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Histopathological Types of Primary Lung Cancer: Hospital-Based Study

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Abstract:
Background*: Lung cancer is considered as the leading cause of cancer death among both men and women.It is also one of the most common cancers in the world. The majority of lung cancers are related to smoking.*
Objective :*This study was intended toidentify thehistopathological typesof lung cancer in relation to gender,age, and smoking habit in a sample of Iraqi patients.*
Patient and methods:*A retrospective study, included a total of 170 patients with histopathologically proved primary lung cancer were targeted by this study. All lung cancer cases diagnosed during a period of one year from January 2011 until December 2011 were retrospectively analyzed based on the data of the national center for early detection of cancer, Baghdad teaching hospital, and Ghazi Alhariry hospital in the medical city complex in Baghdad.*
Results:*There were **124 (72.9 %)** males and **46 (27.1 %)** females .The age of patients varied from 19 to 90 years and the mean age was 62.5 year.From the total number of cases **115 (67.6 %)** patients were smokers while **55 (32.4 %)** patients were nonsmokers.*
It was significant to find mean ages of each type of lung cancer are about the same (around 62 years) except younger (58.8 year) for large cell carcinoma.
*It was significant to find that most frequent type of primary lung cancer is squamous cell carcinoma **(47.1%),** followed by adenocarcinoma **(30.0%),** then by small cell carcinoma **(20%)** , while large cell contributed to small proportions of the sample **(2.9%)** .Lung cancer among male, was more often squamous cellcarcinoma **(53.2%)** . Adenocarcinoma represents the most common type of lung cancer among female (43.4%).Among smokers squamous cell carcinoma was the most common type **(51.30%)** of primary lung cancer while adenocarcinoma was commonly seen in nonsmokers**(41.8%).***
Conclusion*:Males are more liable to have lung cancer than females. Most cases of primary lung cancer may be diagnosed after the age of 45 years. Squamous cell carcinoma represents the most common histological type of lung cancer in this sample of patients with significant predominance in males&smokers.*
Keyword*: PLC: Primary Lung Cancer.*

I. Introduction

Lung cancer has been the most common cancer in the world for several decades, and by 2008, there were an estimated 1.61 million new cases, representing 12.7% of all new cancers. It was also the most common cause of death from cancer, with 1.38 million deaths representing 18.2% of the total. In males, lung cancer is still the most common cancer worldwide with high rates in central-Eastern and Southern Europe, Northern America and Eastern Asia. Very low rates are still estimated in Middle and Western Africa. Incidence rates are generally lower in women, but, worldwide, lung cancer is now the fourth most frequent cancer of women with 516,000 cases and the second most common cause of death from cancer with 427,000 deaths [1].

Malignant tumors of the lung are classified by the World Health Organization (WHO)/International Association for the Study of Lung Cancer (IASLC). There are two main types of lung cancer, including the following:

- Small cell lung cancer SCLC
- Non small cell lung cancer NSCLC

NSCLC isfatherly dividedinto:

- Squamous cell carcinoma.
- Adenocarcinoma.

- Large cell carcinoma.

II. Aims of the study

The aim was to study the distribution of histological types of primary lung cancer among Iraqi patients in relation to: Age, Gender, and Smoking.

III. Statistical analysis

Chi square testwas done to test association between some variable (including the histological types of primary lung cancer, gender, smoking status) . Chi square test for independence used to test the significance of association between discrete variables, and condensation of cells was performed in any table with low expected frequencies.

IV. Patients s and Methods

This retrospective study had included 170 proven cases of lung cancer at medical city hospitals – Baghdad during the period from 1st January to 31st December 2011(about 1 year) .This center is one of the largest medical centers in Iraq, and the referral area covers all parts of the country.

Hospital-based lung cancer incidence data were analyzed retrospectively for histologic types occurring over the mentioned period. The diagnosis in each case was substantiated by histopathologic surgical specimens, or biopsy or cytologic preparations from the original tumor site in the lung.

The histologic types were divided into four categories: small cell carcinoma, squamous cell carcinoma, adenocarcinoma, and large cell carcinoma.Patients who had never smoked were classified as non-smokers, while all the remaining patients who either smoked at the time of diagnosis or had smoked in the past were categorized as smokers.

V. Results

Patients aged below 40 were categorized as the young group and those between 40 and 65 as middle age group and those above 65 as old age group.

It was significant to find majority of cases (60.6%) within the age group 40-65 years as shown in table 1.

