ORIGINAL RESEARCH PAPER

Pathology

HISTOPATHOLOGICAL STUDY OF LUNG MALIGNANCY AT TERTIARY HEALTH CARE CENTER (A STUDY OF 60 CASES)

KEY WORDS: Lung cancer – Smoking – male – squamous cell carcinoma

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ABSTRACT

Lung cancer is the most common cause of cancer related deaths worldwide. Incidence of lung cancer is increasing drastically now a days. In developed countries, lung carcinoma is the leading cause of cancer-related deaths in both men and women. But its mortality rates have been falling during the last three decades because of newer diagnostic modalities such as IHC, molecular studies and targeted therapy. But, in developing countries incidence and mortality are continuously increasing. The objective of study was to study histomorphology and distribution of lung carcinoma according to age, sex, site and smoking habits. All well preserved lung biopsy were included in study. All biopy were grossly examined and processed as per standard protocol. Multiple sections of 3-5 micron thickness were obtained and stained with H&E, followed by examined and classified according to WHO classification of lung carcinoma, 2015. Total 60m cases were studied. Most were in the age group of 61 to70 years (41.66%) with male preponderance. 73.33% patients were smokers. Most frequent symptom was cough (61.66%) with increase sputum production (51.33%). Most of the patients had primary lung cancer in right lung (63.33%). Most common histological subtype was squamous cell carcinoma (53.33%). In India, squamous cell carcinoma is still the most common type of lung malignancy, because Indians still use unfiltered cigarettes and ancient techniques of smoking. Early detection and prompt treatment is necessary to reduce mortality and morbidity associated with lung cancer in addition to imparting awareness about harmful side effects of smoking in society and in environment.

INTRODUCTION

Lung cancer is the most common cause of cancer related deaths worldwide. Incidence of lung cancer is increasing drastically now a days. In developed countries, lung carcinoma is the leading cause of cancer-related deaths in both men and women.[1] But its mortality rates have been falling during the last three decades because of newer diagnostic modalities such as IHC, molecular studies and targeted therapy. But, in developing countries incidence and mortality are continuously increasing.

According to GLOBOCAN 2018 report estimation, there were 2.1 million new cases (11.6% of all cancers.) and 1.8 million deaths due to lung cancer (18.4% of all cancer-related deaths worldwide.[2]) In india 67,795 new lung cancer cases (5.9% of all cancers) were estimated in 2018, out of which 48,698 were males. Death due to lung cancer was 63,475 i.e., 8.1% of all cancer related deaths.[2]

Tobacco smoking is single most common and primary risk factor for development of lung cancer.[3] Various other environmental (tobacco smoke) and occupational factors such as asbestos, radon, nickel, arsenic, chromium may also affect the risk of lung cancer.[4]

The demographic profile including age, gender, stage, histology and even molecular epidemiology varied considerably in different parts of india.(5)

Radiological and histopathological examination together can be used to confirm the lung cancer diagnosis, determine the morphological type and stage, ultimate prognosis and available mode of treatment.(6)

According to revised WHO classification 2015, lung carcinoma broadly classified as SCLC and NSCLC, which is further classified by more detailed and specific diagnosis i.e., Adenocarcinoma (ADC), Squamous cell carcinoma (SCC), Large cell carcinoma (LCC), Non-small cell carcinoma – Not otherwise specified (NSCLC-NOS) and others according to revised WHO classification in 2015 (7,8)

Most of lung cancer present clinically in advanced stage and are unresectable. Only small biopsies are available for diagnosis.(8) The early presenting clinical symptoms of lung cancer are persistent cough, chest pain, breathlessness that mimic the symptoms of lung infection or long term effects of smoking. In India most lung infection is tuberculosis. Due to this reason patient came for treatment delayed.(9,10)

Method of collection of data:

The present Observational cross-sectional study was conducted in the Department of Pathology at Tertiary health care centre in South Gujarat. The cases included were those lung biopsy received at the histopathology section, Department of Pathology during period of January 2017 to May 2021. Brief clinical data were retrieved from the request form sent by clinician which included the age, gender, clinical finding, routine investigations, radiological investigation and clinical diagnosis.

Inclusion Criteria – Histopathologically confirmed cases of lung carcinoma.

Exclusion Criteria- Inadequate and improperly fixed biopsy or biopsy in which conclusive opinion not possible.

