International Journal of Research in Medical Sciences
Chakrabortty R et al. Int J Res Med Sci. 2023 Feb;11(2):471-475
www.msjonline.org
pISSN 2320-6071 | eISSN 2320-6012
DOI: https://dx.doi.org/10.18203/2320-6012.ijrms20230155

Original Research Article

A study on demographical, clinical-radiological, and histopathological profile of bronchial carcinoma in a tertiary care hospital in Bangladesh

Rajashish Chakrabortty*, Dibanur Rashid Siddiqua, Samia Rahman, Susanta Kumar Paul

Department of Respiratory Medicine, Bangabandhu Sheikh Mujib Medical University, Shahbag, Dhaka, Bangladesh

Received: 13 December 2022
Revised: 06 January 2023
Accepted: 09 January 2023

***Correspondence:**
Dr. Rajashish Chakrabortty,
E-mail: drrajashish@gmail.com

ABSTRACT

Background: Bronchial carcinoma has different demographical, clinico-radiological, and histopathological profiles depending on the environment, gender, and racial group. The purpose of this study was to explore the sociodemographical, clinical, radiological, and histopathological patterns of bronchial carcinoma in Bangladesh.
Methods: This cross-sectional descriptive study was conducted at the respiratory medicine department of Bangabandhu Sheikh Mujib Medical University (BSMMU). The study period was one year from January 2021 to December 2021. Our study documented socio-demographic patterns, smoking habits, history of COPD, clinical features, radiological findings, histopathological patterns of the tumor, and participants' performance status.
Results: One hundred histopathologically confirmed patients with bronchial carcinoma were included in this study. The mean age of the participants was 59.57±10.41 years. The majority of the participants were in the 5th and 6th decade, 35% and 34% respectively. Smokers were 80% in our study. The presenting complaints were cough (87%), shortness of breath (61%), and chest pain (58%). Mass lesions (83%) followed by collapse (8%) were the most common imaging findings. Adenocarcinoma (48%) and squamous cell carcinoma (35%) were the predominant histological types.
Conclusions: The histopathological profiles of bronchial carcinoma are changing and adenocarcinoma is becoming the predominant type in Bangladesh.

Keywords: Adenocarcinoma, Bangladesh, Bronchial carcinoma, Mass lesion

INTRODUCTION

Bronchial carcinoma is a leading cause of malignancy-associated death worldwide. With increasing life expectancy with exposure to etiological agents, bronchial carcinoma now constitutes the majority of all cancer diagnoses globally. It has the worst prognosis with 18% of cancer-associated mortality globally.[1]

The bronchial carcinoma patterns vary with environment, race, and sex. Despite these discrepancies, smoking and the use of biomass fuel for cooking in an enclosed atmosphere are the main etiological factors for developing bronchial carcinoma. A recent study in Bangladesh suggested that bronchial carcinoma cases have increased by approximately two hundred percent in the 3years.[2]

Bronchial carcinoma is caused by the atypical proliferation of mutated cells and cancer development. Previously, small cell carcinoma and non-small cell carcinoma were the main classifications of bronchial carcinoma. However, this classification is inadequate due to the accessibility of biomarkers-related novel therapeutics now. Therefore, categorizing bronchial carcinoma using its histopathological and genomic

arrangement has become a topic of interest. The fundamental basis of targeted therapy or immunotherapy is the identification of the mutation subtype. In terms of the incidence of a morphological variety of bronchial carcinoma, adenocarcinoma is now equal to or surpasses squamous carcinoma worldwide.

There are few epidemiological data on bronchial carcinoma available in Bangladesh.[3,4] This study was done to explore socio-demographical, clinical, radiological, and histopathological profiles of bronchial carcinoma.

METHODS

We conducted this cross-sectional descriptive study between 01 January 2021 to 31 December 2021 in the respiratory medicine department of BSMMU. Age, sex, smoking history, presenting symptoms, signs, radiological findings, and histological pattern of bronchial carcinoma of the participants were documented in a data sheet. ECOG (Eastern Cooperative Oncology Group) score was used to evaluate the performance status of the participants. One hundred histopathologically confirmed patients with bronchial carcinoma were included in this study. Participants were informed about the objectives of the study and informed written consent was obtained from the participants. Ethical approval was taken from the institutional review board. Statistical analysis was done using the software IBM-SPSS (Statistical Package for the Social Sciences) version 23. Categorical variables were expressed in percentage and continuous in mean and standard deviation. A Chi-square test was used to determine the association in different categorical variables. A p value of <0.05 was considered statistically significant.

Inclusion criteria

Histopathologically confirmed patients of bronchial carcinoma.

