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Original Research Article

HISTOPATHOLOGICAL STUDY OF SPECTRUM OF LESIONS IN LUNG BIOPSIES IN A TERTIARY CARE PUBLIC HOSPITAL

Disha Sorde[1], Anjali Mahajan[2], Poonam G. Lahane[3], Shailaja Puri[4]

[1]Senior Resident, Department of Pathology, Lokmanya Tilak Municipal Medical College and General Hospital, Sion, Mumbai- 400025, India.
[2]Associate Professor (Professor addl), Pathology, Lokmanya Tilak municipal medical college and general hospital, sion Mumbai -400025, India.
[3]Senior Resident, Department of Pathology, JIIU'S Indian Institute of Medical Science and Research, Warudi, Tq. Badnapur, Dist. Jalna, India.
[4]Senior Resident, Department of Pathology, Indira Gandhi Government Medical College Nagpur, India.

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Corresponding Author: Dr. Anjali Mahajan, Associate Professor (Professor addl), Pathology, Lokmanya Tilak municipal medical college and general hospital, sion Mumbai - 400025, India.
Email: draum@rediffmail.com

Abstract
Background: Lung diseases are some of the most common medical conditions affecting millions of people worldwide and in India. Present study was aimed to study Histopathological spectrum of lesions in lung biopsies in a tertiary care public hospital. **Material and Methods:** Present study was single-center, observational study, conducted in lung biopsy specimens received in the department of Pathology. After gross examination lung biopsy specimens were fixed in 10% formalin, processed and embedded in paraffin wax, serial sections of 4–5-micron thickness obtained and then stained with H & E. **Results:** In present study, total of 110 cases were studied. In the present study, most common age group was 61-70 years consisting of total 36 (32.73%) cases followed by 51-60 years 24 (21.82%) cases and 41-50 years 20 (18.18%) cases. In the present study, out of 110 cases 67(60.90%) were male and 43(39.09%) were females. Male: Female ratio was – 1.55:1. In the present study, malignancy was the most common finding in both males and females comprising 28(41.79%) and 16(37.20%) cases respectively. In the present study, amongst the non-neoplastic lesions, Granulomatous Inflammation 16(45.71%) cases were most commonly found followed Interstitial lung disease 14(40%). Nonspecific inflammation was seen in 3(8.57%). There were 2 (3.5%) cases of Aspergillosis in which there was past history of Pulmonary tuberculosis. Amongst the neoplastic lesions, 18 (36.73%) cases of Squamous cell carcinoma were studied. 12(24.48%) cases were positive for adenocarcinoma. 4(8.16%) cases were positive for small cell carcinoma. 22 cases (20 %) had no significant pathology, while inconclusive reporting was noted in 4 cases (3.64 %). **Conclusion:** Lung biopsy is reliable with high accuracy for diagnosis and subtyping of lung lesions. Histopathological examination plays an important role in making a correct and accurate diagnosis of various lesions of lung.
Keywords: Lung biopsy, lung lesions, histopathological examination, malignancy

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Introduction

Lung diseases are some of the most common medical conditions affecting millions of people worldwide and in India.[1] A lung biopsy is a procedure in which samples of lung tissue are removed with a special biopsy needle to determine if pathology is present.[2] A lung biopsy may be performed using either a closed or an open method. Pathologists are faced with the problem of whether the tiny piece of pulmonary tissue is representative of entire lung or diagnostic of a disease process. The microscopic appearance must be correlated with clinical findings in order to arrive at a more exact classification since variety of diseases may cause rather similar appearing interstitial fibrosis or pneumonitis.[3,4,5] There is a need to study and systematically categorize histopathological patterns identified on lung biopsies for increasing the diagnostic yield and correlating with clinical features for confirming the diagnosis. Present study was aimed to study Histopathological spectrum of lesions in lung biopsies in a tertiary care public hospital.

Material And Methods

Present study was single-center, observational study, conducted in department of Pathology, at Lokmanya Tilak Municipal Medical College, Mumbai, India. Study duration was of 5 years (June 2016 to June 2021). Study approval was obtained from institutional ethical committee.

Inclusion criteria

- All the lung biopsy specimens received in the department of Pathology.

Exclusion criteria

- Specimens of Lobectomy, Pneumonectomy and Segmentectomy

All lung biopsy specimens which have been received during the period June 2016 to June 2021 in the histopathology section of department of pathology are included in the study. Gross examination of the lung biopsy specimens was done. Specimens were first removed in Petridish and observed in terms of number of bits received, whether necrotic or non-necrotic, whether only clot was present. After gross examination lung biopsy specimens were fixed in 10% formalin, processed and embedded in paraffin wax, serial sections of 4–5-micron thickness obtained and then stained with H & E. Data was collected and compiled using Microsoft Excel, analysed using SPSS 23.0 version. Statistical analysis was done using descriptive statistics.

