

**Original Article**

## Role of Brush Cytology in Diagnosis of Bronchial Carcinoma: Experience in Rajshahi Medical College Hospital

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### Abstract

This was a descriptive study conducted in Rajshahi Medical College Hospital (RMCH), Rajshahi and the study period was from June 2017 to June 2019. A total number of 300 patients (48 females and 252 males) were enrolled who underwent elective fiber optic bronchoscopy with brush cytology for the diagnosis of bronchial carcinoma. Our aim was to identify the role of brush cytology in diagnosis of bronchial carcinoma. Most of the cases (84%) were male. Majority 111(37.00%) of the patients were in age group 60-72 years; the mean±SD age was (58.70±13.11). Most of the study participants were farmer 134(44.67%). 182(66.67%) were smoker and 118(39.33%) were non-smoker. For smokers, pack year history was <10 pack in 78(42.85%), 10-20 pack 66(36.26%) and >20 pack 38(20.87%) of cases. Squamous cell carcinoma was the most common type of bronchial carcinoma; found in 95 (31.66%) cases followed by adenocarcinoma 50 (16.66%), large cell carcinoma 43 (14.33%), small cell carcinoma 25 (8.33%), others 87 (29%) This study revealed that the bronchial brush cytology was minimally invasive, well enduring technique with high sensitivity in diagnosis of central lesion of bronchial carcinoma.

**Key Words:** Bronchial Carcinoma, Brush Cytology, Smoking, Diagnosis

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### Introduction

Helping to detect the endobronchial lesion, flexible fiber-optic bronchoscopy is a well enduring technique that permits brushing, washing and biopsy specimens to be taken from any visible suspected lesion. Using fluoroscopic guidance, bronchoscopy permits biopsies to take from more peripheral lesion. The occurrence of lung cancer in Bangladesh is 16.7% of all cancers and the most common cancer (25%) among the male cancer patients with 6.1:1 male female ratio.<sup>1</sup> The incidence of bronchial cancer is increased because smoking habit by people is increasing day by day and also for the changes in life styles, increasing

amount of environmental pollution, the availability of different modern diagnostic modalities to detect lung cancer. 15% of lifetime smokers diagnose to lung cancer, but 10% of lung cancers occur in non-smokers.<sup>3</sup> Bronchial adenoma is a rare type of cancer that grows in the mucous glands and ducts of the bronchi or trachea and in the salivary glands. But it has one of the lowest survival outcomes of any cancer because over two-thirds of patients are diagnosed at a late stage when curative treatment is not possible. Different diagnostic modalities are available in early diagnosis such as radiology, bronchoscopy, bronchial biopsy, exfoliative cytology, brushing, washing and fine

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needle aspiration cytology. Different methods have potentially important differences and this is why it is impossible to perform all techniques in each patient.<sup>3</sup> But bronchial biopsy has the highest sensitivity and specificity for endobronchial malignant lesions among all these Bronchoscopic techniques. Thus, histopathological examination of bronchial biopsy specimen remains the confirmatory or the gold standard test in these situations. However, bronchial biopsies cannot be performed in more peripheral sites, in narrow bronchial lumen or patients at risk of hemorrhage satisfactorily. Alternative methods for diagnosis are sometimes required. In the diagnosis of lung cancers both washing and brushing cytology are very fruitful. Brushings often offer exact information and excellent specimens about the site of the lesion.<sup>4</sup> Cytological assessment of specimens gained through washing and brushing of the respiratory tract is important, and often the initial diagnostic technique carried out in a patient with suspected malignant lung lesion.<sup>5</sup> The benefits of cytology are huge, and most often they help to plan the treatment without the requirement for an open biopsy. Imprint smears from bronchial biopsy have also been found to give a good diagnostic yield.<sup>6</sup> Bronchial biopsy, bronchial brushing and bronchoalveolar lavage were performed on 100, 64 and 37 cases which yielded diagnostic specimens for bronchial carcinoma in 69%, 78.1% and 62.2% cases respectively. If both biopsy specimens and brushings are performed then the diagnostic yield of non-visualized, peripheral lesion is about 60%.<sup>7</sup> Stepwise performance of bronchial biopsy, bronchial brushing and bronchoalveolar lavage provided a diagnostic yield of 85% of cases who had subsequently proven bronchial carcinoma.<sup>8</sup> bronchial brushing is a well enduring procedure and easy to perform than endobronchial biopsy; also, it can be performed without hazard of bleeding and pneumothorax.<sup>9</sup> Therefore, the aim of this study is to assess the role of brush cytology in diagnosis of bronchial carcinoma: experience in Rajshahi medical college hospital.