Exclusion criteria

Metastatic lung cancer, lymphoma, and the patient who received chemotherapy for bronchial carcinoma were excluded from this study.

RESULTS

In our study, the average age of the participants was 59.57±10.41 years, male predominant (84%) and smoker (80%). Previous history of chronic obstructive pulmonary disease (COPD) and lymphadenopathy was 44% and 10% respectively. 36% and 35% were in scale 2 and 3 ECOG performance status. The sociodemographic profile of the participants was shown in Table 1.

In this study, cough (87%), shortness of breath (61%), and chest pain (58%) were the most shared presenting complaints. Hemoptysis was present in only 38 patients. Table 2 showed the presenting complaints during the admission of the participants.

Table 1: Sociodemographical features of the study subjects (n=100).

Variables	No. of the patients (N=100) (%)
Age in years	
≤40	6 (6)
41-50	14 (14)
51-60	35 (35)
61-70	34 (34)
>70	11 (11)
Mean±SD	59.57±10.41
Sex	
Male	86 (86)
Female	14 (14)
Smoking status	
Smoker	80 (80)
Non-smoker	20 (20)
COPD	
Yes	44 (44)
No	56 (56)
Lymphadenopathy	
Yes	10 (10)
No	90 (90)
ECOG	
1	4 (4)
2	36 (36)
3	35 (35)
4	16 (16)
5	9 (9)

Table 2: Presenting complaints of the participants during admission (N=100).

Symptoms	No. of patients (n=100) (%)	Male (n=86)	Female (n=14)
Cough	87 (87.0)	74 (86.0)	13 (92.9)
Shortness of breath	61 (61.0)	53 (61.6)	8 (57.1)
Vena caval obstruction	6 (6.0)	6 (7.0)	0 (0.0)
Voice change	14 (14.0)	13 (15.1)	1 (7.1)
Sputum	37 (37.0)	31 (36.0)	6 (42.9)
Hemoptysis	38 (38.0)	33 (38.4)	5 (35.7)
Chest pain	58 (58.0)	52 (60.5)	6 (42.9)

Table 3: Chest x-ray/CECT finding of the participants.

Radiological lesion	No. of patients	Percentage
Collapse	8	8.0
Pleural effusion	6	6.0
Mass lesion	83	83.0
Lymphadenopathy	3	3.0

CECT: Contrast-enhanced computed tomography

Table 3 showed that mass lesion (83%) was the predominant imaging finding (x-ray/CECT). Collapse and lymphadenopathy were present in only 8% and 3% respectively.

In this present study, adenocarcinoma was the predominant type of bronchial carcinoma (48%) and after that squamous cell carcinoma (35%) (Table 4). The commonest subtype amongst smokers was adenocarcinoma in 37 out of 80 cases (46.3%), followed by squamous cell carcinoma in 28 out of 80 cases (35%). Among non-smokers, adenocarcinoma was the main type of bronchial carcinoma at 55% (11 out of 20). Among the COPD patient, the percentage of adenocarcinoma and squamous cell carcinoma was the same in 18 out of 44 (40.9%) but in the non-COPD group, adenocarcinoma was more common (53.6%) than squamous cell carcinoma (30.4%). Among the COPD patient, the percentage of adenocarcinoma and squamous cell carcinoma was the same in 40.9% (18 out of 44) contrary in the non-COPD group adenocarcinoma was more common (53.6%) than squamous cell carcinoma (30.4%) (Table 5).

Table 4: Distribution of bronchial carcinoma according to histopathologic pattern.

Histopathologic diagnosis	Frequency	Percentage
Adenocarcinoma	48	48.0
Squamous cell carcinoma	35	35.0
Small cell carcinoma	16	16.0
Undifferentiated carcinoma	1	1.0

Table 5: Distribution of bronchial carcinoma according to smoking status, COPD and non-COPD.

Histopathologic diagnosis	Smoker (n=80)	Non-smoker (n=20)	COPD (n=44)	Non-COPD (n=56)
	N (%)	N (%)	N (%)	N (%)
Adenocarcinoma	37 (46.3)	11 (55.0)	18 (40.9)	30 (53.6)
Squamous cell carcinoma	28 (35.0)	7 (35.0)	18 (40.9)	17 (30.4)
Small cell carcinoma	14 (17.5)	2 (10.0)	7 (15.9)	9 (16.1)
Undifferentiated carcinoma	1 (1.3)	0 (0.0)	1 (2.3)	0 (0.0)

DISCUSSION

Bronchial carcinoma has now become the principal cause of malignancy-associated mortality worldwide. However, the patterns of bronchial carcinoma are varied because of demographical variation, socioeconomic status, and gender. In Bangladesh incidence of bronchial carcinoma has risen by almost 200% within just 3 years from January 2015 to December 2017.[2] The demographical, clinical, radiological, and histopathological patterns of bronchial carcinoma have changed all over the world. In Bangladesh, histopathological data are scarce at present. we explored the demographical, clinical, radiological, and histopathological patterns in 100 cases of bronchial carcinoma patients admitted to our respiratory medicine department.

