

Image Guided FNAC in Lung Lesions; At Tertiary Care Centre**Mamta Jain¹, Sakshi Singh², Navita Gupta³, Mayank Sharma⁴, Abhishek Jain⁵**¹Assistant Professor, Department of Pathology, Government Medical College, Kota²Assistant Professor, Dept of Pathology Government Medical College, Kota³Assistant Professor, Dept of Pathology, SMS Medical College, Jaipur.⁴Assistant Professor, Dept of Pathology, Government Medical College, Kota⁵Consultant ENT Surgeon, Jain ENT Centre, Kota Rajasthan

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Abstract:

Image-guided fine needle aspiration cytology (FNAC) is regarded as a rapid, safe, and accurate diagnostic tool in examining lung lesions. This study aims to assess the role of image-guided FNAC in benign and malignant disorders of lung lesions, to analyse the results, and to compare the results with other studies. Over a period of two year (January 2022 to December 2023) one hundred and ten patients with lung lesions were studied for their age, sex, and cytological diagnoses. Out of 110 cases involved in our present study, 84 (76.36%) were male and 26 (23.63%) were female. Out of a total of 110 cases cytological diagnosis on image-guided FNAC showed 2 (1.8%) cases with benign pathology, 16(14.5%) cases were inflammatory in nature and 73 (66.36%) cases to have malignancy and 8(7.2%) cases were suspicious while results were inconclusive in 11(10%) cases. The most common carcinoma as diagnosed by cytology was squamous cell carcinoma accounting for 39 (53.42%) cases, followed by adenocarcinoma in 17 (23.28%) cases, small cell carcinoma in 7 cases, 3 cases as poorly differentiated carcinoma, large cell carcinoma in 3 cases, clear cell carcinoma in 1 case and metastasis in 3 cases, in which 2 were known case of adenocarcinoma and one is Ewing's sarcoma.

Keywords: image guided FNAC, Lung lesions, Squamous cell carcinoma, Adenocarcinoma, Small cell carcinoma.

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Introduction

Across the globe, lung carcinoma is leading cause of death. The global burden of carcinoma is continuously increasing because of adopting cancer causing behaviors particularly smoking in economically developing countries.

Image guided FNAC is a well-established diagnostic method used in the cytological evaluation of lung lesions. This procedure provides a safe, rapid, and accurate diagnosis in patients having lung lesions.[1–3] Moreover, CT-guided FNAC plays an extremely vital role in small and deep seated lesions in which needle placement is correctly possible by avoiding any surrounding blood vessels and adjacent cardiac structures.[4,5]

FNAC plays an integral part in recognizing benign and malignant lesions and aids in typing of lung cancers so as to start particular treatment like chemotherapy or surgery immediately [6] CT-guided FNAC is an accurate and sensitive way of diagnosing malignancy of the lungs.[7–9] On the other hand, post procedure complications are pneumothorax, pulmonary hemorrhage, and hemothysis in fewer cases and simpler methods to

treat .Severe chronic obstructive pulmonary disease, bleeding diathesis, and pulmonary arterial hypertension are the relative contraindications.(4)

The purpose of current study is to assess utility of image guided FNAC in cytopathological diagnosis of lung lesions and to classify them as benign, malignant or suspicious for early detection and treatment.

Material and Methods

A prospective study was done for 2 years involving 110 patients who underwent image-guided transthoracic fine needle aspiration from pulmonary mass lesions at tertiary care center between January 2022 to December 2023.

Informed consent from each patient was taken after explaining risks and benefits. The exact location of the lesion was determined by CT scan or USG. Proper aseptic care was taken by cleaning the skin surface with povidone iodine before every FNAC. Aspiration was done using 22-gauge lumbar puncture needle. The aspirate was obtained by to and fro and rotating movements of the needle

within the lesions and five to ten smears were prepared immediately from the sample. Air-dried smears were stained with May-Grünwald-Giemsa stain for rapid cytopathological evaluation of the lesions. Sample for CBNAAT and AFB was sent in suspected tubercular cases. The smears were then examined under microscope and cytological diagnosis was made.

