



To assess the Histological profile and diagnostic yield of various procedures in patient of Lung malignancy

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Abstract

Background:In India and worldwide lung cancer is the leading cause of cancer mortality. Most of the previous Indian studies have described squamous cell carcinoma as the commonest histology. The present study is therefore aimed to study the histological profile of lung malignancy by using various diagnostic tool and their diagnostic yield.

Methods & Material: This is a hospital based cross sectional study conducted in patients having sign and symptoms suggestive of lung malignancy. Various diagnostic techniques are used for histological profile and we also compare the yield of all diagnostic techniques.

Results: 172 patients were included in the study. Maximum diagnostic yield was obtained by Fibre optic Bronchoscopy (76.7%) followed by CT guided FNAC/Biopsy (44.2%), thoracoscopy guided pleural biopsy (14.4%), USG guided FNAC/Biopsy (12.2%), pleural fluid cytology for malignant cell(3.4%) and sputum cytology for malignant cell (1.1%). Squamous cell carcinoma seen in 37.8% followed by adenocarcinoma in 27.9%, Small cell carcinoma in 13.4%, Large cell

carcinoma in 4.1% and adenosquamous carcinoma in 2.3%.

Conclusions: Squamous cell carcinoma is the most common histological type and Maximum diagnostic yield was obtained with bronchoscopy

Key words: Lung cancer, Histological profile, diagnostic yield , Bronchoscopy.

Introduction

In India and worldwide lung cancer is the leading cause of cancer mortality. Worldwide; there are 1.61 million new cases of lung cancer per year, with 1.38 million deaths, making lung cancer the leading cause of cancer related mortality. India had 53,728 new lung cancer cases in males and 16,547 new lung cancer cases in females, with the corresponding mortality rates of 13.7 and 4.6%, respectively accounting for about 8% of all cancer deaths.

[1]

According to the Indian Council of Medical Research cancer registry 57,795 new cases were reported in 2010, which is projected to rise up to 67,000 new cases annually by the year 2020. [2] The true magnitude of lung cancer is seemingly larger than what the figures suggest.

In the Western Countries and most of the Asian countries Adenocarcinoma has surpassed squamous cell carcinoma.

^[3] This shift might be attributable partly to the smoking habits, particularly filtered cigarettes; Moreover, there is also increasing incidence of lung cancer in females and non smokers. ^[4] Most of the previous Indian studies have described squamous cell carcinoma as the commonest histology ^[5] however; some recent studies from two major centres are showing a changing pattern in India. ^[6]

As most of lung cancers diagnosed at an advanced stage, it is very important to achieve a definitive diagnosis at an early stages in order to increase the chance of a successful treatment.^[7] At present many diagnostic techniques are available,diagnostic yield is largely dependent on the diagnostic accuracy of each technique.

Limited studies are available in the recent past in this area; hence the present study is therefore aimed to study the pathological profile of lung malignancy patients by using various diagnostic tool and their diagnostic yield. The findings of the present study have been compared with those of other relevant studies made in the same field.

Material & Methods

This was a hospital based cross sectional study conducted in male and female patients of age more than 18 years old sign and symptoms suggestive of lung malignancy and/or radiological features on Chest X-ray or CT thorax suggestive of lung malignancy. Patients who did not give consent for the study, having bleeding diathesis, critically ill and uncooperative were excluded.

Detailed history and socio-demographic profile regarding presence of risk factors were recorded like smoking, agriculture, and mining. Exposure to various factors like arsenic, chromium, nickel, asbestos, vinyl chloride, synthetic rubber, air pollution, wood dust and family history were recorded. As per requirement patients were

subjected to suitable investigations enlisted below. Special investigations done such as Chest X ray,CECT Thorax. Sputum for malignant cells, FNAC/BIOPSY, Pleural fluid cytology and biochemistry ,Ultrasound guided or CT guided lung FNAC/Biopsy,Video-Bronchoscopy for Broncho-alveolar lavage (BAL) fluid cytology, Bronchial brushings or washings ,Bronchial biopsy, Trans-bronchial needle aspiration (TBNA), Thoracoscopy for Pleural biopsy ,Immunohistochemistry panel as required like TTF-1, Pan CK, VEGF, EGFR-1, Chromogranin, CD56 , Synaptophysin, etc.Histological classification was done on the basis of morphology and if needed, relevant immunochemistry using the IASLC/ATS/ERS classification of lung tumors.