## Objectives

### a) General objective:

- To identify the role of brush cytology in diagnosis of bronchial carcinoma: experience in a tertiary care hospital.
- To assess the role of brush cytology in diagnosis of bronchial carcinoma: experience in a tertiary care hospital.

### b) Specific Objectives:

- To measure the role of brush cytology in diagnosis of bronchial carcinoma: experience in a tertiary care hospital.
- To compare the role of brush cytology in diagnosis of bronchial carcinoma: experience in a tertiary care hospital.

## Materials and Methods

The present study was conducted in Rajshahi Medical College Hospital (RMCH), Rajshahi. The study was conducted from 1<sup>st</sup> June 2017 to 30<sup>th</sup> June 2019. A total number of 300 patients were enrolled (48 females and 252 males) who underwent elective of brush cytology for the diagnosis of bronchial carcinoma. Patients with unresolved and undiagnosed opacity on chest radiography along with persistent symptoms were picked up for fiberoptic bronchoscopy. Data was collected from hospital record regarding age, clinical presentation, diagnostic procedure and outcome.

### • Inclusion Criteria

- Patients with unresolved and undiagnosed opacity on chest radiography along with persistent symptoms were taken up for fiber optic bronchoscopy.
- Removal of foreign body and respiratory secretions, brushing and biopsy, for arriving in diagnosis of neoplasm, undiagnosed infections, and other noninfectious causes.

### • Exclusion Criteria

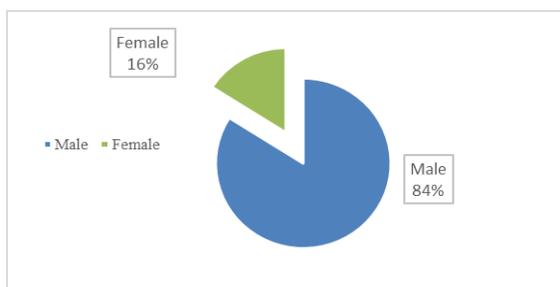
- Uncooperative patients, physically and mentally unfit, and patients not giving consent for the procedure.

## Results

**Table I: Age distribution of the study participants. (n=300)**

Variables	n	%	Mean±SD
20-32	8	2.67	
33-45	40	13.33	
46-59	64	21.33	58.70±13.11
60-72	111	37.00	
73-85	77	26.67	
Total	300	100	

**Figure I: Sex Distribution of the study participants. (n=300)**



**Table II: Occupation of the study participants. (n=300)**

Variables	n	%
Farmer	134	44.67
House Wife	50	16.67
Retired	15	5.00
Businessman	26	8.67
Teacher	13	4.33
Ex-teacher	08	2.67
Government service	33	11.00
Ex- Government service holder	08	2.67
Advocate	04	1.33
Fisher Man	09	3.00
Total	300	100

**Table III: Smoking status of the study participants. (n=300)**

Variables	n	%	Mean±SD
Non-smoker	118	39.33	0.47±1.67
Smoker	182	66.67	
Pack Per Year (n=182)			
<10	78	42.85	
10-20	66	36.26	1.22±1.06
>20	38	20.87	
Total	182	100	

**Table IV: CXR findings of the study participants. (n=300)**

Variables	Right (n=161)		Mean±SD
	n	%	
Collapse	68	42.23	
Mass lesion	40	24.58	
Hilar Shadow	17	10.55	
Patchy Opacity	12	7.45	
Fibrosis and bronchiectasis	24	14.90	
Total	161	100	1.53±0.68
Variables	Left (n=139)		Mean±SD
	n	%	
Collapse	48	35.53	
Mass lesion	22	15.82	
Hilar Shadow	25	17.99	
Patchy Opacity	14	10.07	
Fibrosis and bronchiectasis	30	21.28	
Total	139	100	

**Table V: Symptom of the study participants. (n=300)**

Variables	Cough		Mean±SD
	n	%	
Yes	294	98.00	0.97±0.15
No	06	2.00	
Total	300	100	
	Sputum Production		
Non-productive	88	29.33	1.10±0.30
Productive	212	70.67	
Total	300	100	
	Hemoptysis		
Yes	183	61.00	1.39±0.48
No	117	39.00	
Total	300	100	
	SOB		
Yes	144	48.00	1.47±0.50
No	156	52.00	
Total	300	100	
	Wheezing		
Yes	111	37.00	1.63±0.48
No	189	63.00	
Total	300	100	
	Chest Pain		
Yes	127	43.00	1.57±0.49
No	171	57.00	
Total	300	100	
	Others		
others	22	7.33	0.07±0.26

