespit edildi.

Anahtar Kelimeler: Akciğer kanseri, Erzurum, İnsidans

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Introduction

Lung cancer cases have increased recently, and it is the most frequent cancer type among male patients and the most fatal cancer type for both sexes. Lung cancer is the second most important cause of death after cardiovascular diseases. The most frequent cancer type in Turkey is lung cancer, making up 17.6% of cancers [1]. It is the most frequent cancer type among males, at 26.3% of cancers, and it is at the eighth most common cancer among women, at 4.5%. The distribution of lung cancer cases in geographical regions is Mediterranean, 41.0%; Aegean, 39.5%; Central Anatolian, 38.4%; Black Sea, 28.5%; Marmara, 28.4%; Southeastern Anatolian, 17.7%; and Eastern Anatolian, 11.7%. According to the Ministry of Health Cancer Control Department's report for 2005, the incidence of cancer generally is 173.8/100,000. Lung cancer incidence in Turkey is 30.3/100,000, 52.7/100,000 among male patients and 7.2/100,000 among female patients. There are no updated data about lung cancer epidemiology of either Turkey or Erzurum. Our aim in this study was to determine the lung cancer incidence in Erzurum; its clinical characteristics, mortality rate, cancer subtypes, and stage at diagnosis; the association of tumors with the type of tobacco smoked and nutrition habits; and other characteristics. This analysis used data from a prospective database.

Materials and Methods

In total, 255 patients who were diagnosed with lung cancer in Erzurum in 2005 were included. A standard questionnaire was used to obtain patient information. Age, sex, occupation, hometown, smoker/non-smoker information, passive exposure rate if non-smoker, rate of environmental and occupational exposure, nutrition habits, patient history regarding other diseases (such as tuberculosis and Chronic Obstructive Pulmonary Disease COPD), patient history and patient family history regarding cancer, starting date of symptoms, dates of consulting with a doctor, histopathological diagnosis and information regarding starting treatment were obtained from patient files. The radiographic findings, which were from visual imaging methods such as lung X-rays, thorax CT, abdomen USG, abdomen CT, brain CT and MR, and bone scintigraphy, were noted. The phase of the disease, neoplastic syndromes (VCSS, Pancoast syndrome) and paraneoplastic syndromes were noted under the categories of clinical and radiological findings and laboratory results. The cities' population data, which were used in calculating lung cancer incidence, were obtained from the State Institute of Statistics 2005 database. SPSS 11.0 (IBM Corporation, Route 100 Somers, New York) was used for statistical calculations. Pearson's chi-square test was used to compare categorical variables. P values <0.05 were accepted as statistically significant.

Results

There were 220 male patients (86.3%) and 35 female patients (13.7%) in the study, and the male/female ratio was 6/1. The average age (\pm standard deviation) of the patients was 63 ± 1 years. The average age of male patients was 63 ± 1 and of female patients was 64 ± 2 . There was no statistical difference between male and female average ages ($P=0.61$). Using the 2005 general population census data, lung cancer incidence was determined to be 14.4/100,000 for Erzurum. Histopathologically, 58.5% of cases were non-small cell lung cancer, and 14.9% were small cell lung cancer. The clinical radiological diagnosis rate was 24.7%.

When the relationship between the type of tumor and age was analyzed, the data showed that the younger the patient was, the less frequently small cell cancer was detected, and as age increased, more adenocarcinoma cases were detected, but this difference was not significant ($p=0.16$). When the relationship between sex and tumor type was evaluated, it was determined that the rates of tumor types among male and female patients were different ($p=0.003$). The most frequent tumor type among male patients was squamous cell lung cancer; on the other hand, adenocarcinoma was significantly higher among female patients. In most of the cases (93.9%), the diagnosis was made at a late stage (stage III or IV). Four of the cases (1.6%) were stage II, and five (2.0%) were stage I. In four cases (1.3%), cancers of other systems were detected (one skin, one stomach, one testicle and one larynx). When family histories were evaluated, seven patients (2.7%) had another lung cancer case in their immediate family, and one patient had a relative with lung cancer (0.4%). When the relationship between tumor type and family history was analyzed, squamous cell lung cancer was more common in patients who had a family history of cancer. No family history was detected in adenocarcinoma patients, but there was no significant correlation between tumor type and patient family history. Regarding the patients' smoking habits, 154 patients (60.4%) were active smokers, 49 patients (19.2%) were ex-smokers, 3 patients (1.2%) were passive smokers, and 49 patients (19.2%) had no history of cigarette smoking. When the relationship between smoking and lung cancer was analyzed, squamous cell lung cancer cases were significantly higher among smokers ($p=0.024$), and small cell lung cancer cases were equally distributed among smoking and lung cancer groups. Adenocarcinoma was higher among the non-smoking group. When non-small cell lung cancer and small cell lung cancer cases were compared, no significant difference between smokers and non-smokers was detected.