Standard statistical averages, standard deviation and mean deviation were calculated. Calculation of statistical significance was carried out by the Student's test and Chi-square test for analysis. Key values were expressed with 95% confidence limits. $P < 0.05$ was considered to be statistically significant. Data were entered and analyzed using SPSS software (SPSS Inc. Statistics for Windows, Version 21.0.Chicago)

Results

A total of 172 patients with confirmed histological diagnosis were studied in our study. The mean and median age of the patients in our study was 58.37 and 60 years respectively (S.D \pm 12.52) with a range from 24 to 90 years. Maximum 39.5% percent of patients were in the 51-60 age groups. A larger proportion of non-smokers with lung cancer were noted in the younger age range. Eighty four percent of lung cancer patients below the age of 40 years were non-smokers as opposed to only thirty percent of patients over 60 years of age and the difference was statistically significant ($p < 0.001$). Out of 172 patients, there were 144 (83.7%) males and 28 (16.3%) females i.e. a male: female ratio of approximately 5.14:1.

Maximum diagnostic yield was obtained by Fibre optic Bronchoscopy (FOB) used in 132 patients (76.7%) for positive diagnosis in bronchial washings or Bronchoalveolar Lavage Fluid (BAL) or bronchial biopsy. FOB was followed by CT guided FNAC/Biopsy which gave positive result in 76 patients (44.2%), thoracoscopy guided pleural biopsy in 25 patients (14.4%), USG guided FNAC/Biopsy in 21 patients (12.2%), pleural fluid cytology for malignant cell in 6 patients (3.4%), sputum cytology for malignant cell positive in only 2 patients (1.1%). Metastatic deposits in cervical lymph nodes were confirmed in 9 patients (5.2%) by Fine Needle Aspiration Cytology (FNAC).

Small cell carcinoma (SCLC) was diagnosed in 23 patients (13.4%), while 129 patients (75%) had Non Small Cell Lung Carcinoma (NSCLC). Within NSCLC, the most common histology was squamous cell carcinoma (SqCC) seen in 65 patients (37.8%) followed by adenocarcinoma (AC) in 48 patients (27.9%), Large cell carcinoma (LCC) in 7 patients (4.1%) and Adenosquamous carcinoma (ASqC) in 4 patients (2.3%). Immunohistochemistry (IHC) was utilized in 9 patients (5.2%) for final histology, however in 5 patients (2.9%) who were labeled Poorly Differentiated Carcinoma, IHC could not be done due to economic constraints or patient died or repeat biopsy sample was required. In 20 patients (11.6%) only malignant cell cytology was positive but final histological diagnosis remained inconclusive either due to inadequacy of the sample material or a repeat biopsy was required which could not be done due to patient's economic constraints or denial.

Discussion

The aim of this analysis was to study the current clinico-pathological profile of lung cancer patients at our centre and to assess their outcome. The place of this study was

rural area of western Uttar Pradesh, where majority of the patients are from rural sector.

The mean and median age of the patients in our study was 58.37 and 60 years respectively, as compared to Western population, mean age of our patients was a decade younger than seen in Cetin et al., 2011; Blanchon et al., 2006; Albain et al., 1991.^[8,9] Most of the previous Indian studies like Kaur et al., 2017; Mohan et al., 2016; Malik et al., 2013; Singh et al., 2010; have reported similar mean age.

Fibreoptic bronchoscopy gave the highest yield in our study followed by image guided FNAC/Biopsy, similar results were seen in Pandhi et al, Mohan et al. This may be due to majority of the lesions being central in location. Thoracoscopy guided biopsy had yield of 14.5%. No recent data is available over the past years to see the correlation. Sputum and pleural fluid cytology for malignant cell had low yield which could be due to contamination, collection and processing difficulties.

In our study Squamous cell carcinoma was the most common subtype. The cause is most likely due to the fact that the majority of the patients in our study are smokers; this is consistent with the other Indian studies,^[10,11 12,13] however the predominant type of lung cancer in western world is adenocarcinoma^[14,15]. Few recent Indian studies like Kaur et al, Malik et al, Noronha et al and Kumar et al reported Adenocarcinoma as the most common histological subtype, stating pathological review and use of Immunohistochemistry frequently as the reason for rising trend of Adenocarcinoma. In our study however, despite use of Immunohistochemistry and careful histological observation squamous cell carcinoma was reported as the most common diagnosis, this may be due to high number of smokers in our study ($p = 0.007$).

Adenocarcinoma was the most common histological type among females with 46.4% share and the correlation was

statistically significant ($p = 0.003$). Similar finding was reported by Significant correlation was observed between the smoking status and the histological diagnosis ($p = 0.007$).