Table 1: Age distribution of patients with primary lung cancer

Age Group (year)	No,	%
• < 40	7	4.1
• 40-65	103	60.6
• > 65	60	35.3
Total	170	100.0

The number of male cases in this study was 124 (72.9%) and female cases was 46 (27.1%) with male to female ratio is 2.69: 1.

The distribution of smoking status of patients with primary lung cancer was reveals that most of them are smokers as shown in table 2).

Table 2: Distribution of smoking status with primary lung cancer

Smoking Status	N	%
• Smoker	115	67.6
• Nonsmoker	55	32.4
Total	170	100.0

Histological types of primary lung cancer in the total sample of study ,It was significant to find that most frequent type of primary lung cancer is squamous cell carcinoma (47.1%), followed by adenocarcinoma (30.0%) and small cell carcinoma (20.0%), while large cell carcimona contributed to small proportion of the sample (2.9%) as shown in table 3.

Table 3: Distribution of primary lung cancer according to the histological type

Type of lung cancer	N	%
• Squamous Cell Carcinoma	80	47.1
• Adenocarcinoma	51	30.0
• Small Cell Carcinoma	34	20.0
• Large Cell Carcinoma	5	2.9
Total	170	100.0

Histological types of primary lung cancer in relation to age: Mean age distribution in relation to histological type of lung cancer is detailed in Table 4. It in this study the mean ages of all types of lung cancer are relatively the same (around 60 years) except younger (58.8 year) for large cell carcinoma, table 4.

Table 4: Descriptive statistics for age according to type of primary lung cancer

Type of Malignancy	N	Minimum age	Maximum age	Mean	SD
Squamous Cell Carcinoma	**80**	**19**	**90**	**62.2**	**11.4**
Adenocarcinoma	**51**	**33**	**80**	**63.5**	**9.2**
Small Cell Carcinoma	**34**	**50**	**80**	**62.6**	**7.6**
Large Cell Carcinoma	**5**	**48**	**71**	**58.8**	**9.8**
Total Sample	**170**	**19**	**90**	**62.5**	**10.0**

Histological types of primary lung cancer in relation to gender, Squamous cell carcinoma is the commonest type of lung cancer among males (53.2 %), while in females the adenocarcinoma represents the most commontype (43.5%) as shown in table 5**.**

All types of primary lung cancer are more frequentin male than female. There is statistical significant between histological type of primary lung cancer and gender(P value ≤ 0.005).

Table 5: Distribution of primary lung cancer types in both sexes

Type of lung cancer	Male		Female	
	N	%	N	%
Squamous Cell Carcinoma	**66**	**53.2**	**14**	**30.4**
Adenocarcinoma	**31**	**25.0**	**20**	**43.5**
Small Cell Carcinoma	**23**	**18.5**	**11**	**23.9**
Large Cell Carcinoma	**4**	**3.2**	**1**	**2.2**

Regarding histological types of primary lung cancer in relation to smoking status show the most cancer is Squamous cell carcinoma occur in smoker patients more than nonsmokers (51.3% , 38% respectively) , while adenocarcioma occur more in non-smoker patients than smokers (42.0% , 24.3% respectively). Other lung cancer types showed nosignificant smoking distribution, so in general there is no statistically significant association between histological types p
Of primary lung cancer and smoking status P value≥ 0.1(Table 6)**.**

Table 6:Distribution of lung cancer types according to smoking status of patients.

Type of lung cancer	Not Smoker		Smoker		Total
	N	%	N	%	N
Squamous Cell Carcinoma	**21**	**38.0**	**59**	**51.3**	**80**
Adenocarcinoma	**23**	**42.0**	**28**	**24.3**	**51**
Small Cell Carcinoma	**10**	**18.0**	**24**	**21.0**	**34**
Large Cell Carcinoma	**1**	**2.0**	**4**	**3.4**	**5**

P value ≥ 0.1

VI. Discussion

This study revealed that most of those afflicted by lung cancer were males consisting **72.9%** of patients. This finding regarding male predominance in liability for lung cancer is compatible with the previously well known male predominance in lung cancer susceptibility [3].

Active cigarette smoking is the most well documented cause of lung cancer and has a stronger association with squamous cell carcinoma than other typesof lung cancer [4].The fact that the risk of squamous cell carcinoma falls more rapidly after cessation of smoking than the risk of adenocarcinoma, also this study reflects the stronger link between squamous cell carcinoma and smoking [5].

