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Original Research Article

Computed tomography guided fine needle aspiration cytology of mass lesions of lung: our experience in a tertiary care hospital

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ABSTRACT

Background: The present study was undertaken to evaluate the diagnostic usefulness of image guided fine needle aspiration cytology (FNAC) in various lung lesions-both neoplastic and non- neoplastic.
Method: This retrospective study (Jan 2016-Dec 2018) included 34 cases of lung lesions with strong probable radiological diagnosis of lung neoplasm. Computed tomography (CT)-guided FNAC was performed and cytological smears were stained with May-Grunwald-Gimesa (MGG) stain and conventional Papanicolaou (Pap) stain.
Result: A total of 34 cases of lung masses in our study, included 21 males (61.7%) and 13 females (38.2%). The age interval varied from 15 to 85 years; majority presenting in 6th and 7th decade of age. Smears were broadly categorized into unsatisfactory (n=2;5.88%), benign (n=3;8.82%), suspicious of malignancy (n=2;5.88%) and malignant lesions (n=27;79.41%). Benign category included 2 cases of tuberculosis and 1 case of abscess. Malignant category included the cases, diagnosed as squamous cell carcinoma(n=8); poorly differentiated carcinoma (n=6); small cell carcinoma (n=3); adenoma carcinoma (n=2); primitive neuroectodermal tumor (n=2); non-Hodgkins lymphoma (n=2) and plasmacytoma (n=1). Malignant category also included one case each of Metastatic Adenocarcinoma, adenoid cystic carcinoma, renal cell carcinoma with known primary site of Tumours.
Conclusions: CT-guided FNAC is a less expensive, simple, fast, relatively safe and accurate procedure in the diagnosis of difficult lung lesions; the major limitation being the adequacy of the aspirate.

Keywords: CT, FNAC, Malignant category

INTRODUCTION

Percutaneous FNAC is a rapidly emerging diagnostic tool to assess the nature of radiologically demonstrated lung mass lesions.[1-3]

Even though FNAC has proven its role in the diagnosis of infections and other diffuse benign diseases, is now widely accepted in the diagnoses of localized lung lesions suspicious of being malignant, particularly when less invasive investigations prove to be negative.[4]

Malignant lung lesion is usually suspected on the basis of abnormal radiographic findings, often in conjunction with the symptoms produced by either local/ systemic effects of tumor. Early initiation of specific therapy is possible as FNAC helps to differentiate between benign and malignant.

FNAC with CT-guidance has accuracy of 76-96% for the detection of malignancy of lung nodule.[5-8] In this context, we performed a study to evaluate the usefulness of CT-guided FNAC in the diagnosis of lung mass lesions.

Aims and objectives

The aim and objectives of the study was to evaluate the usefulness of CT-guided FNAC in diagnosis of mass lesions of lung both neoplastic and non-neoplastic.

METHODS

A retrospective study was undertaken involving 34 patients who underwent CT-guided transthoracic FNAC from lung mass lesion at P. G. Department of pathology, GMC, Jammu between 1 January 2016-31 December 2018. All patients presented with respiratory symptoms with a localised lung lesion clinically, which was confirmed radiologically with strong clinical suspicion of lung neoplasm.

Patients having a history of bleeding disorder, severe COPD, pulmonary arterial hypertension, AV malformation, uncontrolled coughing, uncooperative patient, suspected echinococcal cysts, were excluded from the study. Cytological smears were stained with MGG stain and PAP stain.

Smears were broadly categorized into unsatisfactory, benign, suspicious of malignancy and malignant lesions depending upon cytomorphological features.

Sampling technique used in this study was that all patients who underwent CT-guided transthoracic FNAC from lung mass lesion during mentioned period and fulfilling above-mentioned criteria included in study.

It was a retrospective study ethical approval not required.

RESULTS

A total of 34 cases of lung mass lesions were included in the present study, of which 21 were males (61.7%) and rest 13 were females (38.3%). The age of the patients range from 15-85 years with mean age of 56.7 years but the mean age in case of malignant lesions was 61.4 years.

Cyotological diagnoses were broadly classified into 4 major categories (Table 1) unsatisfactory (5.88%), benign (8.82%), suspicious of malignancy (5.88%) and malignant (79.4%).

Among the benign lesions, tuberculosis (5.88%) was the most common, followed by abscess (2.94%). In present study, malignant cases predominated, out of which squamous cell carcinoma (23.5%) was the most common followed by undifferentiated carcinoma (17.5%). Small cell carcinoma (8.82%), adenocarcinoma (5.88%). Primitive neuroendocrine tumor (5.88%), non-Hodgkins lymphoma (5.88%) and plasmocytoma (2.94%).

We found one each case of metastatic adenocarcinoma, adenoid cystic carcinoma and renal cell carcinoma with known primary site of tumor (Table 2).

Table 1: Diagnosis categories of lung mass lesions.

Cytological categories	No. of cases	Percentage (%)
Unsatisfactory	2	5.88
Benign	3	8.82
Suspicious for malignancy	2	5.88
Malignant	27	79.4
Total	34	100

Table 2: Cytological diagnosis of benign and malignant lung mass lesions.

