



Original Article

Role of Cytological and Radiological Correlation in Mass Lesions of Lung in A Tertiary Care Centre of Hadoti Region

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ABSTRACT

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Introduction – Lung lesions include a variety of benign and malignant lesions. According to WHO, 2022 data, lung carcinoma is the most common cancer worldwide and is the most common cause of cancer related deaths. This study was carried out to know the cyto-radiological correlation in mass lesions of lung.

Aims- This study was conducted to know the pathological spectrum of lung lesions and to correlate the radiological findings with USG /CT guided FNAC findings.

Methods – This study was carried out on 100 patients in the Department of Pathology at Government Medical College, Kota for a period of 15 months from January 2023 to March 2024. Patients with suspected lung lesions, were the study subjects. USG/ CT guided FNAC was carried out, examined, and compared with radiological diagnoses.

Results - Adequate sampling material was obtained in 93 patients out of 100 patients. The Cytoradiological correlation was found to be 89.24%. Based on cytology, the most common malignant lesion was Adenocarcinoma (31.18%) followed by Squamous cell carcinoma (29.03%), Small cell carcinoma (12.90%), Poorly differentiated carcinoma (4.30%). 5.37% cases were suspicious for malignancy and 8.60% cases were diagnosed as non-specific inflammatory pathology.

Conclusion – Guided FNAC helps in early detection and diagnosis of lung lesions. Further FNAC in conjunction with radiological diagnosis provides an better accurate diagnosis.

Keywords: Lung Carcinoma, Fine Needle Aspiration Cytology (FNAC), USG/CT guided.

INTRODUCTION

According to WHO, 2022 survey, lung carcinoma is the most common cancer (12.4%) worldwide and is the most common cause of cancer related deaths (18.7%). Despite tremendous efforts to treat this cancer, the overall 5-year survival for all stages is dismally low at 15%.¹ About 85–90% of patients with lung cancer have had direct exposure to tobacco. The strongest associations are with small cell and squamous cell carcinoma.² Although clinical data, location, and radiological findings can narrow down diagnostic possibilities, a definitive diagnosis confirming lung cancer by microscopic examination is indicated before therapy.³ In clinically suspected cases of lung cancer, if histologic confirmation is not there, cytologic confirmation is suffice⁴. Further a Cytologic- Radiologic correlation in lung lesions provide better accurate diagnosis and helps in proper management of the patient.

The purpose of this study to find out pathological spectrum of lung lesions and to correlate cytological findings with the radiological findings.

AIMS AND OBJECTIVES –

The study was conducted to find out pathological spectrum of lung lesions based on cytomorphological features and to correlate cytological diagnosis with the radiological diagnosis.

MATERIALS AND METHODS -

This is a cross-sectional study, carried out in Department of Pathology at Government Medical College, Kota for a period of 15 months from January 2023 to March 2024. Total 100 patients were included in the study.

Inclusion criteria:

Patients of all age groups who were advised guided FNAC for lung lesions.

Exclusion criteria:

1. Patient with suspected bleeding diathesis and on anticoagulant medication.
2. Patient who are unconscious or who cough intractably.
3. Cases whose radiology was not available.

The procedure was explained to the patient before aspiration and written consent was taken.

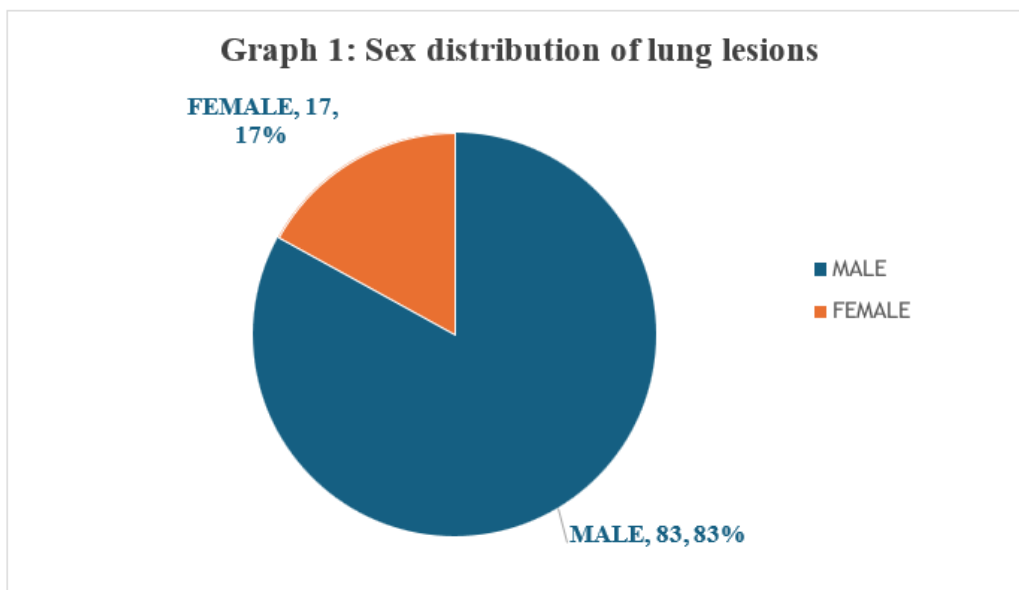
The sample was taken under USG or CT scan guidance by 22 gauge, 90 mm disposable lumbar puncture needle. The aspirate was blown onto clean glass slides. Smears were made by applying gentle pressure with another slide and then air dried. Air dried smears were fixed with methanol for 15-20 minutes. Staining was done with giemsa stain. The slides were examined for cytomorphological features and cytological diagnosis was correlated with the radiological diagnosis.

