



CYTOPATHOLOGICAL STUDY OF PULMONARY LESIONS IN A TERTIARY CARE HOSPITAL

Pathology

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ABSTRACT

AIM- Study of epidemiological factors in relation to various lesions of the lung. Also, to study the cytohistological patterns of inflammatory, benign, and malignant lesions of lung.

BACKGROUND- Lung lesions are the major cause of morbidity and mortality. Various diagnostic techniques provide an accurate diagnosis, early intervention, management, and follow-up with improved outcomes. Bronchoalveolar lavage, Bronchial brushing, and Bronchial biopsy are minimally invasive procedures.

MATERIAL AND METHOD- This study was conducted in the Department of Pathology, MGM Medical College, Navi Mumbai for one year (Jan 2019- Jan 2020). A sample size of 25 patients who underwent bronchoalveolar lavage, bronchial brushing, and biopsy was taken as the subjects.

Inclusion criteria- Patient with non-resolving pneumonia or radiologically diagnosed mass lesions in the lung.

Exclusion criteria- Age less than 18 years or any complications during the procedure.

RESULT- Histopathological correlation was established in 25 patients. The majority of patients were smokers, males in the 5th-6th decades. 15 out of 25 cases showed non-malignant etiology. Out of which majority is showing non-specific Inflammation, 3 of tuberculosis and 1 case showed Mucormycosis.

Out of a total of 10 malignant lesions, 4 cases were Squamous Cell Carcinoma, 3 cases of Adenocarcinoma, and 1 case of Spindle Cell lesion of the Lung.

CONCLUSION- Bronchial Biopsy is the Gold standard for diagnosing lung pathology. Yet, BAL/ Bronchial Brushing can also be contributory in diagnosing lung lesions. Hence, the combination of cytopathology and histopathology is beneficial in diagnosing neoplastic lesions of lung.

KEYWORDS

Lung lesions, Bronchoalveolar lavage (BAL), Brush cytology, Bronchial Biopsy

INTRODUCTION

Lung cancer is the leading cause of mortality worldwide.^[1] The increasing incidence of lung cancer is due to smoking habits, change in life styles and increased environmental pollution. Smoking contributes to more than 80 % of lung cancer in western population.^[1] Although lung carcinoma is more commonly found in males than females, now the ratio is decreasing.^[4] Tobacco smoking contributes to most common cause of lung cancer, although ionizing radiation and occupational exposure also contributes to lung cancer in 15-20 % cases.^[3]

Different modalities are used for the early diagnosis of lung lesions.^[9] Using Flexible fiber-optic bronchoscope, respiratory pathology can easily be accessed by Bronchoalveolar Lavage (BAL), Bronchial Brushing and Bronchial Biopsy.^[6]

BAL is a cheap, easily performed, well tolerated, day care procedure and yields cellular content and proteins from lower respiratory tract lesions even in cases where obtaining the lung biopsy is difficult.^[10,11]

Bronchial Brushing with flexible bronchoscope helps to visualize the lesions present up to sub segmental bronchi. It permits direct visualization of mucosal abnormality. It can detect any localized or early invasive carcinoma.^[5]

Bronchial Biopsy is sensitive, inexpensive procedure for diagnosing lung pathology. It provides a confirmatory diagnosis.^[11] It is considered as a gold standard method.^[6,12] The ability to take lung tissue without surgery is an important step for accurate diagnosis of lung lesions. Although, it cannot be performed in peripheral lung lesions or in patients with bleeding diathesis.^[9]

There are two effective ways for early diagnosis of lung lesions, radiology and cytology.^[7] Radiologically suspicious lesion must undergo further evaluation.^[11]

According to GLOBOCAN 2018, worldwide, incidence of Lung Cancer is 2.1 million new lung cancer cases and 1.8 million deaths predicted.^[1,12]

AIM & OBJECTIVE-

1. To study epidemiological factors in relation to various lung lesions.

2. To study the cytology and histopathology of inflammatory, benign and malignant lung lesions.

MATERIAL AND METHOD-

This is a study of 25 patients for a time period of 1 year from January 2019 to January 2020, in the department of Pathology, MGM Medical college, Navi Mumbai, a tertiary care hospital.

Inclusion criteria-

- a) Unresolved pneumonia
- b) Suspicious mass lesion on radiological examination.
- c) Clinical suspicion of malignancy

Exclusion Criteria-

- a) Age < 18 years,
- b) Complication during the procedure.