Cytological diagnosis	No. of cases	Percentage (%)
Benign, (n=3)		
Tuberculosis	2	5.88
Abscess	1	2.94
Malignant, (n=27)		
Squamous cell carcinoma	8	23.5
Undifferentiated carcinoma	6	17.6
Small cell carcinoma	3	8.82
Adenocarcinoma	2	5.88
Primitive neuroendocrine tumor	2	5.88
Non-Hodgkins lymphoma	2	5.88
Plasmacytoma	1	2.94
Metastatic adenocarcinoma	1	2.94
Metastatic adenoid cystic carcinoma	1	2.94
Metastatic renal cell carcinoma	1	2.94%

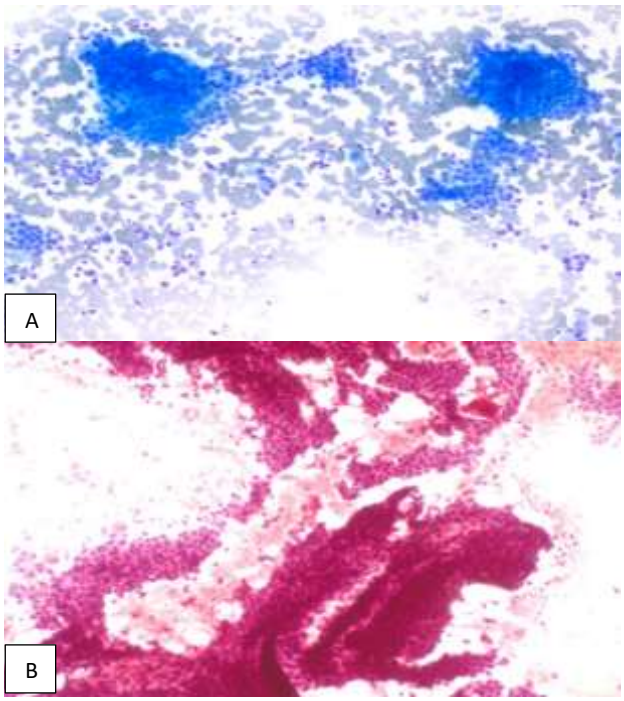

Figure 1 (A and B): MGG x 200 and pap x 200; cytological features of moderately differentiated adenocarcinoma.

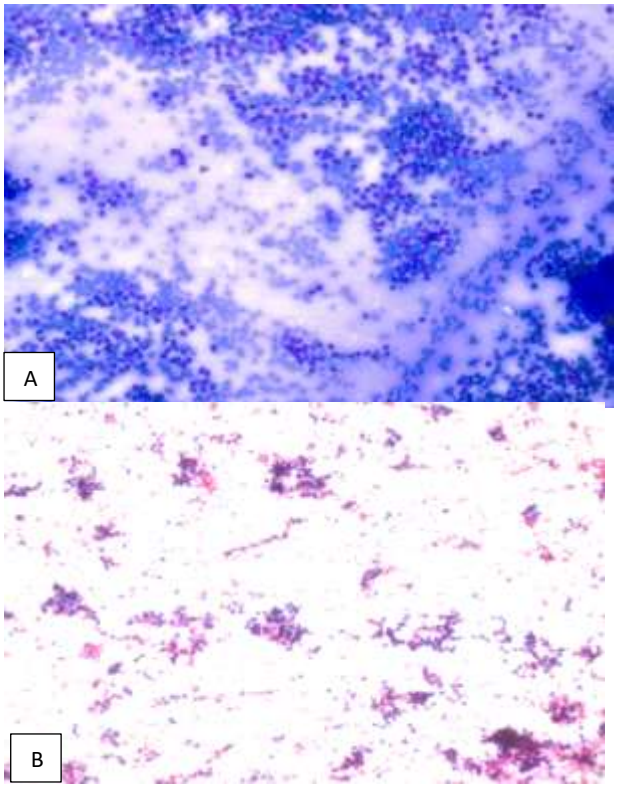

Figure 2 (A and B): MGG x 200 and pap x 100; cytological features of malignant round cell tumors (PNET).