The biopsies and specimens were received in glass or plastic container containing 10% neutral buffered formalin. Specimens were fixed in 10% formalin and processed according to standard procedures. The tissues were processed, embedded in paraffin wax and 1 section was cut which was stained with Hematoxylin and Eosin for morphological assessment. All tissue sections were examined under light microscope. Reporting of lung biopsy l was done according to WHO classification of lung carcinoma, 2015. The clinical and histological data so obtained were analyzed and compared with other similar studies.

RESULT

The maximum number of cases were in the age group of 61 to 70 years. In our study, the proportion of lung cancer cases was more in males comprising of 48 cases (80.00%) as compared to females, 12 cases (20.00%) and the difference was found to be statistically significant (p value < 0.05). Male to female ratio was found to be 4:1.

A significant risk factor for development of lung cancer found in our study was smoking. Majority of cases were smokers i.e., 44 cases (73.33%) than non-smokers, 16 cases (26.66%), and the difference was statistically significant (p value < 0.05). The smoker to non-smoker ratio was 11:4. (Table no.1) Out of 60 lung carcinomas, 38 cases (63.33%) were found in right side of lung while rest of the 22 cases (36.66%) were found in left side of lung. The difference was not statistically significant. (Table no. 2) In present study, we classified lung carcinoma in Non-Small Cell Carcinoma and Small cell carcinoma. Non-Small Cell Carcinoma further classified as SCC, ADC and others. most common histo-morphological diagnosis which found in our study was squamous cell carcinoma (32 cases, 53.33%) followed by adenocarcinoma (19 cases, 31.66%). The cases of Small Cell Carcinoma was 5% (i.e., 3 cases). In others we found 2 cases of NSCLC-NOS, 1 case of Malignant Spindle cell neoplasm, 1 case of NHL and 1 case of Metastasis from leiomyosarcoma. (Table no.3)

Table :1 age, sex and smoking status wise distribution of study cases

Age Groups (in years)	Male (%)	Female(%)	Total (%)
11-20	0	1	1(1.66)
21-30	0	0	0
31-40	1	0	1(1.66)
41-50	9	2	11(18.33)
51-60	16	3	19(31.66)
61-70	20	5	25(41.66)
71-80	2	1	3(5.0)
Total (%)	48(80.0)	12(20.0)	60
Smoking status			
Smoker	44(91.66)	0	44(73.33)
Non smoker	4(8.3)	12(100)	16(26.66)

Table:2 Distribution of cases according to side of lung involved on radiology (n=60)

Site	N (%)	Chi Square Goodness of fit Test
Right	38 (63.33)	□2=4.26
Left	22 (36.66)	p value= .05
Total	60	

Table:3 Distribution according to histo-morphological diagnosis. (n=60)

Histo-morphological Diagnosis	Numbers
SCC	32 (53.33%)
Adenocarcinoma	19 (31.66%)
Small Cell Carcinoma	3 (5.0%)

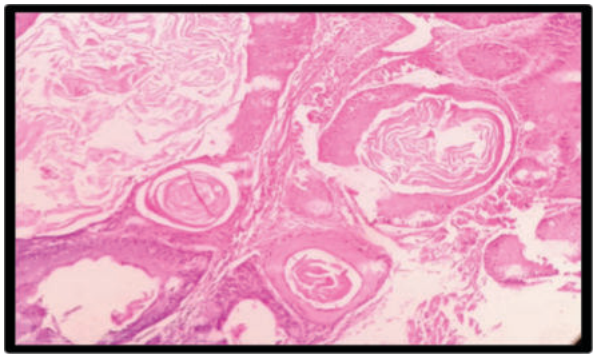

Figure.1 SCCWell-differentiated SCC shows keratin pearl (H&E 10X)

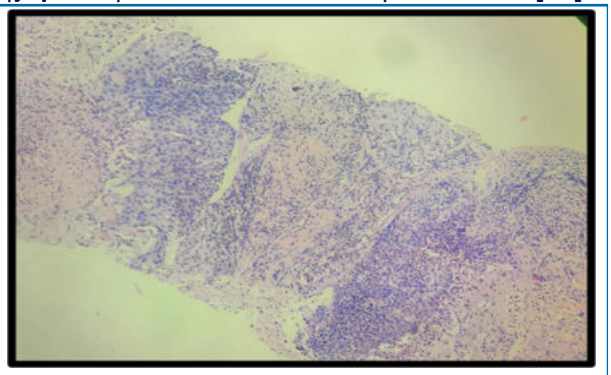

Figure.2SCC – show cohesive tumour cells with pavement like architecture and areas of keratinazation (H&E 10 x)