A total of 40 patients underwent BAL by bronchoscopy, out of which brush cytology and bronchial biopsy were done in 25 cases only. The samples were received in the laboratory for processing. After centrifugation of BAL fluid, smears were prepared from the sediments. PAP and MGG were used as routine stains on BAL and brush cytology. For bronchial biopsy, H & E staining was done. Special stains like ZN (Ziehl Neelsen) stain for AFB, PAS (Periodic Acid Schiff) and GMS (Grocott-Gomori's methenamine silver) stain for fungal elements were carried out wherever indicated.

OBSERVATION & RESULT-

40 patients with suspicious radiological lung lesion were subjected to bronchoscopy for further evaluation. BAL being simple diagnostic procedure was done in all the cases. However, histopathological confirmation was done in 25 cases only.

In this study, age group ranged from 22-72 years with majority of patients in 5th and 6th decade. Total 25 patients were studied. Out of which 17 were male and 8 were female, hence suggestive of male preponderance and majority of them were smokers.

Male to female ratio found was 2.1:1 (table 1)

Table 1 – Gender & Age Wise Distribution (n= 25)

Age Group	MALE	FEMALE	TOTAL
21-30	1	1	2
31-40	1	-	1
41-50	4	1	5
51-60	5	5	10
61-70	2	-	2
71-80	4	1	5
TOTAL	17(68%)	8(32%)	= 25

Smoking contributes to 60% of the cases, with Smoker to Non-Smoker ratio as 3:2 (table 2)

Table 2 – Smoker To Non-smoker Percentage

	NUMBER (n=25)	PERCENTAGE
SMOKER	15	60%
NON-SMOKER	10	40%

Out of 25 cases diagnosed on histopathology, 15 cases were of Non-Neoplastic etiology and 10 cases were of Neoplastic origin.

Non-Neoplastic lesions included 15 cases, of which 10 cases were of Chronic Non-Specific Inflammation, 3 cases of Granulomatous Inflammation (Tuberculosis), 2 cases of Acute Inflammation out of which 1 case was of Fungal infection (Mucormycosis). (table 3)

Table 3- Categorising Non-neoplastic Lesion On Biopsy

NON-NEOPLASTIC LESION- TYPE	CASES (n = 15)	PERCENTAGE
ACUTE INFLAMMATION	1	6.6%
CHRONIC NS* INFLAMMATION	10	66.6%
GRANULOMATOUS	3	20.0%
FUNGAL	1	6.6%

*NS- Non-Specific

Out of 10 cases that were of neoplastic origin, the diagnosis of malignant tumors included Non- Small cell carcinoma and Small cell carcinoma 1 case each, Squamous cell carcinoma 4 cases, Adenocarcinoma 3 cases. 1 case of Benign Spindle cell lesion of lung was also seen. (table 4)

Table 4- Neoplasm Typing On Bronchial Biopsy (n=10)

S.No	Type Of Neoplasm	Cases No. (n=10)	Percentage
A.	BENIGN LESION-		
A.1	Spindle Cell Lesion	01	10%
B.	MALIGNANT TUMOR		
B.1	NON SMALL CELL CARCINOMA	07	70%
B.1.1	Squamous Carcinoma	04	40%
B.1.2	Adenocarcinoma	03	30%
B.2	SMALL CELL CARCINOMA	02	20%

Table 5 – Comparative Evaluation Of Bal, Bronchial Brush And Biopsy In Various Lung Lesions (n= 25)

	DIAGNOSIS	BAL	BRUSH	BIOPSY
1.	INFLAMMATORY	13	15	15
	ACUTE	8	5	1
	CHRONIC NS* INFLAMMATION	5	10	10
	GRANULOMATOUS	-		3
	FUNGAL	-		1
2.	SUSPICIOUS FOR MALIGNANCY	2	2	--
3.	POSITIVE FOR NEOPLASM	5	7	10
4.	HEMORRHAGIC	5	1	--
	TOTAL CASES (= 25)			

*NS: non specific

MICROSCOPIC IMAGES–

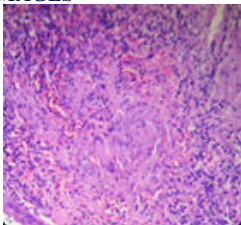


FIG.1- Showing well-formed epithelioid cell granuloma in histopathology (10x)

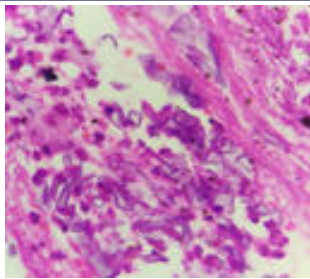


FIG.2- Showing septate, with branching at an acute angle Mucormycosis in H&E stain under oil immersion. (100x)