Most of the patients were farmers (46.3%). No other occupation had a high enough rate to be of importance. When nutrition and heating habits of the patients were examined,

diets consisting animal nutrition and heating with organic fuels were the most common. Four patients (1.6%) had a history of tuberculosis, 19 patients (7.5%) had changes consistent with sequelae in their lung X-rays, and in 9 patients (42.9%) secondary sequelae was detected. Tuberculosis history and patients who had findings supporting tuberculosis in their lung radiology had no significant correlation. COPD in 35 cases (13.7%) and bronchiectasis in 1 case (0.4%) were detected when accompanying lung diseases were examined. Asthma, idiopathic pulmonary fibrosis and collagen tissue diseases were not detected. There was no significant correlation between tumor type and presence of COPD. Most cases of lung cancer were symptomatic (247 cases, 99.2%). The most frequent symptoms were coughing (84.3%), chest pain (71.4%) and loss of appetite or weight (60.8%). When the tumors were evaluated radiologically, 69.0% were located centrally, 29.4% were located peripherally and 1.6% were unknown. There was no significant relationship between tumor type and radiological location. Lung X-rays and thorax tomography showed masses in 94.6% of the patients. Other radiological characteristics are stated in Table 1.

In total, 208 patients underwent bronchoscopy. In 122 of them, pathology was determined bronchoscopically, but in one patient the bronchoscopy was normal. Invasive procedures were mostly performed in the diagnosis. Fifty-five cases (22.4%) were diagnosed via examination of sputum. Bronchoscopic procedures were mostly used for diagnosis. These procedures during bronchoscopy were bronchoscopic mucosal biopsy (68.2%), bronchoscopic lavage (52.2%) and bronchoscopic fine needle aspiration (48.6%). The most used methods during non-invasive staging were computed thorax tomography and abdomen ultrasonography. Again, various invasive procedures were done during clinical staging and mostly consisted of bronchoscopic procedures. Metastasis investigations were applied to 237 patients (92.9%) for clinical staging, and liver metastasis was found more often than other metastases (9.4%) (Table 2). Most metastasis was seen in small cell lung cancer, but this was not statistically significant. Radiological evaluation of tumor location showed that most were in the right lung (56.1%) and upper right lobe (22.4%).

Discussion

Although there may be minor variations, lung cancer is the most frequent cancer among men and second highest among women in all countries [2], including Turkey [3]. Lung cancer incidence in Turkey according to the data provided by the Ministry of Health is 11.5/100,000. In 2001, according to the Izmir Cancer Control Center's data of the years 1993-1994, the rate of lung cancer among all cancer types was 38.6% in men and 5.2% in women. According to the data provided by the Ministry of Health, the rate of lung cancer is highest in the western and southern regions (Mediterranean, 41.0/100,000;

Table 1. Radiological characteristics of the tumor

Radiological Finding	Number of cases	%
Mass image	242	94.6
Atelectasia	120	47.1
Obstructive pneumonia	78	30.6
Cavity in tumor	50	19.6
Lymphangitic dissemination	12	4.7
Calcification in tumor	5	2.0
Pancoast tumor	7	2.7

Table 2. Location and rate of metastasis which were detected during diagnosis

LOCATION OF METASTASIS	AMOUNT	%
Liver	24	9.4
Bone	16	6.3
Lung	16	6.3
Brain	15	5.6
Surrenal	9	3.5
Cervical lymphadenopathy	5	2.0
Abdominal lymphadenopathy	3	1.2
Kidney	2	0.8
Axillary lymphadenopathy	1	0.4
Skin	-	-
Other (heart, bone marrow, spleen)	3	1.2

Aegean and Central Anatolian, 39.5/100,000) and lowest in southeastern and eastern Anatolia (17.7/100,000 and 11.7/100,000, respectively) [4]. In the context of our study, in 2005, the number of patients who were diagnosed with lung cancer at a hospital in Erzurum for the first time was 255. Of these, 220 were male (86.3%) and 35 were female (13.7%), and the male/female ratio was 6/1. The male/female ratios in Holland (11/1) and Spain (11.7/1) are higher than in Erzurum, but many European countries, the USA and Japan have lower ratios (the ratio in the USA is 2.1/1 and in Japan 3.9/1) [5]. A study in 1994 evaluated 116 patients in Erzurum, 90 of whom (78%) were male and 26 female (22%). In our study, the number of female patients was higher than in the previous study (about 1.6 times) [6]. In the study that was conducted in 86 lung cancer patients in Izmir, 71 of the patients were male (83%) and 15 of them were female (17%). The male/female ratio in that study was 4.7/1.

