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Epidemiologic and Pathologic Characteristics of Lung Cancer in Thiqar Province, Iraq

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Abstract :

Introduction : Lung cancer is the most common cancer in males and the leading cause of cancer mortality. In females, it is also one of the top three females cancers in terms of incidence and mortality. With the changes in smoking prevalence and habits in many countries , the epidemiological and pathological features of lung cancer have changed significantly in the last three decades.

Aim of the study :
To study the epidemiological and pathological characteristics of lung cancer in Thi-Qar, a major province in the south of Iraq.

Patients and Methods :
Retrospective cross sectional study of 287 patients with a pathologically confirmed diagnosis of primary carcinoma of the lung who attend Al-Nasiriyah oncology center during the period from January 2013 to December 2018.

Results :
The total number of registered patients was 287. Males constitute 71 % (n = 205), and, females 29 % (n = 82) with a Male to Female ratio of 2.5:1. Mean age of the patients in the study was 66 years (SD = 12.9) , Range (36 – 95 years). About 75% of the patients are between 50 – 80 years of age, with 12% of patients below 50 years of age. Up to 57% of the patients in the study are current smokers, 28% ex-smokers, while 15% are never smokers. Females constitute half of never smoker patients with lung cancers, while, males make up two thirds of lung cancer patients with history of smoking (current or past). Non small cell lung cancer constitute 80% of cases while small cell lung cancer 20% of cases. Squamous cell carcinoma was the most common histological type in both sexes (40%) and the predominant type in males, while, adenocarcinoma was more common in females. Squamous cell carcinoma and small cell lung cancer were strongly associated with smoking, while, adenocarcinoma occur at higher frequency in never smokers. Half of the patients diagnosed at an advanced stage of the disease, while, 28% diagnosed with loco-regional disease, and, only 22% of the patients diagnosed with localized disease

Conclusions :
Lung cancer in Thi-Qar is more common in males than females, and, in age groups 50 to 70 years of age, occur at significantly higher frequency in smokers, and, presents in half of cases at an advanced stage of the

disease. Squamous cell carcinoma is the predominant histological type, although adenocarcinoma were more commonly seen in females and never smokers.

Keywords : Lung cancer, Age and Sex distribution, Histological types, Thi Qar, Iraq.

Introduction :

Worldwide, lung cancer is the second most common cancer in both sexes, and the leading cause of cancer morbidity and mortality in males in 2020. In females, it ranks third for incidence, after breast and colorectal cancer, and second for mortality, after breast cancer [1].

Epidemiological studies in 1950 has definitely established tobacco smoking as the single strongest risk factor for lung cancer [2, 3]. National policies, regulations and social efforts to decrease the prevalence of smoking have succeeded in reducing the number of smokers in many developed countries, for example, the percentage of smokers in the adult US population, have decreased from 42.4% in 1965 to 15% in 2015 [4].

This decrease in the prevalence of smoking have translated into a decrease in the incidence and mortality from lung cancer in the US and other developed countries, however, in developing countries, the incidence and mortality from lung cancer is increasing due to commencement of the tobacco epidemic in various countries and populations [5]. In some countries, especially in Asia, second-hand smoke and cooking oil fumes are implicated in addition to other risk factors (genetic susceptibility, occupational exposure, hormonal status, and pre-existing lung disease) for rising lung cancer in never-smokers [6]. In addition, air pollution is another significant risk factor of lung cancer in never smokers [7].

The WHO divides lung cancer into two major classes based on its biology, therapy, and prognosis: Non-Small cell lung cancer (NSCLC) and Small cell lung cancer (SCLC) [8]. NSCLC accounts for more than 80% of all lung cancer cases, and it includes two major types: 1) nonsquamous, including adenocarcinoma, large-cell carcinoma, and other subtypes; and 2) squamous cell (epidermoid) carcinoma [9]. The recent decrease in lung cancer incidence has also been accompanied by changes in the predominant histological types. In one comparative analysis, trends in adenocarcinoma were shown to be increasing in women but stabilizing in men across many high-income countries. The overall decrease in lung cancer incidence was mainly driven by reductions in squamous cell carcinoma in men and by the decline in the prevalence of smoking [10].