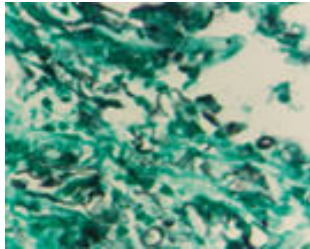


FIG.3- Showing Mucormycosis under GMS stain. (100x)

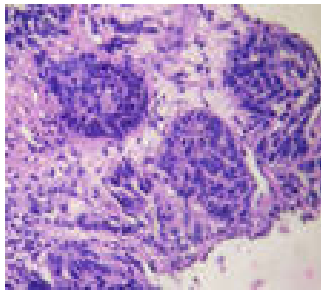


FIG. 4 – Showing well differentiated squamous cell carcinoma (40x) in histopathology

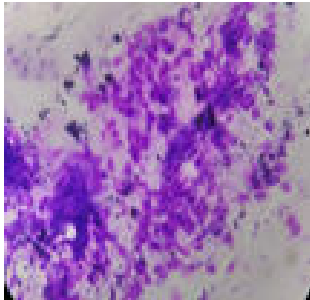


Fig. 5- Showing positive for malignancy in BAL fluid cytology (40x)

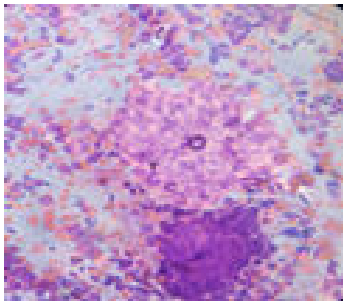


Fig.6 - Showing positive for malignancy in bronchial brush cytology (40x)

Table 6: Comparison Between Different Studies-

Similar Studies	Smoker: Non Smoker	Male: Female	Age group Most common	Lung cancer type Most common
Agrawal et al ^[9]	2.33:1	2.13:1	-	Squamous cell C
Rohtagi et al ^[5]	1.22:1		5-6 th decade	Squamous cell C
Present study	3:2	2.12:1	5-6 th decade	Squamous cell C

DISCUSSION -

Cytology has proven itself as the first line diagnostic procedure for the suspected neoplastic lung lesions, followed by biopsy.^[9] Correct histological typing is important for proper clinical management and it is generally accepted that the cell type seen in biopsy material will be an accurate reflection of main tumor.

Age group of 5th-6th decade were most commonly affected. Rohtagi et al showed similar results.^[5]

In our study, the male to female ratio was 2.12:1. Studies showing similar values are Agrawal et al which showed M:F ratio as 2.3:1^[9]

RESULT-

In this study, Chronic non-specific inflammation was most common type of inflammation on cyto- histological correlation, which proved to be a benign process. Tuberculosis was the most common cause of inflammatory lesion.

Our study shows Squamous cell carcinoma as the most common type followed by adenocarcinoma. 10/25 (40%) cases were diagnosed as neoplastic. 1 case showed benign etiology. Neoplasm contributes to 10 cases, which is further subdivided as Non-Small Cell and Small Cell Carcinoma. Non- Small cell carcinoma includes Squamous cell carcinoma and Adenocarcinoma.

In the present study, Squamous cell carcinoma contributes 4/10 (40%) of total malignant cases, which was making it the most common, followed by Adenocarcinoma 3/10 (30%) Similar to the study done by Khan et al , which showed squamous cell carcinoma as the most common type of lung cancer.^[13] Another study conducted by Pradeep et al showed similar finding with Squamous cell carcinoma as the most common lesion, followed by Adenocarcinoma, followed by small cell cancer.^[8]

BAL can be done in all the suspicious lung lesions. Though histopathology is confirmatory, multiple cytological techniques like BAL, bronchial brushing can be used for quick reporting of lung lesions.

CONCLUSIONS

The diagnosis of neoplastic lesions of lung is a diagnostic problem for pulmonologist because some malignant lesions mimic infectious or inflammatory conditions. BAL has a relevant role in ruling out such lesions.

Bronchoscopy is a simple, effective method that can be useful and effective tool for early diagnosis of cancer. BAL being the simplest inexpensive procedure, does not require much guidance. Although, biopsy being the gold standard, a combination of cytology and histological examination have been beneficial in diagnosing suspicious lung lesions.^[2]

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Nil.

Conflicts of Interest-

There are no conflicts of interest.

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