The average age of the participants was 59.57±10.41 years and the majority (35%) were within the 51-60 years of age group in this study. A similar age group was found in different studies.[5-7] Bronchial carcinoma commonly affects those aged in the 6th and 7th decade, and the risk of developing bronchial carcinoma increases with aging.[8] Out of 100 cases of bronchial carcinoma 86 participants were men and 6:1 man-to-woman ratio. This male predominance in our study is consistent with the finding of others.[9-12]

Among the risk factors of bronchial carcinoma, smoking was the most common risk factor. It is well established that lifetime smokers are at 20-40 times risk to develop bronchial carcinoma than non-smokers and this risk is directly proportional to the period of smoking and the number of pack years.[13,14] In our study, smokers were 80%, and 4:1 smoker-to-non-smoker ratio. However, this ratio was 1.7:1 to 3.9:1 in different Indian studies.[15,16] In our county, women have a lesser frequency of smoking and less pollution exposure than males. In average smoker men, the chance of developing bronchial carcinoma is nearly nine to ten times higher than in non-smokers whereas the risk increased at least 20-fold in the case of heavy smokers.[17,18] Hitherto it is thought that smoking is linked with squamous cell carcinoma but in this survey, both the smokers (46.3%) and non-smokers (55%) had the adenocarcinoma predominant.

The utmost frequent presenting complaint was cough (87%), then shortness of breath (61%), and chest pain (58%). Nearly one-third (31%) of participants had hemoptysis (31%) and only 6% had superior vena cava obstruction. This clinical presentation is similar to the study done in India and western studies.[19-21]

In our study, 44 percent of the participants had a history of COPD. The association of histological types with COPD and non-COPD showed 18 out of 44 (40.9%) of COPD and 30 out of 56 (53.6%) non-COPD had adenocarcinoma, and 40.9% and 30.4% had squamous cell respectively.[22]

At imaging findings, 83 out of 100 (83%) mass lesions had the primary feature of bronchial carcinoma followed by collapse 8% (8 out of 100) and pleural effusion. Sarfraz et al and Rawat et al observed similar presentations.[6,19]

This present study observed that pleural effusion was most frequently found in adenocarcinoma, subsequently small-cell carcinoma. Sarfraz et al also demonstrated identical findings in their study.[6] The mass lesions were found in 44.6% (37 out of 83 patients) of adenocarcinoma, followed by squamous cell carcinoma in 37.3% (31 out of 83 patients).

This study revealed that the predominant histological subtype of bronchial carcinoma was adenocarcinoma (48%). Squamous cell carcinoma accounted for 35%. This finding is analogous to the observations of Albasri et al, Gabremariam et al, Malik et al, and Noronha et al.[23-26] However, it is contrary to the other Bangladeshi study, Indian studies, Iran, Nepal, Malaysia, Senegal, Saudi Arabia, and Turkey.[3,20,27-33]

Recently histological patterns of bronchial carcinoma have been shifting to adenocarcinoma probably due to alternation in smoking behaviors. Behera et al observed that small-cell carcinoma was often found in smokers below the age of 40 years and squamous cell carcinoma after 40 years, whereas adenocarcinoma in non-smokers.[21] Mohan et al observed that squamous cell carcinoma was predominated earlier, but at present, adenocarcinoma is the predominant bronchial carcinoma.[5]

At the time of diagnosis, the performance status of the participants had poor 36% on scale 2 and 35% on scale 3. In bronchial carcinoma, Lilenbaum et al, Wakelee et al, and Noronha et al observed higher poor performance status than Mohan et al.[26,34-36] This could be because the majority of patients only pursue medical attention once their illness has progressed.

Logistic regression findings in our study showed that males with COPD had five times more chance to develop bronchial carcinoma than females [OR: 5.369 (CI: 1.040-27.727; p<0.045)]. Smoking is the primary cause of COPD and bronchial carcinoma. The high rate of bronchial carcinoma in COPD might be caused by genetic predispositions, early aging of the lungs, oxidative stress that alters DNA, and an inflammatory process that releases several cytokines linked to the formation of bronchial carcinoma.[22,37]

Single-center study and small sample were the limitations of our study.