In Iraq, lung cancer is the second most common cancer in both sexes and all ages with 2,485 new cases diagnosed in 2020, and, ranks first as the most commonly diagnosed cancer in males [11]. Studies from Iraq which described the epidemiologic and pathological characteristics of lung cancer in Baghdad [12, 13], and, in Al-Najaf city [14] have shown that lung cancer is more common in males than females, most cases are between 55 – 65 years of age, smokers constitutes the vast majority of cases, and, squamous cell carcinoma is the predominant histological type. Two studies have examined the incidence rate and time trend analysis of lung cancer in two major Iraqi cities, one from Basrah [15] studied the period from 2005 to 2012, and, the second from Ninawa [16] studied the period from 2000 to 2010. In both studies, the incidence rates of lung cancer were stable with a tendency to decline in 2011 and 2012 in Basrah [15]. To date, characteristics of lung cancer

in Thi Qar have not been reported. This study have been conducted to study the epidemiologic and pathologic characteristics of lung cancer in Thi Qar provinc

Patients and Methods :

A retrospective cross sectional study of 287 patients with primary lung carcinoma who attended at Al-Nasiriyah oncology center from January 2013 to December 2018.

All included patients have a pathological diagnosis of primary lung cancer. Excluded patients include those with cancers metastatic to the lungs, Neuroendocrine lung tumors, and mesenchymal tumors and patients diagnosed without a tissue biopsy.

According to the International Classification of Diseases for Oncology, 3rd edition (ICD-O-3), cases were classified into the following histological types: Squamous cell carcinoma, Adenocarcinoma (including large cell carcinoma), Small cell carcinoma and Mixed histology (non-small cell carcinoma with small cell component).

Descriptive statistics (frequency and percentages) were used and the chi square test were used to compare between variables. P value < 0.05 were considered to be significant.

Results :

Table(1): Distribution of patients according to Sex

	No. Of Patients	%
Males	**205**	**71**
Females	**82**	**29**
Total	**287**	**100**

Table (2) : Distribution of patients according to Age

	Total (N = 287)	%	Male (N = 205)	%	Female (N = 82)	%
< 50 Year	**34**	**12**	**25**	**73**	**9**	**27**
50 – 60 Year	**60**	**21**	**41**	**68**	**19**	**32**
61 – 70 Year	**81**	**28**	**54**	**66**	**27**	**34**
71 – 80 Year	**75**	**26**	**58**	**77**	**17**	**23**
> 80 Year	**37**	**13**	**27**	**73**	**10**	**27**
Range	**36 – 95**		**36 – 94**		**39 – 95**	
Mean	**66**		**66.5**		**64.8**	
SD	**12.9**		**12.8**		**13.1**	

Table(3) : Distribution of patients according to Smoking Status

	Total	%	Male	%	Female	%
Smokers	164	57	127	77	37	23
Ex-Smokers	80	28	56	70	24	30
Never Smokers	43	15	22	51	21	49

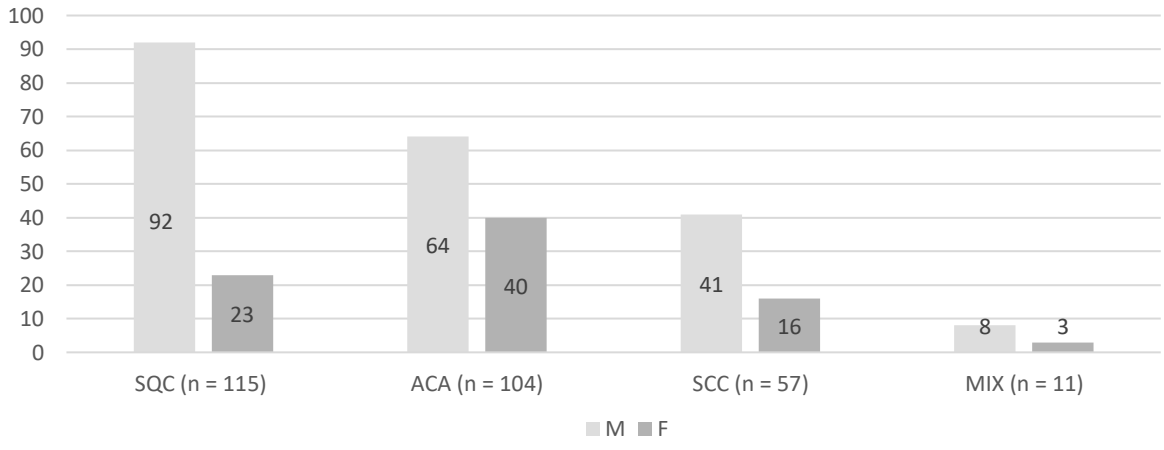
Table (4) : Distribution of patients according to Stage at Diagnosis