Results

In present study total of 110 cases studied. The following results were noted. Most common age group was 61-70 years consisting of total 36 (32.73%) cases followed by 51-60 years 24 (21.82%) cases and 41-50 years 20 (18.18%) cases. In the present study, out of 110 cases 67(60.90%) were male and 43(39.09%) were females. Male: Female ratio was – 1.55:1.

Table 1: Demographic profile of all cases

Age in years	Female	Male	Total (n = 110)	%
1-10	0	1	1	0.91%
11-20	1	1	2	1.82%
21-30	3	3	6	5.45%
31-40	7	8	15	13.64%
41-50	8	12	20	18.18%
51-60	8	16	24	21.82%
61-70	14	22	36	32.73%
71-80	0	4	4	3.64%
81-90	2	0	2	1.82%
Grand Total	43	67	110	100%

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Malignancy was the most common finding in both males and females comprising 28(41.79%) and 16(37.20%) cases respectively.

Table 2: Gender wise distribution on lung biopsy (n=110)

Type of Lesion	Female	Male	Grand Total	Percentage
Malignant	16	28	44	40.00%
No significant pathology/Normal Appearance	4	18	22	20.00%
Granulomatous Inflammation	9	7	16	14.55%
Interstitial lung disease	8	6	14	12.73%
Suspicious for malignancy	3	2	5	4.55%
Inadequate for opinion	0	4	4	3.64%
Nonspecific inflammation	3	0	3	2.73%
Fungal Etiology	0	2	2	1.82%
Grand Total	43	67	110	

Among the symptoms, cough was most common symptom in the cases studied seen in 68.18% of cases followed by Dyspnoea on exertion 63(57.27%), Loss of appetite (37.27%) and Loss of weight (35.45%). Hemoptysis was seen in 21(19.09%) of cases.

Among 49 malignant cases smoking history was present in 59% of cases. Among Smokers, Squamous cell carcinoma and small cell carcinoma were the most common malignancies. Right side of the lung is most commonly involved 61 cases (55.45%). Left side involvement is seen in 28(25.45%). Bilateral Involvement was seen in 21 cases (19.09%).

Table 3: Clinical & radiological features

Clinical features	No. of cases (n = 110)	Percentage
Dyspnoea on exertion	63	57.27 %
Loss of appetite	41	37.27 %
Loss of weight	39	35.45 %
Hemoptysis	21	19.09 %
Smoking History		
Present	65	59.09%
Absent	45	40.91%
Side affected		
Right side	61	55.45 %
Left side	28	25.45 %
Bilateral Involvement	21	19.09 %

Most common radiological finding in HRCT chest and chest X-ray in cases of malignancy was mass lesion (42.73%) followed by Consolidation (22.73%). Other findings were cavitatory lesion (8.18%), pleural effusion (1.82%), Honeycombing (8.18%), Multiple masses (5.45%), opacities (9.09%), and fungal ball (1.82%). Similar findings are published in various case studies.

Table 4: Radiological Findings

Radiological Findings	No. of cases (n = 49)	Percentage
Mass lesion	21	42.73%
Consolidation	11	22.73%
Opacities	4	9.09%
Cavitatory lesion	4	8.18%
Honeycombing	4	8.18%
Multiple masses	3	5.45%

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Pleural effusion	1	1.82%
Fungal ball	1	1.82%

Amongst the non-neoplastic lesions, Granulomatous Inflammation 16(45.71%) cases were most commonly found followed Interstitial lung disease 14(40%). Nonspecific inflammation was seen in 3(8.57%). There were 2 (3.5%) cases of Aspergillosis in which there was past history of Pulmonary tuberculosis.

In the present study, amongst the neoplastic lesions, 18 (36.73%) cases of Squamous cell carcinoma were studied. 12(24.48%) cases were positive for adenocarcinoma. 4(8.16%) cases were positive for small cell carcinoma. 02(4.08%) were positive for non-small cell carcinoma and 4(8.16%) cases were positive for High grade malignancy. We have reported 4(8.16%) case as suspicious for malignancy. Among 4 cases of small cell carcinoma 3 were confirmed by Synaptophysin. 22 cases (20 %) had no significant pathology, while inconclusive reporting was noted in 4 cases (3.64 %).