CONCLUSION

Bronchial carcinoma is the major and principal cause of malignancy-associated mortality worldwide. Adenocarcinoma was the most prevalent variety in our study. The prime causal factor for bronchial carcinoma still smoking. Mass lesion remains the most common radiological presentation.

Funding: No funding sources
Conflict of interest: None declared
Ethical approval: The study was approved by the Institutional Ethics Committee

REFERENCES

1. Sung H, Ferlay J, Siegel RL, Laversanne M, Soerjomataram I, Jemal A, et al. Global Cancer Statistics 2020: GLOBOCAN Estimates of Incidence and Mortality Worldwide for 36 Cancers in 185 Countries. CA Cancer J Clin. 2021;71(3):209-49.
2. Report: Lung cancer on the rise in Bangladesh. Dhaka Tribune. 2021. Available from: https://archive.dhakatribune.com/health/2021/01/25/report-lung-cancer-on-the-rise-in-bangladesh. Accessed on 2 June 2021.
3. Islam MR, Hasan ATMK, Khatun N, Ridi IN, Rasheed MMO, Islam SMA, et al. Demographic differentials of lung cancer survival in Bangladeshi patients. PLoS One. 2021;16(12):e0261238.
4. Siddique AB, Begum SM, Mandal T, Mutsuddy P, Kar R, Jabin Z. Demography and characteristics of lung cancer patients evaluated by 18F-FDG PET-CT imaging-retrospective analysis in NINMAS. Bangladesh J Nuclear Med. 2022;25(1):22-7.
5. Mohan A, Garg A, Gupta A, Sahu S, Choudhari C, Vashistha V, et al. Clinical profile of lung cancer in North India: A 10-year analysis of 1862 patients from a tertiary care center. Lung India. 2020;37(3):190-7.
6. Sarfraz S, Gupta R, Bhardwaj S. Histopathological patterns of endobronchial lung biopsy specimen in lung cancer along with clinico-radiological correlation. Int J Contemp Med Res. 2018;5(11):K1-5.
7. Mandal SK, Singh TT, Sharma TD, Amrithalingam V. Clinico-pathology of lung cancer in a regional cancer center in Northeastern India. Asian Pac J Cancer Prev. 2013;14(12):7277-81.
8. Tas F, Ciftci R, Kilic L, Karabulut S. Age is a prognostic factor affecting survival in lung cancer patients. Oncol Lett. 2013;6(5):1507-13.
9. Dey A, Biswas D, Saha SK, Kundu S, Kundu S, Sengupta A. Comparison study of the clinico-radiological profile of primary lung cancer cases: An Eastern India experience. Indian J Cancer. 2012;49(1):89-95.
10. Ramani V, Bijit C, Vinu S, Belagutti JS, Radheshyam N. Clinicopathological profile of lung cancers at an institute from south India- a record based retrospective cohort study. Adv Lung Cancer. 2020;09(03):41-54.