When the results of several studies are taken into consideration, the cancer incidence in various cities among women varies between 1.2% and 22%. The rate obtained here (13.7%) is average compared to other studies. The lung cancer incidence in Erzurum according to estimated population data

for 2005 is 14.4/100,000. This rate is only slightly higher than the result obtained in 1994 (13.6/100,000). This incidence rate is also close to the number (11.5/100,000) provided by the Ministry of Health for the year 2001.

The average age of the patients who were diagnosed with lung cancer was (\pm SD) 62.3 \pm 1 years, the average age of male patients was 63 \pm 1, and the average age of female patients was 64 \pm 2. The average age of lung cancer patients obtained by the previous study conducted in Erzurum was 59.5 [6]. The study conducted by the Turkish Thoracic Society (TTS) and the Lung and Pleural Malignancies Study Group in 1994-1998 showed that the average age of lung cancer patients was 58.4 [7]. In our study, the average age was higher than the ages in previous studies. These findings show that the frequency of lung cancer between the ages of 50 and 70 has increased, and this increase is consistent with the peak in lung cancer in the 60-70 age group in the literature. When the relationship between tumor type and age was analyzed, the younger the patient was, the less frequent small cell cancer was, and as age increased, more adenocarcinoma cases were detected, but these differences were not significant. The study conducted in Erzurum in 1994 showed that the rate of lung cancer below the age of 50 was 18%. This rate is higher than the rate we observed [6].

The frequencies of squamous cell and small cell lung cancer related to smoking at 3. and 4. sections is consistent with the literature [8]. The analysis showed a significant correlation between tumor type and sex, especially between adenocarcinoma and the female sex. In the literature, the incidence of adenocarcinoma among women was 30% higher than the squamous cell lung cancer incidence, but in our study, the difference was only 5% [9]. The female patients had a higher rate of adenocarcinoma in our study, but it is low when compared to other countries. The rate of adenocarcinoma among the female patients in this study was 23%, the squamous cell lung cancer rate was 26%, the small cell cancer rate was 23%, and the giant cell carcinoma rate was 15%. In a previous study conducted in Erzurum among 116 primary

lung cancer patients, the rate of squamous cell lung cancer was 48%, small cell carcinoma 20%, adenocarcinoma 16%, giant cell carcinoma 9% and undifferentiated carcinoma 9% [6]. When the histopathological sub-types were examined in this study, we found that there were different sub-types (e.g., clinical-radiological tumor and non-small cell lung cancer), but the ratios were roughly the same (Table 3). In the study conducted by Çikrikçiöğlü et al., the obtained rates were as follows: squamous cell lung cancer, 52.8%; adenocarcinoma, 23.5%; small cell cancer, 18%; mixed tumor, 2.3%; giant cell carcinoma, 2%; and carcinoid tumor, 0.9% [10]. In the study conducted in İzmir, the rate of non-small cell lung cancer was 76.8% and small cell lung cancer 23.2% [11]. The difference in the results of these studies conducted in Turkey may be due to regional differences as well as differences in histopathological evaluation and the reporting of the tumor (for example, lack of specifying the sub-types in non-small cell lung cancers). More than 90% of the patients had late-stage tumors. The lung cancer cases that were detected in other countries were also mostly at a late stage (stage IV) or local late stage (stage IIIA or IIIB). Seventy percent of lung cancer patients cannot undergo surgery, the radical treatment method at diagnosis [12]. This rate is even higher in Turkey. In the study conducted by the TTS, 86.7% of the cases were at a late stage [7].

