RESEARCH ARTICLE

Clinico-pathological profile of bronchogenic carcinoma: a sample from Al-Imamain Al-Kadhimain Medical City in Baghdad

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ABSTRACT

Introduction: Bronchogenic carcinoma is one of the leading causes of preventable death. Characterisation of the clinical, pathological, and radiological profiles of bronchogenic cancer can assist in disease management and help determine risk factors for specific cancer types. .

Objective: To assess the clinico-pathological profile of bronchogenic carcinoma in Al-Imamain Al-Kadhimain Medical city in Baghdad.

Methods: This cross-sectional study included 100 patients diagnosed with bronchogenic cancer. Patient clinical characteristics, diagnostic modalities, and histopathologic cancer type were recorded.

Results: Squamous cell carcinoma (SCC) was the most common histopathological type of bronchogenic cancer, accounting for 44% of the patients, followed by adenocarcinoma (39%). Squamous CC and large/undifferentiated CC were more common in males (84.09% and 75%, respectively) than in females (15.91% and 25%, respectively), with significant differences. All patients with small CC (100%) and 75% of patients with SCC were ex/current smokers, versus 0% and 25%, respectively, were non-smokers, with highly significant differences. In contrast, 69.23% of patients with adenocarcinoma were non-smokers compared with 30.77% who were ex/current smokers, with a significant difference.

Conclusion: SCC and adenocarcinoma are the most common types of bronchogenic cancer. Male gender is significantly associated with SCC and large/undifferentiated CC. SCC and small CC are more common among smokers than other histopathological types of bronchogenic cancers.

Key words: Clinical Profile, Pathological Profile, Bronchogenic Carcinoma.

INTRODUCTION

Bronchogenic carcinoma, also known as lung cancer, refers to tumours originating in the lung parenchyma or within the bronchi. It is one of the leading causes of cancer-related deaths in the United States. It is estimated that there are 225,000 new cases of lung cancer in the United States annually, and approximately 160,000 die from lung cancer. Its dramatic rise in later decades is mainly attributable to the increase in smoking among both males and females.[1,2] In Iraq, according to the World Health Organisation (WHO), lung cancer is the second most common malignant disease after breast cancer, and it is the second most common cause of death in malignant diseases after breast cancer.[3]

A combination of intrinsic factors and exposure to environmental carcinogens is involved in the pathogenesis of lung cancer.[4] Familial and genetic variations can predispose a person to lung cancer, even in non-smokers.

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Many genetic mutations within tumours have been identified. For example, mutations in the epidermal growth factor receptor (EGFR) gene are present in 20% of adenocarcinomas. Tumour mutations may also predict response to or toxicity from certain chemotherapies and are an important area for future investigation. [5] Tobacco use causes 80% to 90% of all lung cancers.[6] Second-hand tobacco smoke exposure is also a significant risk factor, with younger age at exposure associated with a higher risk of lung cancer.[7] Risk factors typically depend on the dose and the duration of smoking.[8]

The broad divisions of small cell lung cancer (SCLC) and non-small cell lung cancer (NSCLC) represent more than 95% of all lung cancers. The WHO (World Health Organisation) classifies SCLC into three cell subtypes: oat cell, intermediate cell, and combined cell. SCLC with NSCLC component, squamous, or adenocarcinoma).[9] Non-small cell lung cancer is classified into Squamous cell carcinoma, Adenocarcinoma, Adenosquamous carcinoma, and large cell carcinoma.[10]

Patients with lung cancer are almost always symptomatic at diagnosis.[11] Symptoms can be caused by the primary tumour (e.g., cough, haemoptysis); intrathoracic spread (e.g., Horner syndrome, superior vena cava obstruction); and distant metastases (e.g., bone pain). Paraneoplastic syndromes, such as the syndrome of inappropriate antidiuretic hormone, can also cause symptoms.[12]

This study aimed to assess the clinic-pathological profile of bronchogenic carcinoma among Iraqi patients who visited the oncology department at Al-Imamain Al-Kadhimain Medical City during the first half of 2020.