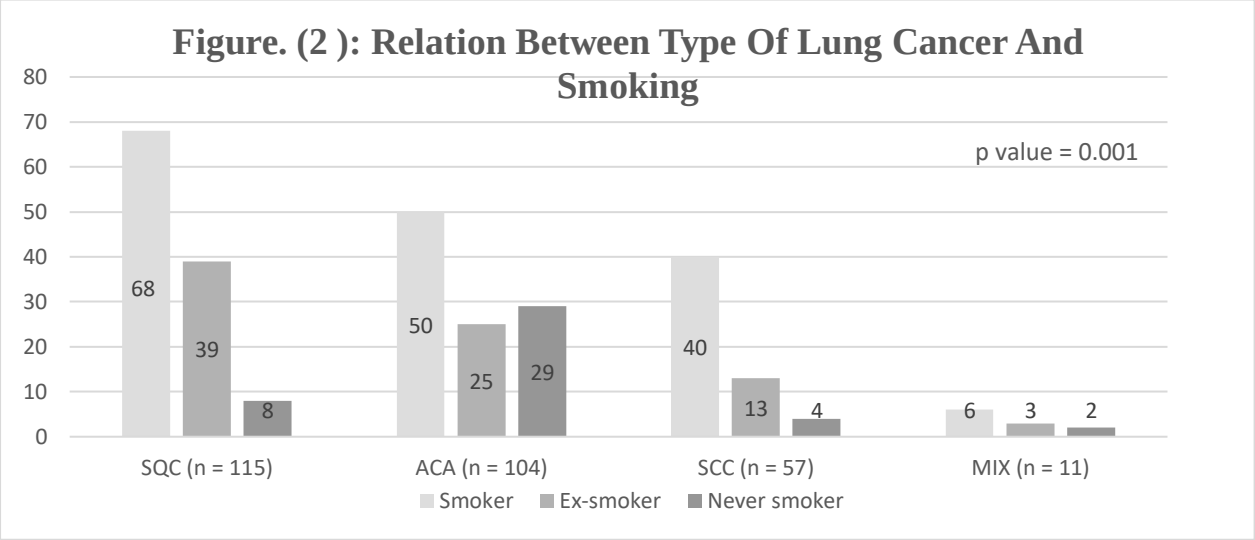
	No. of patients	%
Localized	**63**	**22**
Loco-Regional	**81**	**28**
Metastatic	**143**	**50**
Total	**287**	**100**

Table (5) : Distribution of patients according to Pathological Type

	No. of patients	%
Squamous cell CA (SQC)	**115**	**40**
Adenocarcinoma (ACA)	**104**	**36**
Small Cell Carcinoma (SCC)	**57**	**20**
Mixed Histology	**11**	**4**
Total	**287**	**100**

Figure. (1) : Relation Between Type Of Lung Cancer And Gender





Discussion :

Globally, incidence rates for lung cancer are roughly 2 times higher in men than in women, although the male-to-female ratio varies widely across regions, ranging from 1.2 in Northern America to 5.6 in Northern Africa. Although differences in the incidence of lung cancer between males and females are largely attributed to higher prevalence of smoking in males, the recent worldwide increase in incidence of lung cancer in females, however, was not fully explained by sex-specific differences in smoking behavior [17]. It is possible that differences in the distribution of histologic subtypes, coupled with the differences in the speed of risk reduction associated with these subtypes after smoking cessation, may have contributed to the higher incidence of lung cancer among women than among men [18]. In this study, cases were more common in males than females with male to female ratio 2.5 : 1 (Table 1).