Table 5: Types of lesions on lung biopsies (n=110)

Type of Lesion	Number of cases	Percentage
Normal (No significant pathology)	22	20.00%
Non-neoplastic	35	31.82%
• Nonspecific Inflammation	3	2.73%
• Granulomatous Inflammation	16	14.55%
• Fungal etiology	2	1.82%
• Interstitial lung disease	14	12.73%
Neoplastic	49	44.55%
• Squamous cell carcinoma	18	16.36%
• Adenocarcinoma	12	10.91%
• Positive for malignancy	4	3.64%
• Suspicious for malignancy	5	4.55%
• Small cell carcinoma	4	3.64%
• Non-small cell carcinoma lung	2	1.82%
• High Grade Malignancy	4	3.64%
Inconclusive	4	3.64%

Discussion

Interpretation of lung biopsies in a patient with lung disease is best accomplished using a multidisciplinary approach that results in a composite clinico-pathologic diagnosis.[3] A pattern- based histopathological approach to lung diseases provides a ‘‘map’’ for the general pathologist to navigate this area successfully, especially so when used with aid of the clinical patterns of presentation.

In our study of 110 cases, the mean age of the person undergoing bronchoscopy was 54.27. Majority of the patients were above 50 years of age. The age distribution and mean age of patients who underwent bronchoscopy for lung lesions were similar to the studies done by Kakodkar *et al.*,[6] (61.01 years), Bhat N *et al.*,[7] (58.62 years), Bodh *et al.*,[8] (62 years), Bhatti *et al.*,[9] (60.09 years), and Shah *et al.*,[10] (57.4 years).

The most common age group for malignancy was 61-70 yrs. which was similar to studies done by Kotadia *et al.*,[11] Bhat *et al.*,[7] Shah *et al.*,[10] In study done by Bhat *et al.*,[7] 33.2% patients were between 51 to 60 yrs. age group and 32.7% cases were between 61-70 yrs. age group. Kotadia *et al.*,[11] found that 37.5% of cases were in 61-70 yrs. age group and malignancy was common in 6th and 7th decade.

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In our study, the most common radiological finding was mass lesion seen in 29.09% of cases. Similarly, Sharma *et al.*,[12] found mass lesion in 30.6% cases whereas Rawat *et al.*,[13] found it in 46.13% cases. Various other studies also had the similar findings.[14,15] The right side of the lung is involved more commonly in our study which was similar to studies done by Dhatwalia *et al.*,[16] Thakkar D *et al.*,[17] & Sarfraz *et al.*,[18]

In the current study as well as the studies done by Naik Ks *et al.*,[19] Nasreen K *et al.*,[20] & Dhatwalia *et al.*,[16] It was found that squamous cell carcinoma was the most common cancer associated with smoking in the cases studied. In our study malignant lesions were more common as compared to benign lesions. The finding was similar to studies done by Dhatwalia *et al.*,[16] Shah *et al.*,[10] Gupta *et al.*,[21] & Shrestha *et al.*,[22]

In our study among non-neoplastic lesions, Granulomatous Inflammation were more common. This finding was similar to the studies done by Kulshreshtha *et al.*,[23] & Shrestha *et al.*,[22]. In current study Granulomatous lesion was seen in 28.07% of cases. Similarly, Kulshrestha *et al.*,[23] found Granulomatous lesion was most common among non-neoplastic diseases 30.20% of cases.

The most common malignancy in our study was Squamous cell carcinoma accounting for 36.73% of cases which was similar to majority of other studies as described above. Kakodkar *et al.*,[6] found squamous cell carcinoma in 38% of cases. Kotadia *et al.*,[16] found it in 39.39% of cases. Bodh *et al.*,[8] found squamous cell carcinoma in 38.70% of cases whereas Bhat *et al.*,[7] found squamous cell carcinoma in 37.7% cases. Adenocarcinoma was second most common malignancy the finding which was again similar to other studies.

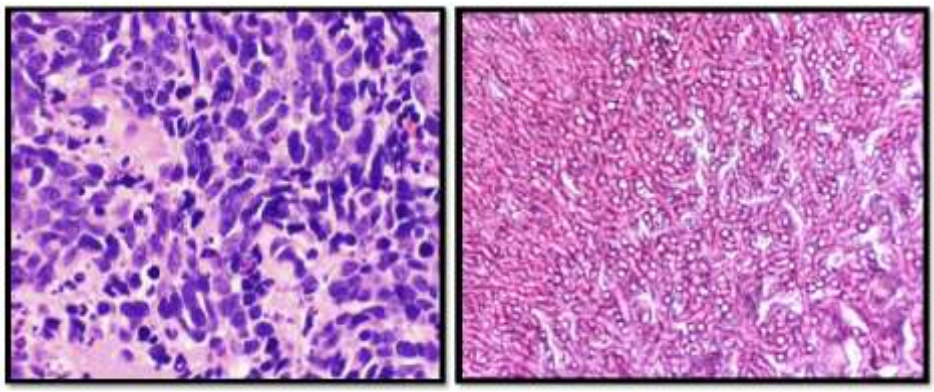

Figure 1: Small cell carcinoma (H&E stain-400x); Figure 2: Aspergillus (H&E stain-400x)