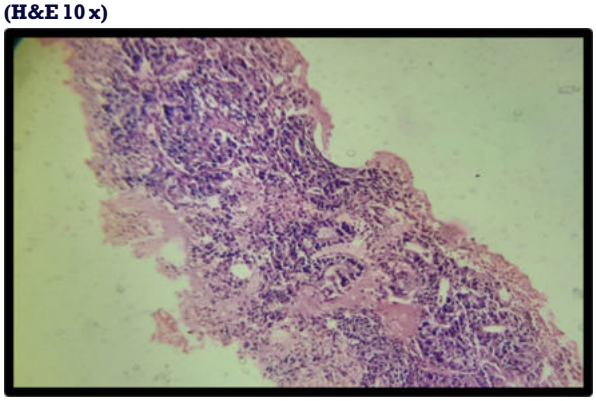

Figure.3ADC - Malignant epithelial cells arranged in acinar pattern, lepidic pattern, forming glands at places and few cells in micropapillary pattern. (H&E 10X)

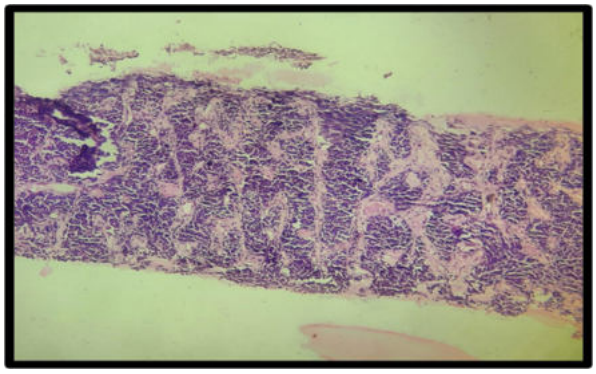

Figure.4SCLC of the lung shows a solid proliferation of uniform small cells infiltrating connective tissue (H&E 10X)

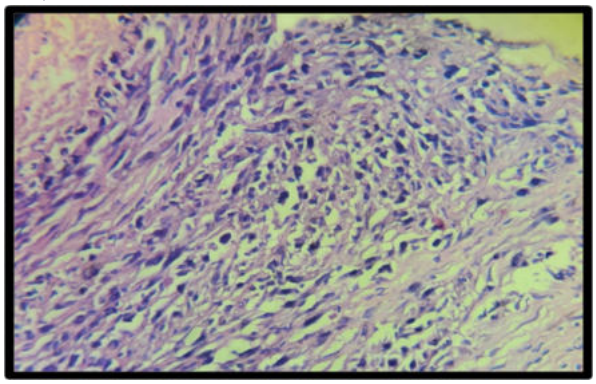

Figure.5 Spindle cell neoplasm - Cells show moderate pleomorphism. Cells are oval/spindle in shape with ovoid/spindle nuclei, irregular nuclear membrane, coarse granular chromatin, inconspicuous nucleoli and variable amount of eosinophilic cytoplasm. (H&E 40X)

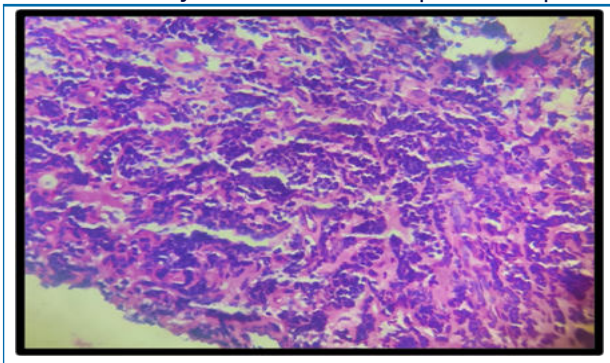

Figure.6 NHL Cells are small with high N:C ratio, finely granular chromatin, inconspicuous nuclei, irregular nuclear membrane (convolution at places).(H&E 40X)