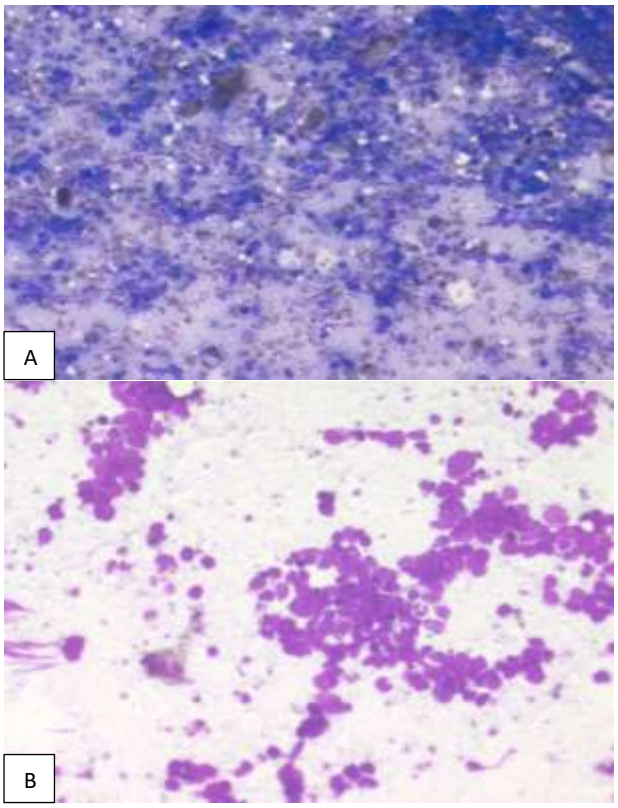

Figure 3 (A and B): MGG x 200; cytological features of high grade non-Hodgkins lymphoma.

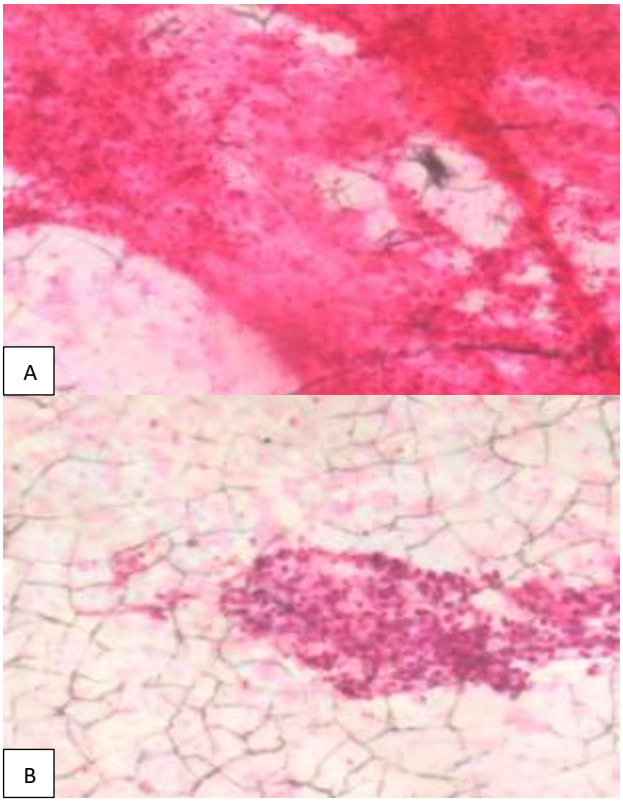

Figure 4 (A and B): Pap x 200; cytological features of squamous cell carcinoma.

DISCUSSION

Cytopathologic techniques have provided us valuable diagnostic information from specimens of lung lesions obtained through less invasive procedures including expectorated sputum, bronchoalveolar lavage, brushings, washings and aspiration procedures.[9] FNA is usually applied to localized lesions however, it can be used for definitive diagnosis of some benign neoplasms and infections such as tuberculosis.[10-12] CT is most popular among different imaging modalities such as fluoroscopy, ultrasonography.[1,11,13-17] FNA proves to be of greatest benefit to patients for whom it spares a more invasive surgical procedures. Surgical intervention, in fact can be avoided in up to 50% of patients with clinically suspected lung cancers.[18] More than 95% of lung tumors diagnosed by FNA can be divided into small cell carcinoma and non-small cell carcinoma, which is most important regarding the treatment of primary lung cancer.[19]

In the present study, there was a male predominance with a M:F ratio of 3:1.8. Among the FNA proven cases of malignancy, this difference was even more evident with a M:F ratio of 3:1 as, their is higher incidence of predisposing factors like smoking, chronic obstructive pulmonary disease and alcoholism in male.[20]

Literature revels that non-small cell carcinomas constitute 70% of diagnosed primary lung cancers and small cell

carcinomas was found to comprise around 20%.[21] In this series same pattern was observed.

Gangopadhyay et al observed adenocarcinoma being the most common malignant tumor in their study group.[22] In our study most common malignant tumor was squamous cell carcinoma. This difference was probably due to increased incidence of smoking in this area. A survey conducted by the international institute of pollution science and the ministry of health and family welfare revels that 26.6% of people in J and K, the highest rate in the country.[23]

Mukherjee et al performed their study on solitary pulmonary nodules and found most of patients of malignant lesions were males and fall in the age group of 40-70 years.[24] These findings are compatible with our study.

Fassina et al evaluated the role and accuracy of rapid onsite evaluation (ROSE) of CT guided FNAC of lung nodules.[25] They concluded FNA with ROSE as a safe and useful tool in the diagnosis of lung cancer patients.

The major limitation being the adequacy of the aspirate.

CONCLUSION

CT guided FNAC is a simple, safe, minimally invasive and reliable procedure with good diagnostic accuracy for the diagnosis and categorization of lung mass lesions.

FNAC should be used earlier and more frequently to shorten the diagnostic interval and allow more prompt therapy for persistent lung lesions.

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Ethical approval: The study was approved by the Institutional Ethics Committee

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