METHODS

Study design and setting: This is a cross-sectional study involving 100 patients with bronchogenic cancer who attended the Oncology Department at Al-Imamain Al-Kadhumain Medical City, Baghdad, between January 1, 2020, and July 31, 2020.

Ethical consideration: The research proposal was approved by the Ethics Committee of the Arab Board of Health Specialisation in Iraq. Agreement from the hospital administration was obtained to use the data. Written consent was obtained from each participant after the study's aim was explained. Participation in the study was voluntary, and the participants were assured that their data would be kept confidential.

Inclusion Criteria: Adult patients, aged 18 years or older, of both sexes who visited the Oncology Department at Al-Imamain Al-Kadhimain Medical City during the study period with an established diagnosis of bronchogenic carcinoma were the target population of this study. The definitive diagnosis was based on histopathological examination by a consultant histopathologist of a biopsy or FNA of the lesion. Exclusion Criteria: Patients with incomplete data or who refused to participate were excluded from this study.

Sampling and sample size: The authors selected 100 patients conveniently.

Data Collection and procedure: For each participant, we recorded age, sex, smoking history, clinical presentation, and histopathological diagnosis. The presenting symptoms were cough, weight loss, haemoptysis, shortness of breath, anorexia, chest pain, and fatigue. The histopathological types of bronchogenic cancer used in this study were squamous cell carcinoma, adenocarcinoma, small cell carcinoma, large cell carcinoma, and undifferentiated cell carcinoma. Histological types of bronchogenic carcinoma were studied to define any association with age, sex and clinical presentation.

Statistical Analysis: Statistical analyses of all data were performed with SPSS software (SPSS 21.0 for Windows, IBM, Chicago, IL, USA). Normality of all continuous data was checked using the Kolmogorov–Smirnov test. Normally and non-normally distributed data variables were expressed as the mean ± standard deviation and as the median ± interquartile range, respectively. Categorical variables were presented as counts and percentages, and comparisons were conducted using Fisher's exact tests. P-value was considered significant

Table 1 | Demographic Characteristics of the Patients (N=100)

Variables	Value
Age, years	
Mean ± SD	62.26±10.8
Range	28-88
Age groups	
≤50	15(15%)
51-65	45(45%)
>65	40(40%)
Gender	
Male	70(70%)
Female	30(30%)
Smoking	
Never	41(41%)
Ex/current	59(59%)

Table 2 | Clinical presentation of the patients

Clinical feature	Frequency	Percentage
Cough	71	71%
Weight loss	51	51%
Haemoptysis	32	32%
Shortness of breath	28	28%
Anorexia	26	26%
Chest pain	10	10%
Fatigue	5	5%
Others*	4	4%
* Including three cases with back pain and one case of voice hoarseness		

if it was < 0.05.

RESULTS

The mean age of the patients was 62.26±10.8 years (range= 28-88 years). The 51-65 years age group was the most common, accounting for 45% of patients, followed by the>65 years age group (40%). Male patients accounted for 70 (70%), and female patients accounted for 30 (30%). Fifty-nine patients (59%) were either ex- or current smokers, **Table 1**.

Cough was the most common clinical feature encountered in 71 patients (71%), followed by weight loss in 51 patients (51%), hemoptysis in 32 patients (32%), shortness of breath (SOB) in 28 patients (28%), and anorexia in 26 patients (26%). Less frequent presentations included chest pain in 10 patients (10%) and fatigue in 5 patients (5%), as shown in **Table 2**.

Squamous cell cancer was the most common histopathological type of bronchogenic cancer, accounting for 44% of the patients, followed by adenocarcinoma (39%). Less common histopathological types included small CC (9%), undifferentiated CC (6%), and large CC (2%), as demonstrated in **Table 3**.

For statistical purposes, large and undifferentiated CC were combined into a single group. Generally, there was no significant association between age groups and histopathological types of bronchogenic cancer (p-value = 0.069). Of note, both Squamous cell cancer and small cell cancer were more common in the older age group (>65 years) than in the younger groups, while adenocarcinoma was more common in the age group 51-65 years than in other groups (**Table 3**).