A follow-up CT scan was done in every patient immediately after the procedure to rule out pneumothorax. Although all patients with postprocedural complications were observed

carefully, no active treatment was required for any of these patients.

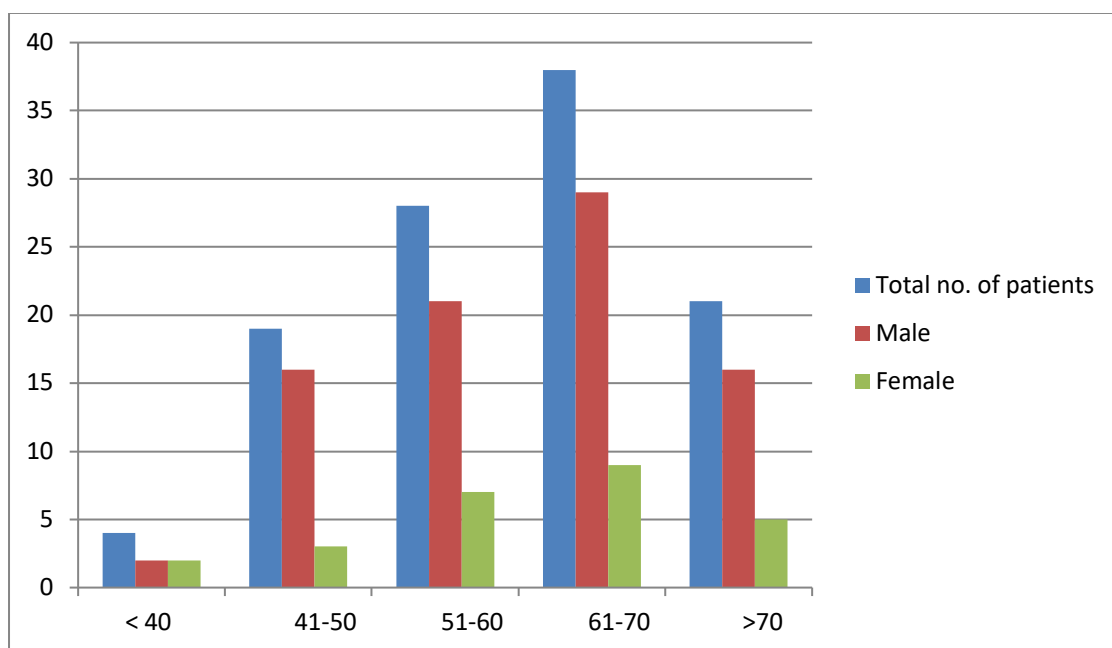
Results

Out of 110 cases involved in our present study, 84 (76.36%) were male and 26 (23.63%) were female. The youngest patient was a female of 25 years whereas the oldest was a male of 82 years; the overall mean age of all the patients was 62.8 years.

Of the 110 patients 84(76.36%) were males and 26 (23.63%) were females. A male preponderance was therefore noted with a M:F ratio of 3.23:1.[Table 1].

Table 1: Age distribution

Age group in years	No. of patients	Male	Female
<40	4	2	2
41-50	19	16	3
51-60	28	21	7
61-70	38	29	9
>70	21	16	5
Total	110	84	26



Graph 1:

The results were then classified into following categories: 1) Benign 2) Malignant, 3) Suspicious, 4) Inflammatory, 5) Inadequate [Table_2]. Out of a total of 110 cases cytological diagnosis on image guided FNAC showed 2 (1.8%) cases with benign pathology, 16(14.5%) cases were inflammatory in nature and 73 (66.36%) cases to have malignancy and 8(7.2%) cases were suspicious while results were inconclusive in 11(10%) cases.