Three studies from Iraq have reported comparable male to female ratio of 3.1:1 in Basrah [15], 3:1 in Baghdad [12], and, 2.5:1 in Al-Najaf [14].

The mean age of patients with lung cancer in this study was 64.4 ± 12.5 years, for males 64.7 years ± 12.5 years and for females 63.5 ± 13.1 years (Table 2). These figures are approximately similar to the figures reported in two studies in Iraq [13, 14]. Patients below 50 years of age constitute 12% of the cases, and, those between 50 to 70 years constitute about 50% of cases. According to GLOBOCAN 2020 estimates of lung cancer cases, age groups below 45 years accounted for only 2.4% of incident cases, while, age group 60 – 69 years have the highest number of incident cases. However, in regions of Africa, lung cancer in age groups below 45 years constitute 11.1% of the cases, and, around 60% of cases occurred in age groups 60 years or older, whereas in Europe, only 1–2% of lung cancer cases occurred in age groups below 45 years, and, around 80% of new cases occurred in age groups 60 years or older [1]. The age-standardized rates of lung cancer displays positive correlation with human development index (HDI) as well as tobacco smoking prevalence [19]. In 2021, the human development index (HDI) of Iraq was 0.686 points, leaving it in 121th place in the table of 191 countries published. This is combined with initiation of smoking at

younger age groups may partly explain the relatively higher percentage of lung cancer in younger age groups in this study.

About 85 % of the patients in this study have history of smoking (either current or past), while 15 % of the cohort are never smokers (Table 3). Similar figures for the association between lung cancer and smoking have been reported from two studies in Iraq [12, 13]. This is consistent with the figures published recently in a large cohort of lung cancer patients in the U.S., and showed that 36.7%, 50.8%, and 12.5% were current, former, and never smokers, respectively [20].

In this study, about half of lung cancers in the never smokers group occurred in females (Table 3), which was consistent with the current observations in international literature on the increasing incidence of lung cancer in non-smoker females [21]. Genetic factors and epigenetic changes in a variety of genes exert a significant effect on the risk of lung cancer in never smokers. In addition, epidemiological and non-genetic factors such as pollution, occupational exposure, socioeconomic status, infections, medical history, and, the effect of female sex hormones may determine the risk of lung cancer in never smokers [22].

Previous studies from Iraq have shown that squamous cell carcinoma is more common than adenocarcinoma in Iraqi patients [12, 14, 16]. In this study, squamous cell carcinoma were found in 40% of the study population while adenocarcinoma constitute 36% (Table 5). However, adenocarcinoma was the predominant histological type in females while squamous cell carcinoma is the predominant type in males (Figure 1). In the WORLD07 study, among female patients diagnosed with non-small-cell carcinoma, 75% had adenocarcinoma, 11% squamous cell carcinoma, and 7% large-cell carcinoma [23].

Although all histologic types of lung cancer were significantly associated with cigarette smoking, a meta-analysis reported that the association was stronger with squamous cell carcinoma and small cell carcinoma than with adenocarcinoma [24]. This is consistent with the results in this study which shows that a significantly higher percentage of patients with history of smoking develop squamous and small cell lung cancers, while, higher percentage of never smokers develop adenocarcinomas (Figure 2). Several studies have suggested that lung cancer in non-smokers is different enough from a biologic and epidemiologic perspective to be looked at as a completely different entity [25]. Non-small cell lung cancer, mainly adenocarcinoma, is more common in non-smokers and light smokers, as well as former smokers. For heavy smokers, squamous cell carcinoma and small cell lung cancer are seen more commonly [26].

Conclusions And Recommendations :

This is the first study about the epidemiology of lung cancer in Thi-Qar. Similar to other cities in Iraq, this cancer is more common in males than females, and is most common in patients more than 50 years of age. Also, lung cancer was strongly associated with smoking especially in those with squamous or small cell histology. Lung cancer incidence in patients below 50 years of age in this study was found to be higher than reported in developed countries. These findings needs to be confirmed in a larger study that include patients across Iraq, and, to be correlated with prevalence of smoking in Iraq in different age groups.

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