Table 3 | Association of age with histopathological types

Category	SCC	Small CC	Adenocarcinoma	Large/ undifferentiated CC (n=8)	P-value
Age					
≤50	4(9.09%)	0(0%)	8(20.51%)	3(37.5%)	0.069
51-65	17(38.64%)	4(44.44%)	20(51.28%)	4(50%)	
>65	23(52.27%)	5(55.56%)	11(28.21%)	1(1.25%)	
Gender					0.035
Male	37 (84.09)	5(55.56)	22(56.41)	6 (75)	
Female	7 (15.91)	4 (44.44)	17(43.59)	2 (25)	
Smoking					< 0.001
Never	11(25)	0(0)	27 (69.23)	5 (62.5)	
Ex/Current	33(75)	9(100)	12 (30.77)	3 (37.5)	
Total	**44 (44 %)**	**9 (9 %)**	**39 (39 %)**	**8 (8 %)**	**100 (100 %)**

Table 4 | Association of clinical features with histopathological type of bronchogenic cancer

Clinical feature	SCC	Small CC	Adenocarcinoma	Large/ undifferentiated CC	P-value
Cough	34(77.27%)	7(77.78%)	25(64.1%)	5 (62.5%)	0.527
Weight loss	25(56.82%)	1(11.11%)	22(56.41%)	3(37.5%)	0.061
Hemoptysis	12(27.27%)	2(22.22%)	15(38.46%)	2(25%)	0.695
SOB	13(29.55%)	1(11.11%)	10(25.64%)	4(50%)	0.340
Anorexia	9(20.45%)	3(33.33%)	12(30.77%)	2(25%)	0.701
Chest pain	5(11.36%)	2(22.22%)	2(5.13%)	1(12.5%)	0.446
Others	4(9.09%)	0(0.00%)	5(12.82%)	0(0.00%)	0.498
Total	44	9	39	8	

Squamous CC and large/undifferentiated CC were more common in males (84.09% and 75%, respectively) than in females (15.91% and 25%, respectively), with significant differences (p value 0.035). The frequency of small CC and adenocarcinoma was comparable between males and females. All patients with small CC (100%) and 75% of patients with SCC were ex/current smokers, versus 0% and 25%, respectively, were non-smokers, 69.23% of patients with adenocarcinoma were non-smokers compared with 30.77% who were ex/current smokers, with a significant difference (p value 0.001) (**Table 3**).

None of the included clinical features had a significant association with the histopathological type of bronchogenic cancer. Although weight loss was more frequent among patients with squamous cell cancer (SCC) and adenocarcinoma (56.82% and 56.41%, respectively) than small CC and large/undifferentiated CC (11.11% and 37.5%, respectively), the difference was not significant (p value > 0.05) (**Table 4**).

DISCUSSION

In this study, the mean age of patients with bronchogenic carcinoma was 62.26 ± 10.8 years. Anant in his study [13] found that the mean age of patients with bronchogenic carcinoma in north India was 58 years. In our study, males were more frequently affected than females (70% vs. 30%). This finding is consistent with the study by Omran et al. in Iraq,[14] which reported that 75.9% of lung cancer cases occurred in males and 24.1% in females. It also

aligns with the study by Viswanath et al.[15] which found that males accounted for 76.67% of cases, compared with 23.33% in females. The observed gender difference may be attributed to the higher incidence of smoking among males compared with females. [16] In this study, 41 patients (41%) were never smokers, while 59 patients (59%) were former or current smokers. In the study by Bharate et al.,[17] 53.4% of patients were non-smokers and 46.6% were smokers.

In this study, cough, weight loss, haemoptysis, and shortness of breath were the most common clinical presentations. In contrast, the study by Bharate et al.[17] reported chest pain, cough, breathlessness, and anorexia as the most frequent presenting symptoms. In contrast, Alberto et al.[18] found cough, pain, dyspnea, and haemoptysis to be the most common clinical features. Variation in clinical presentation across studies may be related to differences in lesion site and size.