In men aged 40 years and over, squamous cell carcinoma still accounted for the majority of lung cancers. Adenocarcinoma was the most common type in men younger than 40. The high incidence of adenocarcinoma in the younger group is similar to findings in other published studies [6, 7, 8, and 9]. Adenocarcinoma was also the predominant type among older male nonsmokers.

Induction of squamous cell carcinoma perhaps requires long exposure to carcinogens, and therefore occurs less frequently in the young. Cigarette smoking seems to be an important causative factor in the development of lung cancer even in younger individuals [10]. However, this cannot explain the occurrenceof lung cancer in patients less than 40 years or Women in this study who developed lung cancer without a smoking history.In our study, for each major histological type of lung cancer, the mean age wasapproximately **62** years.

Elhassani [28] on 750 patients with lung cancer showed men to women ratio **4.4:1** squamous Cell carcinoma **37%,** adenocarcinoma **27%,** small cell carcinoma **21%,**large cell carcinoma **6%.**

AL- Saleem et.al [29] 344 slide were reexamined for patients with lung cancer from 1976-1982 the results were men to women ratio was **7:1** squamous cell carcinoma **48%** , adenocarcinoma **13%** , large cell carcinoma **7%** there were men predominant in all types.

Al- Alusi [30] 1519 patients with lung cancer studied men to women ratio were **4.5:1** , **90%** smokers, squamous Cell carcinoma **42%,** adenocarcinoma **24.5%** ,small cell carcinoma **17.8%** and large cell carcinoma **5.5%.**

Some large population-based studies [11-13] have obtained that adenocarcinoma of the lung showed a significant increase in both men and women, and adenocarcinoma has become the mostprevalent type in both sexes [15]. There are several etiologic factors responsible for the increasing incidence of adenocarcinoma: advances in histopathologic diagnosis resulting in reclassification of other cell types as adenocarcinoma, especially large undifferentiated carcinoma (**47%**) of undifferentiated carcinomas were reclassified as adenocarcinoma by Valaitiset al [15]; an increase in female patients, who have a predilectionfor adenocarcinoma; improvement of diagnostic methods for detecting peripheral lesions [15-16]; and the role of passive smoking[17-19].However, lung cancers among younger men, non-smoking older men and women were more often adenocarcinoma in our study,suggesting the influence of factors other than tobacco. Some factors including diet [20] hormones [21] family history [22] and occupationalexposure [23] have been proposed. Advances in molecular biology show promise for correlating specific genetic changes with exposure to carcinogens. [24-25].

El-Torkyet al [26]observed an increase in thefrequency of small cell carcinoma among women through a review of **4928** cases of lung cancer. An autopsy study in Japan also revealeda similar trend [27] but this was attributed to a change in the criteria of lung cancer histology from undifferentiated carcinoma to small cell carcinoma.In our study undifferentiated large cell carcinoma showed low incidence rates over the period of study , the reason for this is unclear, but undetermined carcinoma which cannot be identified easily by cytopathology or even histopathology may have decreased as a result of improvements in electron microscopy and immunohistochemistry.

There is no doubt that the proportion of adenocarcinoma among lung cancers and the proportion of women with lung cancer are high, the reasons for the development of adenocarcinomain the lungs of non-smokers of either sex are still unknown. Small cell carcinoma has demonstrated a higher distribution among males than females, reflecting strong association with smoking.

Therefore the influence of factors other than tobacco causing lung carcinoma awaits further investigation.

VII. Conclusions

1. There was predominance of males among primary lung cancer patients and this might be due to more prevalent smoking habit males.
2. The majority of lung cancer patients were in the age range of 40- 65 years.
3. Squamous cell carcinoma was the most common type of lung cancer among patients in this study.
4. Squamous cell carcinoma was the most common type of lung cancer among smoker males reflecting the strong association between smoking and this type of lung cancer.
5. Adenocarcinoma showed higher incidence in women and non smoker males suggesting the presence of risk factors other than tobacco in the development of lung cancer**.**
6.

VIII. Recommendations

1. Further studies that including the data of many years are needed to describe the precise incidence of each type of lung cancer in our country.
2. Further detailed studies are needed to assess the role of passive smoking in the development of lung cancer.
3. Other studies are needed to demarcate risky thresholds for smoking duration and heaviness and their effect on the type of lung cancer.
4. Further large sampled studies are needed to evaluate other factors that influence the type of lung cancer like occupational exposures to carcinogens and area of residence**.**

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