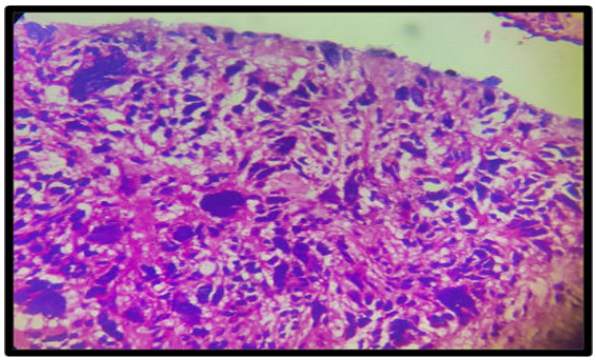

Figure.7Metastasis from LMS - Bizarre cells and tumour giant cells are seen. Frequent typical and atypical mitosis are also seen

DISCUSSION

The present study showed that lung cancer is a male predominant disease, as smoking is the most important risk factor for lung cancer is more common in males. This is also seen in other study conducted by Tuladhar A et al(11), Dubey N et al(12), Shah et al(13) and Kumar et al(14).

The mean age of lung cancer was 61 yr as the disease is usually found in people elderly age which is similar as Rahul Gupta et al(15), Dubey N et al(12), Kumar et al(9) and sharma et al(16).

Smoking is associated with development of SCC and SCLC (18) In the current study, majority of cases were smokers 44 (73.33%), while 16 (26.66%) cases were non-smokers. Among smokers, all are male patients. This is comparable with Rawat et al, Dey A et al, Ramakrishna Rachakonda et al and Kumar et al.(4,6,19,20)

Table 4: Comparison of incidence of histo morphological types of lung carcinoma with other study.

	Sanjeet kumar Mandal et al 2013	Rahul et al 2015	Das A et al 2017	Kumar et al 2021	Present study 2021
SCC	223(49.1 %)	77(45.3 %)	118(40.00 %)	17(34 %)	32(53.3 3%)
ADC	140(30.8 %)	60(35.3 %)	102(34.58 %)	13(26 %)	19(31.6 6%)
Small Cell Carcinoma	67(14.8%)	18(10/6 %)	52 (17.63%)	10 (20%)	3(5%)
Others	24(5.2%)	11(6.5%)	23(7.79%)	4(8%)	6(10%)

In the past, lung cancer was broadly classified as SCLC and NSCLC. But now a days, with introduction of newer diagnostic modalities such as IHC, molecular analysis and newer treatment modalities such as personalized treatment, targeted therapies, new WHO classification of lung cancer was introduced in 2015 which took small biopsy and cytology samples. According to WHO 2015 NSCLC is further classified as ADC, SCC, LCC, NSCLS-NOS and others, which helps to better understand the tumour and excellent harmony between pathologist and clinician to eliminate confusion regarding terminology.(18)

Sub classification on NSCLC has become essential now a days because new era of targeted therapies are available which have different effects in different histological subtypes. Such as Gefitinib, tyrosine kinase inhibitor, is first line therapy for ADC with EGFR mutation. Bevacizumab, a monoclonal antibody against VEGR is associated with increased risk of hemorrhage in SCC. Pemetrexed is also contraindicated in SCC.(22)

In western countries, pattern of lung cancer has been changing from SCC to predominance of ADC, because of increasing use of filtered cigarettes. This type of modification make smokers to inhale more deeply and frequently thereby exposing more peripheral airways and parenchymal cells to carcinogens. (23–28)

But in India SCC is still the most common histological type followed by ADC, small cell carcinoma, LCC and others. In present study also, we found SCC most common type i.e., 32 cases (53.33%) followed ADC i.e., 19 cases (31.66%), Small cell carcinoma i.e., 3 cases (5%) and others i.e., 6 cases (10 %). This result was in concordance with aforementioned studies (Table 15) and many other studies. i.e., (4,11, 15,16, 20,29–36)

In current study, SCC is the predominant histological type because of the fact that majority of cases in our study are smokers. These similar findings are observed in various previous studies.(14,21,37–40)

CONCLUSION

In India, squamous cell carcinoma is still the most common type of lung malignancy, because Indians still use unfiltered cigarettes and ancient techniques of smoking.Early detection and prompt treatment is necessary to reduce mortality and morbidity associated with lung cancer in addition to imparting awareness about harmful side effects of smoking in society and in environment.

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