The rate of the cigarette-related cases in our study was 80.8%. Cancer occurrence risk among passive smokers is 3.5%. The starting age of smoking, duration of smoking habit, number of cigarettes smoked and types of tobacco used (e.g., filtered, non-filtered, cigar, low-nicotine or -tar) affect the risk of lung cancer development [13]. The national, hospital-based retrospective study conducted in our country by the TTS to determine the characteristics of lung cancer showed that 90% of the patients had a history of smoking [7]. In our study, the active smoking rate was 70.2% among male patients and 2.9% among female patients. The passive smoking rate among women was 8.6% and 0% among men. Of the male patients, 22% had quit smoking. In our study, the group who was not affected by cigarette smoke (19.2%) was larger than this group in the TTS study (10%) [7]. The analysis of the relationship between smoking and lung cancer type showed that the smoking rate among squamous cell lung cancer patients was higher. Smokers were more prevalent among non-small cell lung cancer patients compared to small cell lung cancer patients, but this difference was not statistically significant. In fact, the distribution of cell types was highly correlated with the smoking rate. Squamous cell lung cancer, which is directly correlated with smoking, was more frequent among male patients. Our study showed that the squamous cell lung cancer rate was the highest among the smoking patients (61.7%). Among non-smokers, the small cell lung cancer histopathological type had the highest rate (38.1%). These findings are similar to those of Köktürk et al. [13]. Occupational

Table 3. Histopathological sub-types of tumor

Tumor type	Number	Percentage
Squamous cell lung cancer	73	28.6
Clinical-radiological tumor	63	24.7
Non-small cell lung cancer *	59	23.2
Small cell lung cancer	38	14.9
Adenocarcinoma	17	6.7
Giant cell	3	1.2
Carcinoid tumor	2	0.8
TOTAL	255	100

*Non-small cell cancer sub-types which weren't defined in pathology report

distribution was consistent with the socio-economical structure of the region (45.9% farmer, 14.5% housewife, 7.9% civil servant). When nutrition and heating habits of the patients were examined, diets consisting of animal nutrition and heating with organic fuels were the most common. Most of the patients were smokers who had high-fat diets. Tuberculosis history and patients who had findings supporting tuberculosis in their lung radiology had no significant correlation. Four patients (1.6%) had tuberculosis in their history, 19 (7.5%) had changes consistent with sequelae in their lung X-rays, and 9 (42.9%) had secondary sequelae detected. In the TTS study, idiopathic pulmonary fibrosis was detected in 0.3% of the cases, and fibrotic scar tissue secondarily developing into lung tuberculosis was detected in 2.9% of the cases [7]. Our findings are also consistent with the results of that study. COPD, which was detected in 35 cases (13.7%) of patients, had the highest rate among accompanying lung diseases. No significant correlation was found between tumor type and presence of COPD. COPD also had the highest rate in the TTS study, but that rate (18.1%) was higher compared to our results. COPD is believed to play a role in the development of lung cancer. The observations of Skillrud et al. on COPD cases over 10 years showed an 8.8% lung cancer development rate [14]. Most of our patients were symptomatic (99.2%). The most frequent symptoms were coughing (84.3%), chest pain (71.4%) and loss of appetite or weight (60.8%). The comparisons showed that asymptomatic cases were less frequent in our study and that the rate of the complaints varied. In most cases, the tumor location was central. There was no significant correlation between tumor type and radiological location. Of the central tumors, 52.2% were squamous cell lung cancer, 33.7% were small cell cancer, and 15.1% were adenocarcinoma. Of the peripheral tumors, 69.2% were squamous cell lung cancer, 20.5% were small cell cancer and 10.3% were adenocarcinoma. When the locations of tumors in these cases were compared to the cases in the literature, the central location rate of squamous cell lung cancer was lower by a ratio of 2/3. Also, small cell tumors were mostly centrally located, consistent with the literature. Adenocarcinoma is most commonly peripheral (55-60%) [15]. The rate of peripheral location of adenocarcinoma was close to the rate of central location in our study, which differs from the literature. Bronchoscopy was applied to 208 patients. In these patients, endobronchial lesions were detected in 47.5%, mucosal infiltration was detected in 19.6%, and exterior pressure was detected in 13.7%. Additionally, bronchoscopy was normal in 0.4% in these patients. In a study of 273 cases conducted by Uslu et al., vegetal tumor was detected in 45 patients (16.5%), tumor infiltration was detected in 139 (50.9%), and indirect tumor was detected in 89 (32.6%) [16].

In our study, 237 patients were investigated for metastasis, which was detected at diagnosis in 26.7% of the patients. The metastasis rate, especially the bone metastasis rate, was

generally lower. The analysis of the relationship between the histological type of the tumor and the frequency of metastasis that showed the highest rate of metastasis was detected in small cell lung cancers, but this was not statistically significant.

In conclusion, our study shows that lung cancer incidence and its epidemiologic characteristics in Erzurum are similar to the results of previous studies that were conducted in our region and in the general population of Turkey.

Conflict of interest statement: The authors declare that they have no conflict of interest to the publication of this article.

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