RESULT –

Total 100 patients were included in this study. Most of the cases were in the age group 61-70 years with 52 patients (52%) followed by age group 51-60 years with 26 patients (26%) (Table 1). There were 83 male patients and 17 female patients with male to female ratio 4.88:1 (Graph 1).

Table 1: Age distribution of lung lesions

Age Group	No. of patients	Percentage
0-40 years	1	1%
41-50 years	11	11%
51-60 years	26	26%
61-70 years	52	52%
71-80 years	10	10%



Adequate material for reporting cytology, was obtained in 93 out of 100 patients. The material was inadequate in 7 cases on repeated aspirations. These cases were omitted for further calculations.

- The radiological and cytological diagnoses were concordant in 83 cases out of 93 cases (Table 2).
- The cytoradiological correlation was found to be 89.24% (Table 3).
- Discrepancy was noted in 10 (10.76%) out of 93 cases between radiological and Cytological diagnosis.

The most common lesion found on cytology was adenocarcinoma 29 cases (31.18%). All these 29 cases were diagnosed as malignant on radiology. The second most common lesion on cytology was squamous cell carcinoma 27 cases (29.03%).

Among these 27 cases, 26 cases were diagnosed as malignant on radiology and one case was diagnosed as benign etiology.

There were 12 cases (12.90%) diagnosed as small cell carcinoma and 4 cases (4.30%) diagnosed as poorly differentiated carcinoma on cytology. All these 16 cases were given malignant on radiology.

There were 5 cases (5.37%) with suspicion for malignancy. These cases were given as malignant on radiology.

- 8 cases (8.60%) were diagnosed as non specific inflammatory pathology on cytology. Out of these 8 cases, 3 cases were given benign and 4 cases were given malignant on radiology.
- 6 cases (6.45%) were diagnosed as tubercular pathology on cytology. Out of these 6 cases only 2 cases were concordant on radiology and 4 cases were given malignant.
- 1 case (1.07%) was diagnosed as benign cystic lesion on cytology and
- 1 case as fungal infection. These cases were concordant on radiology.

There were 83 concordant cases on radiology and cytology while 10 cases were discordant. The cytoradiological correlation was 89.24%.

Table 2: Cytological and radiological correlation of lung lesions

Cytological diagnosis	Cases numbers	Concordant	Radiological diagnosis of concordant cases	Discordant	Radiological diagnosis of discordant cases
Adenocarcinoma	29	29(100%)	Neoplastic etiology	0	-
Squamous cell carcinoma	27	26(96.29%)	Neoplastic etiology	1(3.70%)	Progressive massive fibrosis
Small cell carcinoma	12	12(100%)	Neoplastic etiology	0	-
Poorly differentiated carcinoma	4	4(100%)	Neoplastic etiology	0	-
Suspicious for malignancy	5	5(100%)	Neoplastic etiology	0	-
Non-specific inflammatory pathology	8	3(37.5%)	Infective etiology	5(62.5%)	Neoplastic etiology
Tubercular pathology	6	2(33.33%)	Tubercular etiology	4(66.66%)	Neoplastic etiology
Benign cystic lesion	1	1(100%)	Infective etiology	0	-
Fungal pathology	1	1(100%)	Fungal etiology	0	-
Total number	93	83(89.24%)	-	10(10.75%)	-

Table 3: Rate of concordance in cytological and radiological diagnosis

	Similar diagnosis on cytology and radiology	Dissimilar diagnosis on cytology and radiology
Malignant lesion	71	1
Benign lesion	7	9
Suspicious for malignancy	5	0
No. of patients	83	10
Percentage	89.24%	10.75%

Among 72 cytological malignant lesions, 71 cases were given as malignant on radiology and one case was given benign. 5 case with cytological suspicion for malignancy, were also given as suspicious for malignancy on radiology.