Table 2: Cytological diagnosis of pulmonary lesions

Type	No of cases
Benign	2
Malignant	73
Suspicious	8
Inflammatory	16
Inadequate	11

In the 2 cases with benign pathology, that show reactive pneumocytes and benign looking cells.

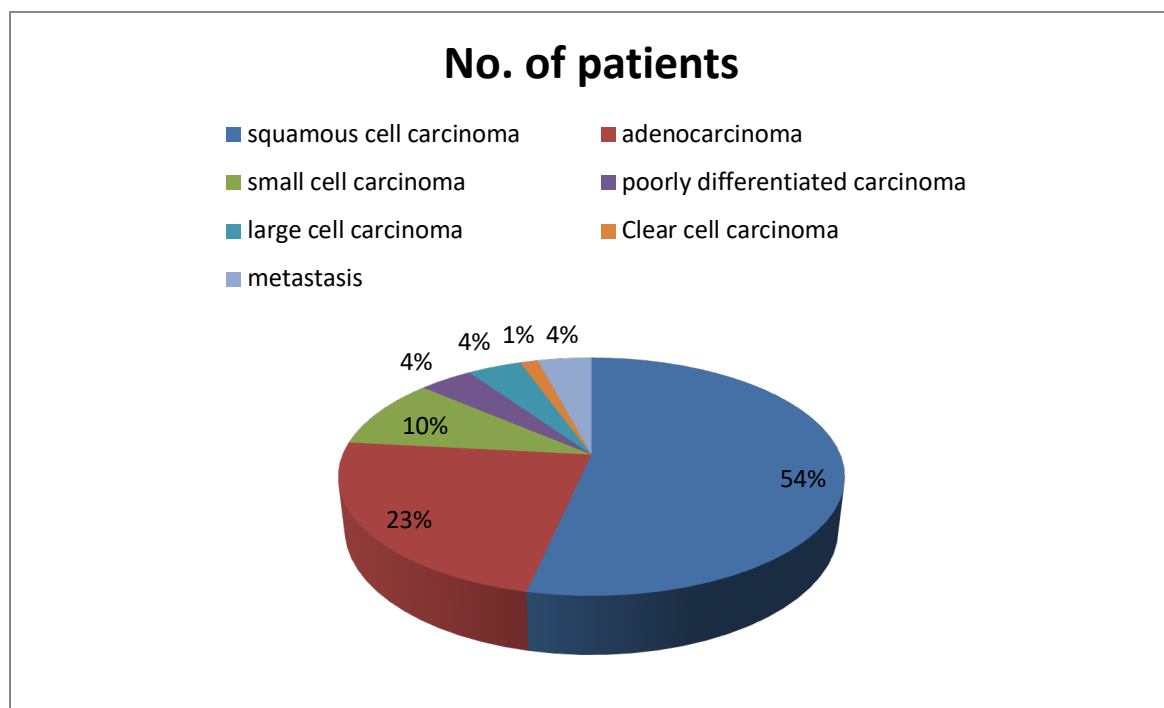
Out of 16 inflammatory cases 7 cases showed granulomas with background necrotic material. They showed acid-fast bacilli (AFB) with Ziehl-Neelsen stain and 3 of them were CBNAAT positive were labeled as Tuberculosis. The remaining 9 cases showed abscess and chronic non-specific inflammation and fungal infection. The majority of the cases that is 73 (66.36%), were diagnosed as malignancy. The pattern of distribution of cytological diagnoses is shown in Table 3. Most of the cy-

tology reports (82%) were descriptive followed by an impression and did not follow a uniform standard format of reporting.

The most common carcinoma as diagnosed by cytology was squamous cell carcinoma accounting for 39 (53.42%) cases, followed by adenocarcinoma in 17 (23.28%) cases, small cell in 7 cases, 3 cases as poorly differentiated carcinoma, large cell carcinoma in 3 cases, clear cell carcinoma in 1 case and metastasis in 3 cases, in which 2 were known case of adenocarcinoma and one is Ewing’s sarcoma. [Table_3].