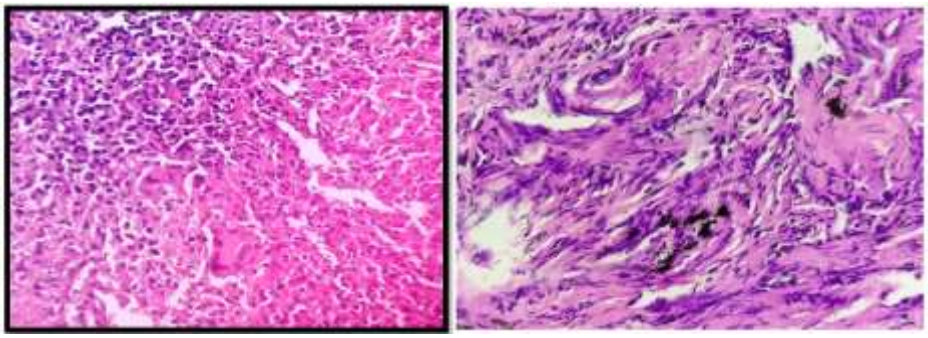

Figure 3: Granulomatous Inflammation with Necrosis and Langhan's Giant cells (H & E stain 400x); Figure 4: Interstitial Lung disease (H & E stain 400x)

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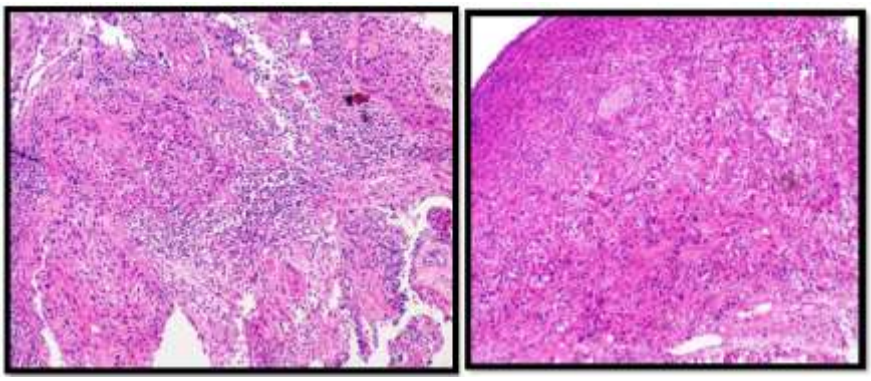

Figure 5: Squamous cell carcinoma (H & E stain 100x); Figure 6: Non-Small Cell Lung carcinomas (H & E stain 100x)

Conclusion

Lung biopsy is reliable with high accuracy for diagnosis and subtyping of lung lesions. Histopathological examination plays an important role in making a correct and accurate diagnosis of various lesions of lung. Hematoxylin and Eosin stain is the gold standard method used for diagnosis.

In our study of 110 cases, the age group varied from 8-85 years with mean age of 54.38 yrs. and majority being males. The majority of the patients were symptomatic with cough and breathlessness being the most common symptoms of presentation to hospital. We were able to pick up conditions ranging from granulomatous inflammation to malignancy on histopathology. Our study was similar to other studies done by various hospitals with minor differences attributed to small sample size.

Conflict of Interest: None to declare
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References