- Among 16 cytological benign lesions, 7 cases were given benign and 9 cases were given as malignant on radiology.
- Discrepancy was noted in 10 out of 93 cases. This discrepancy was more for benign lesion than the malignant lesions. Among malignant lesions, discrepancy was noted only in one case while among benign lesions, discrepancy was noted in 9 cases.
- One case reported as progressive Massive fibrosis on radiology, was diagnosed as squamous cell carcinoma on FNAC.

- 4 cases of tubercular pathology were misdiagnosed as malignant on radiology. These patients were recovered after anti-tubercular treatment. 5 cases reported as malignant on radiology, were diagnosed as non-specific inflammatory pathology on FNAC.

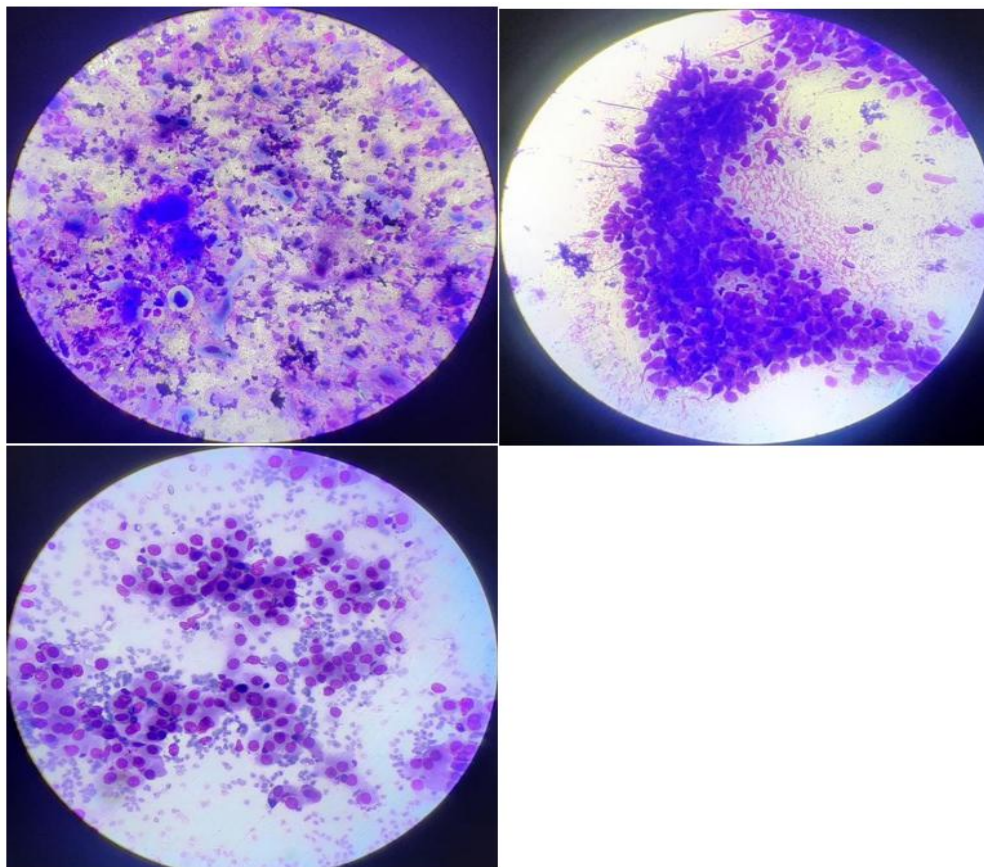


Figure-1: Cytomorphological features of lung lesions

Figure-1: (A) Pleomorphic cells in squamous cell carcinoma with blue cytoplasm and hyperchromatic nuclei [MGG, 100x]. (B) Irregular solid cohesive sheet in squamous cell carcinoma [MGG, 100x]. (C) Sheet of cells with moderate to abundant amount of cytoplasm and eccentric round nuclei in adenocarcinoma [MGG, 200x].