Table 3: Cytological diagnosis of malignant lesions

Type	No. of patients
squamous cell carcinoma	39
adenocarcinoma	17
small cell	7
poorly differentiated carcinoma	3
large cell carcinoma	3
Clear cell carcinoma	1
metastasis	3



Graph 2: No. of patients

8 cases that were reported as suspicious for malignancy were due to paucicellularity. These cases could not be further subtyped; however, they had a strong clinical and radiological suspicion and hence were kept in a suspicion category. Out of 73 FNAC proven malignant cases, 58 were males and 15 were females. Out of 110 cases, 4 (3.6%) cases had complications, 2 cases had mild pneumothorax, one case showed mild hemorrhage from peri-lesional area and chest pain in one case which could be managed conservatively.

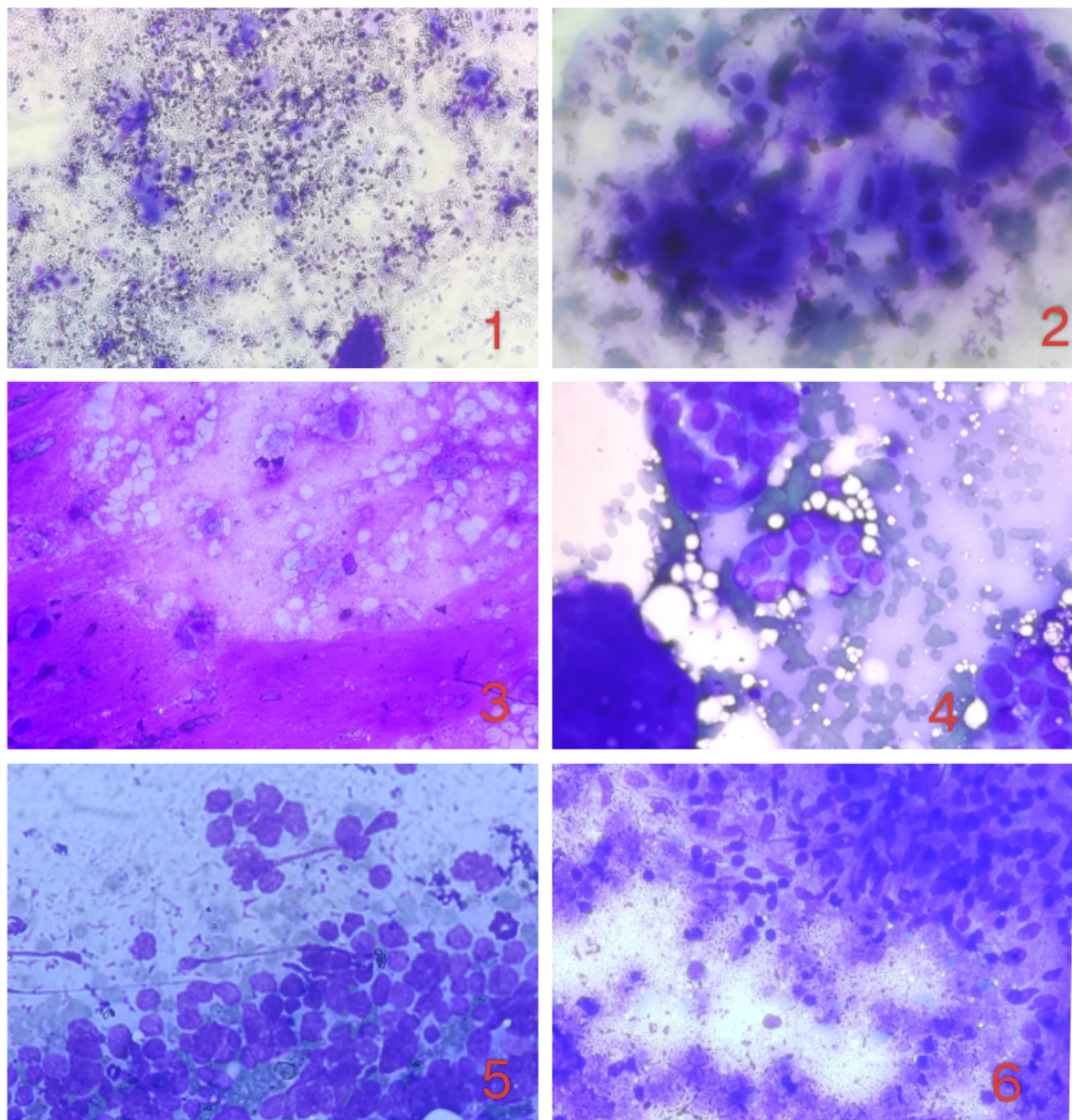


Figure 1-2: Squamous cell carcinoma showing malignant squamous cells in clusters and singly scattered. Dyskeratotic cells and keratin also seen.(Giemsa stain 10X AND 40X). 3 – Mucinous Adenocarcinoma show malignant cells with vacuolated cytoplasm and mucin in the background. (Giemsa 40x) 4- Adenocarcinoma show cells forming 3D clusters and forming acini having fine chromatin. (Giemsa 40x) 5 – Small cell carcinoma showing tumor cells having scant cytoplasm, inconspicuous nucleoli and showing crowding and moulding. (Giemsa 40x) 6- Tubercular lesion- showing epithelioid granuloma and caseous necrosis. (Giemsa 40x)

Discussion

Image-guided FNAC is a safe and reliable method to diagnose pulmonary lesions. It is more useful in diagnosing localized lesions than diffuse parenchymal lung disease diagnosis. It helps to differentiate malignant lesions from non-malignant ones and also helps in sub-typing the malignancies. In the present study, all the 110 cases with lung lesions were adults. The peak age incidence (56 – 65yrs) was almost the same as found in some

recent studies. The age range varied in most of the series from the third to eighth decade.