According to the present study, the most common bronchogenic cancer was squamous cell cancer (SCC), followed by adenocarcinoma. This was consistent with many previous studies, which reported that SSC remains the most common type.[19,20] Furthermore, Afrose et al. [21] showed that SCC was the commonest (38%) histological subtype and adenocarcinoma was the second most common subtype (26.90%) among Indian patients. However, many other studies worldwide indicated that adenocarcinoma is the most common type, accounting for more than 40% of bronchogenic cancers, 60% of the NSCC, and more than 70% of surgically resected cases.[22] On the other

hand, SCCs make up about 20% of lung cancers. [23] Malik et al.[24] in their study observed that adenocarcinoma was the commonest histological subtype, accounting for 39% of all lung cancer cases in a subset of the Indian population. The incidence of SCC has declined in recent decades, likely because of changes in smoking behaviour.

In the present study, there was no significant association between age groups and different histopathological types of bronchogenic cancer. This is consistent with Afrose et al., [21] who observed no significant difference between the younger and older age groups in histological subtypes. In contrast, several studies found that adenocarcinoma is the predominant histological subtype in younger patients.[25,26] These studies proposed that etiopathogenesis in younger and older patients is different, and age should be considered as an independent factor while implementing preventive measures against lung cancer.

Based on the results of the present study, squamous CC and large/undifferentiated were more common among males than among females; the frequency of small CC and adenocarcinoma was comparable between males and females. In accordance with this result, the study by Mäkitaro et al. [27] reported that SCC accounted for 43% among males and 20% among females, while adenocarcinoma accounted for 23% among males and 46% among females. The percentages of small cell carcinoma among the males and females were almost similar, 23% and 25%, respectively.

A trend toward increased adenocarcinoma among females has also been reported by Ko et al. [28] and Hirayama.[29] Afrose et al[21] analysed 342 cases diagnosed as primary bronchogenic cancer. Regarding gender-wise distribution of histological subtypes, ACC is the most common subtype of lung cancer among women. However, the reason for this change is unclear. Possible factors, as suggested by Janssen-Heijnen's study,[30] are the increase in women smokers and a change in smoking behaviour.

In the current study, all patients with small

CC (100%) and 75% of patients with SCC were ex/current smokers, whereas 0% and 25%, respectively, were nonsmokers, with highly significant differences. In contrast, 69.23% of patients with adenocarcinoma were nonsmokers compared with 30.77% who were ex/current smokers, with a significant difference. Yang et al.[31] reported that more peripheral cancers, such as adenocarcinoma and large cell cancer, show weaker associations with smoking than more central tumours such as SCC or SCLC. The strength of the association between smoking and adenocarcinoma (ADC) may depend on the relative prevalence of other factors such as genetic profile, occupational chemicals or other environmental exposures such as passive smoking. Also, the results of the present study are consistent with many previous reports [32,33] that support a weaker association between AC and smoking.

Another explanation of this association involves the possibility that smoking affects a different number of stages of lung carcinogenesis according to histological type. Furthermore, differences in risk patterns may reflect the fact that adenocarcinoma tends to arise more frequently distally, whereas SCC arises proximally within the pulmonary airways. If larger smoke particles that tend to deposit proximally contain a wider range of carcinogens, this would make smoking a complete carcinogen for non-adenocarcinoma types but not for the cases of adenocarcinoma arising distally.[31] Therefore, the interaction between physical factors (i.e., the diameter of smoke particles) and chemical factors (i.e., the types of lung cancer that may be caused by different carcinogens in smoke) may well account for the difference in the magnitude of the odds ratio by histological type.[34]

Furthermore, the present study revealed no significant association between clinical features and histopathologic type. In line with this result is an Egyptian study in which cough was the most frequent symptom, accounting for 85.9% of patients; however, no association was found between clinical presentation and histopathologic types.[35] Polanskie et

al.[36] recruited 257 Polish patients with bronchogenic carcinoma who showed chest pain, fatigue, nausea and vomiting, dyspnea were more common in squamous than non-squamous cell cancer.

CONCLUSION

The most common histopathological types of bronchogenic cancers are SCC (44%) and adenocarcinoma (39%). Male gender is significantly associated with SCC and large/undifferentiated CC. Squamous CC and small CC are more common among smokers than other histopathological types of bronchogenic cancers. There was no significant association between age groups, clinical presentation, and the histopathological types of bronchogenic cancer.

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