11. Sheikh S, Shah A, Arshed A, Makhdoomi R, Ahmad R. Histological pattern of primary malignant lung tumors diagnosed in a tertiary care hospital: a 10-year study. Asian Pac J Cancer Prev. 2010;11(5):1341-6.
12. 12. Khan NA, Afroz F, Lone MM, Teli MA, Muzaffar M, Jan N. Profile of lung cancer in Kashmir, India: a five-year study. Indian J Chest Dis Allied Sci. 2006;48(3):187–90.
13. Ozlü T, Bülbül Y. Smoking and lung cancer. Tuberk Toraks. 2005;53(2):200-9.
14. Jung KJ, Jeon C, Jee SH. The effect of smoking on lung cancer: ethnic differences and the smoking paradox. Epidemiol Health. 2016;38:e2016060.
15. Kshetrimayum S, Srivastava A, Kant S, Verma A, Prakash V, Bajaj D, et al. A study of the socio-demographic, clinical, pathological, and radiological profile of lung cancer in a tertiary care center. Int J Adv Med. 2016;3(4):920-7.
16. Darling HS, Viswanath S, Singh R, Ranjan S, Pathi N, Rathore A, et al. A clinico-epidemiological, pathological, and molecular study of lung cancer in Northwestern India. J Cancer Res Ther. 2020;16(4):771-9.
17. Dela Cruz CS, Tanoue LT, Matthay RA. Lung cancer: epidemiology, etiology, and prevention. Clin Chest Med. 2011;32(4):605-44.
18. Schwartz AG, Cote ML. Epidemiology of lung cancer. Adv Exp Med Biol. 2016;893:21-41.
19. Rawat J, Sindhwani G, Gaur D, Dua R, Saini S. Clinico-pathological profile of lung cancer in Uttarakhand. Lung India. 2009;26(3):74-6.
20. Alamoudi OS. Lung cancer at a University Hospital in Saudi Arabia: A four-year prospective study of clinical, pathological, radiological, bronchoscopic, and biochemical parameters. Ann Thorac Med. 2010;5(1):30-6.
21. Behera D, Balamugesh T. Lung cancer in India. Indian J Chest Dis Allied Sci. 2004;46(4):269-81.
22. Wang W, Xie M, Dou S, Cui L, Zheng C, Xiao W. The link between chronic obstructive pulmonary disease phenotypes and histological subtypes of lung cancer: a case-control study. Int J Chron Obstruct Pulmon Dis. 2018;13:1167-75.
23. Albasri AM. Histopathological analysis of lung cancers. An 11-year retrospective study from Al-Madinah Al-Munawwarah, Saudi Arabia. Saudi Med J. 2019;40(5):503-6.
24. Gebremariam TH, Haisch DA, Fernandes H, Huluka DK, Binegdie AB, Woldegeorgis MA, et al. Clinical Characteristics and Molecular Profiles of Lung Cancer in Ethiopia. JTO Clin Res reports. 2021;2(7):100-96.
25. Malik PS, Sharma MC, Mohanti BK, Shukla NK, Deo S, Mohan A, et al. Clinico-pathological profile of lung cancer at AIIMS: a changing paradigm in India. Asian Pac J Cancer Prev. 2013;14(1):489-94.
26. Noronha V, Dikshit R, Raut N, Joshi A, Pramesh CS, George K, et al. Epidemiology of lung cancer in India: focus on the differences between non-smokers and smokers: a single-center experience. Indian J Cancer. 2012;49(1):74-81.
27. Bhatti V, Kwatra KS, Puri S, Calton N. Histopathological spectrum and immunohistochemical profile of lung carcinomas: a 9-year study from a tertiary hospital in north India. Int J Appl Basic Med Res. 2019;9(3):169-75.
28. Singh N, Aggarwal AN, Gupta D, Behera D, Jindal SK. Quantified smoking status and non-small cell lung cancer stage at presentation: analysis of a North Indian cohort and a systematic review of the literature. J Thorac Dis. 2012;4(5):474-84.
29. Hajmanoochehri F, Mohammadi N, Zohal MA, Sodagar A, Ebtehaj M. Epidemiological and clinicopathological characteristics of lung cancer in a teaching hospital in Iran. Asian Pac J Cancer Prev. 2014;15(6):2495-500.
30. Prasad R, James P, Kesarwani V, Gupta R, Pant MC, Chaturvedi A, et al. Clinicopathological study of bronchogenic carcinoma. Respirology. 2004;9(4):557-60.
31. Kan CS, Chan KMJ. A review of lung cancer research in Malaysia. Med J Malaysia. 2016;71(1):70-8.
32. Niang A, Bonnichon A, Ba-Fall K, Dussart C, Camara P, Vaylet F, et al. Lung cancer in Senegal. Med Trop. 2007;67(6):651-6.
33. Demirci E, Daloglu F, Gundogdu C, Calik M, Sipal S, Akgun M. Incidence and clinicopathologic features of primary lung cancer: a North-Eastern Anatolia region study in Turkey (2006-2012). Asian Pac J Cancer Prev. 2013;14(3):1989-93.
34. Lilenbaum RC, Cashy J, Hensing TA, Young S, Cella D. Prevalence of poor performance status in lung cancer patients: implications for research. J Thorac Oncol. 2008;3(2):125-9.
35. Wakelee HA, Dahlberg SE, Brahmer JR, Schiller JH, Perry MC, Langer CJ, et al. Differential effect of age on survival in advanced NSCLC in women versus men: analysis of recent Eastern Cooperative Oncology Group (ECOG) studies, with and without bevacizumab. Lung Cancer. 2012;76(3):410-5.
36. Mohan A, Latifi AN, Guleria R. Increasing incidence of adenocarcinoma lung in India: Following the global trend? Indian J Cancer. 2016;53(1):92-5.
37. Durham AL, Adcock IM. The relationship between COPD and lung cancer. Lung Cancer. 2015;90(2):121-7.

Cite this article as: Chakrabortty R, Siddiqua DR, Rahman S, Paul SK. A study on demographical, clinical-radiological, and histopathological profile of bronchial carcinoma in a tertiary care hospital in Bangladesh. Int J Res Med Sci 2023;11:471-5.