Among the cases 84(76.36%) were males and 26 (23.63%) were females. A male preponderance was therefore noted with a M:F ratio of 3.23:1. In studies done by saini et al showed, the percentage of male patients was found to be 71.1%. (10) and also in study done by saha et al showed (78.9%) were male and (21.1%) were female.(11)

The neoplastic lesions (66.36%) outnumbered the non-neoplastic (16.3%) cases. Among the

neoplastic lesions, the most common malignancy was squamous cell carcinoma (53.42%) and adenocarcinoma (23.28%) was the second most common. It is followed by small cell carcinoma (6.36%). This result corroborated with other studies [11-14].

Pneumothorax was most common complication of other studies; we found two cases in our study. The overall rate of complications (3.63%) in our study was also remarkably less than other series where the range varied from 6 to 50%.[15,16] In our study, 2 cases had mild pneumothorax, mild hemorrhage from peri-lesional area in one case and chest pain in one case was found and which could be managed conservatively.

FNAC is a safe, rapid, highly sensitive, and specific procedure with fewer complications. Radiological guidance has enabled accurate localization of pulmonary lesions, which helps in better yield on FNAC. It helps in the early diagnosis of lung malignancies with further subtyping in most cases, thus hastening the time at which therapy can be started. Inflammatory lesions like tuberculosis can be diagnosed accurately on FNAC.

FNAC diagnosis helps to decide treatment modalities for pulmonary lesions and to avoid unnecessary surgical management of lung malignancies.

Conclusions

Image-guided FNAC of lung lesions provides a rapid and safe diagnostic procedure with minimal complications. The categorical diagnosis can also be achieved on the basis of cytomorphology. The figures obtained from this study are comparable with other studies except for a few differences.

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