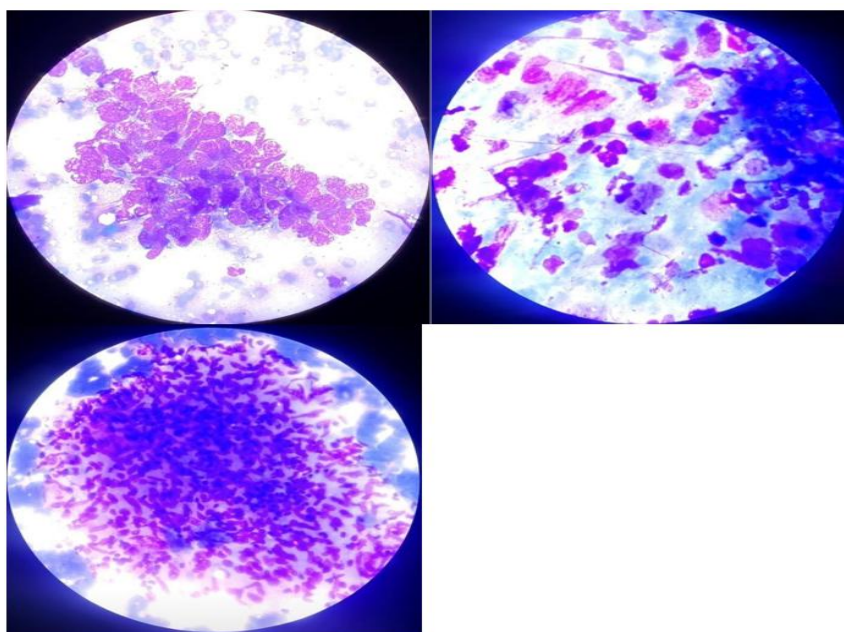


Figure-2: Cytomorphological features of lung lesions

Figure-2: (D) Sheet of cells with nuclear moulding and fine granular chromatin in small cell carcinoma [MGG, 400x]. (E) Poorly differentiated atypical cells in poorly differentiated carcinoma [MGG, 400x]. (F) Epithelioid cells forming granuloma [MGG, 400x].

Cytological and radiological correlation provides a better accurate diagnosis of lung lesions and helps in better management of the patients.

DISCUSSION –

According to WHO, 2022 survey, lung carcinoma is the most common cancer worldwide and is the leading cause of cancer related deaths. The present study was conducted to correlate cytological and radiological in diagnosis of lung lesions for better accurate diagnosis and management.

This study showed peak age group of presentation of lung lesion was 51-60 years with average age of presentation 55.5 years. Similar average age of presentation was found in the study done by Ahmed Z et al. (2018)⁵ and Chakrabarti PR et al. (2020)⁶.

The male preponderance was consistent with the studies done by Baby J et al. (2014)⁷ And Ahmed Z et al. (2018)⁵, Chakrabarti PR et al. (2020)⁶.

The cytoradiological correlation in the present study was found to be 89.24%. This was similar to studies done by Piplani S et al. (2014)⁸ (Table 4). This was slightly lower as compared to other studies done by Biswas P et al. (2016)⁹, Gadodiya K et al. (2019)¹⁰ and Chakrabarti PR et al. (2020)⁶. It may be because, in the present study, a greater number of inflammatory cases were reported as malignant on radiology.

Table 4: Comparison of cytoradiological Correlation

	Cytoradiological correlation
Piplani S et al. (2014) ⁸	89.2%
Biswas P et al. (2016) ⁹	92.6%
Gadodiya K et al. (2019) ¹⁰	91.89%
Chakrabarti PR et al. (2020) ⁶	90.40%
Present study	89.24%

Discrepancy was noted in 10 out of 93 cases. This discrepancy was more for benign lesions than the malignant lesions. There was 100% cytoradiological concordance in cases reported as adenocarcinoma on cytology. One case reported as progressive massive fibrosis on radiology turned out to be squamous cell carcinoma on cytology.

Five cases of neoplastic etiology on radiology, turned out to be non- specific inflammatory pathology on cytology. These patients improved after conservative management.

Four cases of neoplastic etiology on radiology, turned out to be tubercular pathology on cytology. All these patients improved after anti-tubercular treatment.

Although histopathological diagnosis is gold standard for diagnosis of lung lesions, guided FNAC in conjunction with radiology provides a great help in early diagnosis and management of the patient.

CONCLUSION

In the present study, cytopathological diagnoses of various lung lesions were correlated with radiological diagnoses. The cytoradiological correlation found to be 89.24%. Correlation among diagnostic modalities provides a better diagnostic impression and helps in better management of the patient. Further guided FNAC is a safe and minimally invasive procedure for early diagnosis and subcategorization of lung lesions.

LIMITAIONS - No histopathological correlation was available in this study.

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