There was predominance of adenocarcinoma in young female and squamous cell carcinoma in older male patients in our study which is similar to various studies outside India.^[16]

Age Groups	Frequency	Percent
<30	3	1.7
31-40	16	9.3
41-50	28	16.3
51-60	68	39.5
61-70	34	19.8
71-80	17	9.9
>80	6	3.5
Total	172	100.0

Table 1: Age wise distribution of lung cancer patients

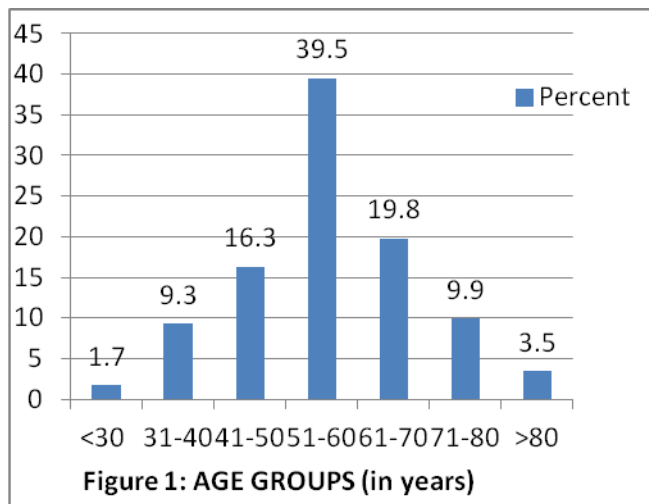


Table 2: Gender wise distribution of patients

Sex	Frequency	Percent
Male	144	83.7
Female	28	16.3
Total	172	100.0

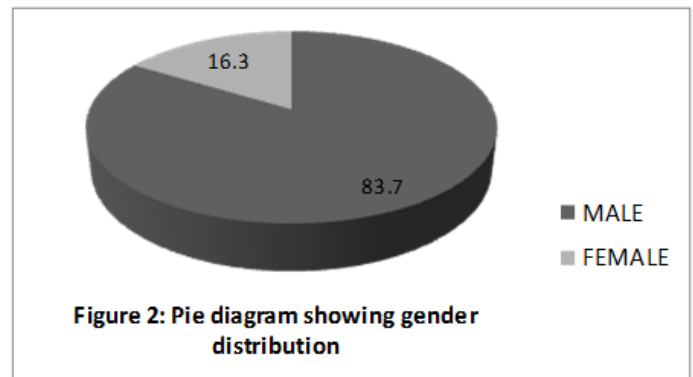


Table 3: Diagnostic yield of various procedures

Procedures	Frequency	Percent
Fibre Optic Bronchoscopy(FOB)	132	76.7%
Transthoracic CT guided FNAC/Biopsy	76	44.2%
Transthoracic USG guided FNAC/Biopsy	21	12.2%
Thoracoscopy guided pleural biopsy	25	14.5%
Pleural Fluid Cytology for malignant cell	6	3.4%
Sputum Cytology for malignant cell	2	1.1%

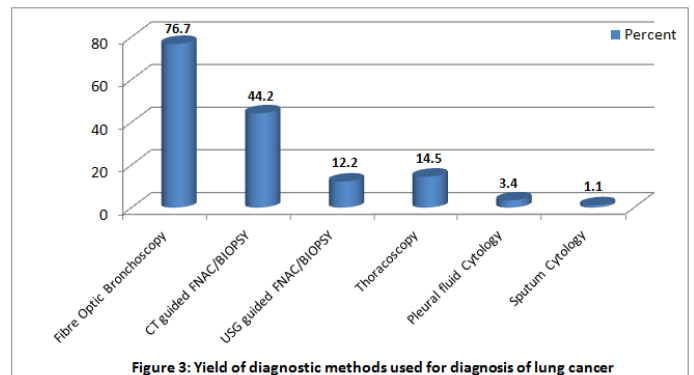
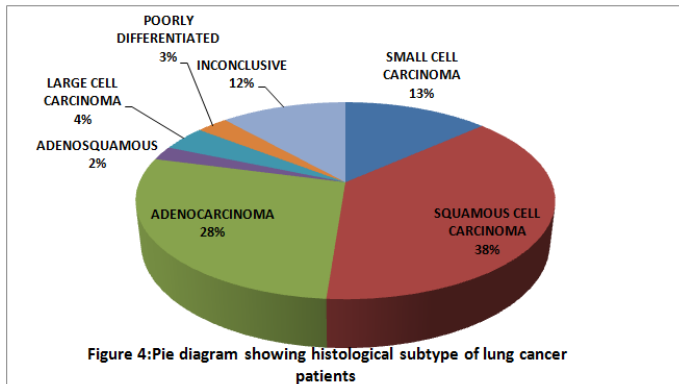


Table 4: Histological distribution of lung cancer patients

Subtype	Frequency(n=172)	Percent
Small Cell Carcinoma	23	13.4
Large Cell Carcinoma	7	4.1
Squamous Cell Carcinoma	65	37.8
Adenocarcinoma	48	27.9
Adenosquamous Carcinoma	4	2.3

Poorly Differentiated Carcinoma	5	2.9
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Conclusion

- Current study showed Squamous cell carcinoma is still the most common histological type; lung cancer is a male predominant disease owing to smoking habits. Adenocarcinoma is the leading histological subtype among females.
- Lung cancer is often mistreated as tuberculosis in the Indian subcontinent and hence continues to be diagnosed late.
- Maximum diagnostic yield was obtained with bronchoscopy owing to mostly central lesions with Squamous cell carcinoma the predominant subtype.

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