**Table VI: Histological type of the study participants (n=300)**

Variables	n	%	Mean±SD
Adenocarcinoma	50	16.66	2.48±1.37
Squamous cell carcinoma	95	31.66	
Large cell carcinoma	43	14.33	
Small cell carcinoma	25	8.33	
Others	87	29.00	
Total	300	100	

## Discussion

The age of the patients with bronchial carcinoma ranged from 20 to 85 years with the mean age of  $58.70 \pm 13.11$  years. This result was correlated with the findings of study of Hassan et al.<sup>10</sup> where age of the patients ranged from 35 to 85 years with the mean age of 60.14 years. This result was also in agreement with other studies.<sup>11-13</sup> While Shah et al.<sup>27</sup> reported the mean age of their patients with bronchial carcinoma was 45.6 years which was lower than the present study and Santos-Martínez et al.<sup>14</sup> reported that the mean age was 67.1 ( $\pm 11.1$ ), which was higher than the present study. In this study 252 (84%) patients were male and 48 (16%) patients were female. Male were more frequently affected by bronchial carcinoma than that of female. Similar male preponderance of bronchial carcinoma was reported in several other studies.<sup>1,15-17</sup> Male-Female ratio in this study is markedly increased which can be explained by some reasons like small sample size, less reporting of female patients in a tertiary care hospital and less common smoking habit in female in our country. We found the study participants majority 182(66.67%) were smoker and 118(39.33%) were non-smoker, for smoker 78(42.85%) of them consume 10 pack or less, 66(36.26%) of them consume 10-20 pack and 38(20.87%) of them consume 20 pack or more per year. David et al.<sup>18</sup> found 89% of lung cancer patients were smoker in a series of 100 patients with bronchial carcinoma, which is quite similar to our study. In the diagnostic yield of bronchial carcinoma, squamous cell carcinoma was the most common histopathological type in 95 (31.66%) patients, followed by adenocarcinoma in 50 (16.66%) patients, small cell carcinoma in 25 (8.33%) patients and large cell carcinoma in 43 (14.33%) patients and other complications in 87(29%) patients. Whereas, Shrestha et al.<sup>19</sup> found squamous cell carcinoma (60.9%) was the most common histological pattern of bronchial carcinoma, followed by small cell carcinoma (19.5%) and adenocarcinoma (8.0%). Tuladhar et al.<sup>20</sup> found the various bronchogenic malignancies in decreasing order of frequency were squamous cell carcinoma (51%), followed by small cell carcinoma (19%), adenocarcinoma (11%), non-

small cell carcinoma (7%), large cell carcinoma (4%), carcinoma in situ (4%) and small round cell carcinoma (4%). We also found CXR findings of the study participants in both two sides (right and left). We found that 294(98%) patients had cough and only 2% didn't. Most common symptom of patient was cough which is similar to previous published studies.<sup>21</sup> Chest pain and breathlessness on exertion were also common complaints of patients. In this study 127(43.00%) patients had chest pain. Right lung was involved in 52% of cases and upper lobe was involved in 50% of cases. Similar reports have appeared in literature.<sup>22-25</sup> In right side, the CXR findings were collapse 68(42.23%), mass lesion 40 (24.58%), hilar shadow 17(10.55%), patchy opacity 12(7.45%) and fibrosis and bronchiectasis 24(14.90%) Left lung was involved in 46% of cases, and bilateral lesions were present in 2% of cases. Right and left main bronchus was involved in 38% of cases followed by 6% each in middle and lower lobes. Most common finding detected during FOB was exophytic growth, which was detected in 46% of patients. Similar reports are available in literature.<sup>26,27</sup> In this study, the left variables were collapse 48(35.53%), mass lesion 22 (15.82%), hilar shadow 25(17.99%), patchy opacity 14(10.07%) and fibrosis and bronchiectasis 30(21.28%). But we could not find such literatures related to CXR findings in the diagnosis of bronchial carcinoma.

### Limitations of the Study

This was a descriptive study in a single community with comparatively small number of patients. So, the study result may not reflect the exact scenarios of the whole country.

### Conclusion and recommendations

This study revealed that the bronchial brush cytology was minimally invasive, well enduring technique with high sensitivity in diagnosis of central lesion of bronchial carcinoma. It can be done as an outpatient technique and the patient can go home immediately after the procedure. There is minimum level of complications. So, it is concluded that the diagnostic yield of bronchial

brush cytology is superior to that of endobronchial biopsy in central bronchial carcinoma.

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