1. Global Burden of Disease Cancer Collaboration. The Global Burden of Cancer 2013. JAMA Oncol 2015; 1(4): 505-27
2. Gray's Anatomy; Churchill Livingston: 10th edition.
3. World Health Organization Media Centre. Cancer Fact Sheet 2017. Available from: http://www.who.int/mediacentre/factsheets/fs297/en [Last accessed on 2017 Oct 05]
4. Behera D. Epidemiology of lung cancer-Global and Indian perspective. Journal Indian academy of clinical Medicine 2012; Volume 13(2):131-137
5. Ferlay J, Soerjomataram I, Ervik M, Dikshit R, Eser S, Mathers C *et al.* GLOBOCAN 2012, Cancer Incidence and Mortality Worldwide: IARC Cancer Base No. 11 [Internet]. Lyon, France: International Agency for Research on Cancer; 2013. Available from: http://globocan.iarc.fr [Last accessed on 2017 Oct 05].
6. Kakodkar UC, Arora AS, Vadala R. Diagnostic yield of various bronchoscopic techniques for evaluation of lung cancer; a retrospective analysis comparing endobronchially visible and non visible lesions. J. Evolution Med Dent Sci 2016; 5(43) :2687-2692.
7. Bhat N, Nazeir MJ, Bashir H, Bashir N, Farooq S, Fatima K, Baba MK. Correlation of Bronchial biopsy with Bronchoalveolar lavage in lung malignancies. International Journal of Research in Medical Sciences 2016; 4(2):428-435.
8. Bodh A, Kaushal V, Kashyap S, Gulati A. Cytohistological correlation in diagnosis of

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lung tumours by using fiber optic bronchoscopy; Study of 200 cases. Indian J Pathol Microbiol 2013; 56(2):84-8.

9. 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 Jul-Sep;9(3):169-175. doi: 10.4103/ijabmr.IJABMR_66_19. PMID: 31392181; PMCID: PMC6652278.
10. Shah, H. S., Daveshwar, S. R., Daveshwar, M. R., & Rana, N. A. (2020). Analysis of histopathological patterns of lung and pleural biopsy in correlation with immunohistochemistry. International Journal of Health and Clinical Research, 3(6), 175–181.
11. Kotadia TP, Jasani JH, Vekaria PN. Comparison of Bronchial biopsy, Bronchoalveolar lavage, Brush cytology and Imprint cytology in suspected cases of lung carcinoma. Indian Journal of Biomedical and Advance Research 2013(4); 09: 579-84.
12. Sharma DK, Kumar M, Garg M, Jain P. Clinicopathological Profile of Lung Cancer - Changing Trends in India. Int J Res Med. 2016;5:57– 62.
13. Rawat J, Sindhwani G, Gaur D, Dua R, Saini S. Clinico-pathological profile of lung cancer in Uttarakhand. Lung India Organ Indian Chest Soc. 2009;26(3):74–76.
14. Rana S, Bhattacharyya BD, Katoch C, Kishore K, Arora A. Clinical, Radiological, and Histopathological Profile of Patients with Endobronchial Lesions on Fiber-Optic Bronchoscopy. J Assoc Chest Physicians 2018;6:53-60
15. Sahin F, Yildiz P. Radiological, bronchoscopic and histopathologic characteristics of patients with primary lung cancer in Turkey (2006–2009). Asian Pac J Cancer Prev;12:1947-52
16. Aarti Dhatwalia, Vineet Kumar, Vandna Raghuvanshi and Varun Jaswal, Histopathological profile of endobronchial biopsies at tertiary care centre in a northern state of India: A cross sectional study, JNGMC, Vol 17, No.2,December 2019
17. Thakkar D, Damor P, Vithalani K. Clinicopathological profile of patients with bronchogenic carcinoma at a tertiary care center in Western India. Indian J Respir Care 2019;8:80-3
18. Sarfraz *et al.* , Rahul G. , Subhash B. Histopathological Patterns of Endobronchial Lung Biopsy Specimen in Lung Cancer along with Clinico - Radiological Correlation. International Journal of Contemporary Medical Research Volume 5 | Issue 11 | November 2018
19. Naik KS, Jarag M, Shah P, Patel M, Patel A, Shah A. Shifting trends of lung tumours and its diagnosis by lung biopsy: a study of 78 cases. Int J Res Med Sci 2015;3:3524-9
20. Nasreen K, Satkirti A, Raina A, Bhushan I. Histopathological assessment of lung biopsies. Journal of Advanced Medical and Dental Sciences Research. 2019 Aug;7(8). 43.
21. Gupta S, Bhalotra B, Jain N. Spectrum of intrabronchial mass lesions and role of flexible bronchoscopy in their diagnosis: a series of 74 cases. The Indian journal of chest diseases & allied sciences. 2010 Apr 1;52(2):79.
22. Shrestha R, Shrestha A, Yogi S, Histomorphological Spectrum of Diseases in Endobronchial Biopsy, JNGMC, Vol 17, No.2,December 2019
23. Kulshrestha R, Menon BK, Rajkumar, Vijayan VK. Role of a pattern-based approach in interpretation of transbronchoscopic lung biopsy and its clinical implications. Indian J Chest Dis Allied Sci. 2012 Jan-Mar;54(1):9-17. PMID: 22779117.