ORIGINAL ARTICLE

Computed Tomography Guided Fine Needle Aspiration of Lung Lesions Suspected to be Bronchogenic Carcinoma: Experience of a Tertiary Care Hospital

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Abstract

CT guided FNAC is a simple and safe procedure of diagnostic value in patients with lung lesions suspected to have lung malignancy. We undertook a study on 41 patients and were able to diagnose/ rule out malignancy in 85.37% of these patients, while in 14.63 % of patients the smears were non diagnostic. Once malignancy was diagnosed in these patients, then the next most important step was to categorize the lesions. 44% of patients had squamous cell carcinoma, 12.12 % had adenocarcinoma, 9.75% had small cell carcinoma, 7.31 % had poorly differentiated carcinoma, 4.87% each had metastasis & tuberculosis and 2.43% had aspergillosis. Squamous cell carcinoma was the commonest subtype in our study, which is contrary to changing trends in incidence of lung carcinoma where adenocarcinoma has replaced squamous cell carcinoma as the commonest lung malignancy. Three of our patients had minor complication in the form of mild pneumothorax, and it resolved in all patients within 24 hours.

Keywords

CT, FNAC, Cytology, Adenocarcinoma Lung, Squamous Cell Carcinoma Lung, Small Cell Carcinoma Lung

Introduction

A vast majority of morbidity and mortality worldwide is accounted for by pulmonary diseases, which range from infections to neoplasia (1). In order to treat these patients, an accurate diagnosis is required. In developed countries lung cancer remains the leading cause of death, while tuberculosis is commonest cause of death in developing countries (2). Radiological studies often help in diagnosing lung masses and cancer is often suspected on these studies (3). The size and location of lesion are usual criteria to decide about the approach to acquire sample for cytological or histopathological examination (4). The most commonly used method worldwide is computed tomography (CT)-guided fine needle aspiration cytology (FNAC) of the lung masses. Confirmation of the clinical/ radiological diagnosis is often done on FNAC. In addition the tumour type is also diagnosed on cytology (4). CT guided FNAC has very high accuracy and sensitivity for detection of malignancy (5). We performed this study to see the usefulness and spectrum of lung masses diagnosed on CT guided FNAC.

Materials & Methods

The present study was carried out in Department of Pathology in association with Department of Radio diagnosis after IEC clearance on 41 patients who underwent CT guided FNAC of lung masses in last three years in the Department of Radio diagnosis of Government Medical College, Jammu. All the patients had strong clinician suspicion of malignancy and

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underwent FNAC were diagnosed as peripheral lung masses The study group comprised of 41 patients who underwent CT guided FNAC of lung mass after getting informed consent.

Lesions were labelled as peripheral depending on whether lesions were surrounded by normal parenchyma without any evidence of endobronchial abnormalities (6). The exclusion criteria for patients included uncooperative patients, patients unable to hold breath, patients with pulmonary hypertension, arteriovenous malformation, bleeding disorders, severe obstructive pulmonary disease, uncontrollable coughing, suspected hydatid cyst and contralateral pneumonectomy. Detailed history and clinical examination was done before performing the FNAC. A pre procedure axial CT scan of chest was performed to localise the lesion accurately and to decide the best approach to do FNAC depending on the shortest distance from the lesion to the visceral surface of the lungs, except where there was presence of overlying skeletal structures or large pulmonary vessels (*Fig 1, 2*). FNAC was performed in the presence of a pathologist, radiologist and/ or sometimes also a clinician, after the risks and benefits had been explained to the patients. The procedure was done by using 22-gauge disposable lumbar puncture needle with needle length of approx. 90mm. The needle was introduced during the suspended respiration directing the tip of needle towards the lesion. Repeat slice of area of interest was taken to check the exact position of the tip. 20 ml disposable

syringe was used for aspiration using to & fro and rotating movements of the needle within the lesion. Multiple slides were made after smearing the aspirate on slides. Half of the slides were fixed with 95% ethyl alcohol and stained with Papanicolaou (pap) stain, while rest of the air dried smears were stained with May-Grunwald Stain (MGG) stain. A post procedure CT scan was also done in all patients to rule out pneumothorax. The cytological reports were categorised as unsatisfactory, benign, suspicious (of malignancy) and malignant. Those smears which were properly prepared and stained were considered satisfactory. The diagnosis suspicious of malignancy was considered after the failure to reveal any morphologic features that reliably distinguish benign from malignant specimens.

Results

A total of 41 patients were included in this study. Out of these, 82.93 % of patients were male and 17.07 % were females. Maximum percentage i.e. 80.43% of the patients were in the age group of 61-80 followed by 41-60 age group, which had 14.63% patients (*Table No.1*). Maximum percentage (56.09%) of the lesions were in left lung (*Table No.2*) (1). In 85.37 % of the patients, we were successful in making a cytological diagnosis on smear, while in 14.63 % of patients, the smears were non diagnostic. Squamous cell carcinoma was the most common diagnosis and was found in approx. 44 % of patients (*Table no.3*) (*Fig. 3*). Adenocarcinoma was present in 12.12 % of patients, small cell carcinoma in

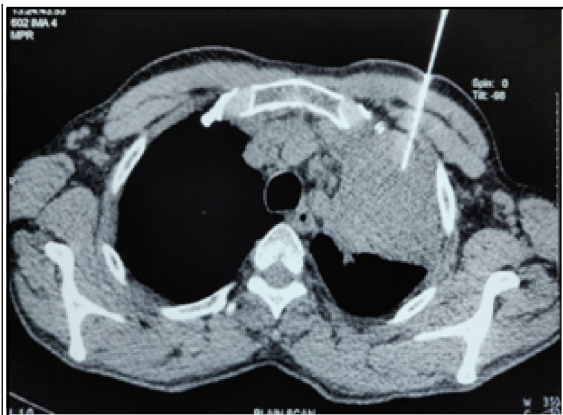*Fig.1 CT guided FNAC of Left sided Lung lesion in Supine position*

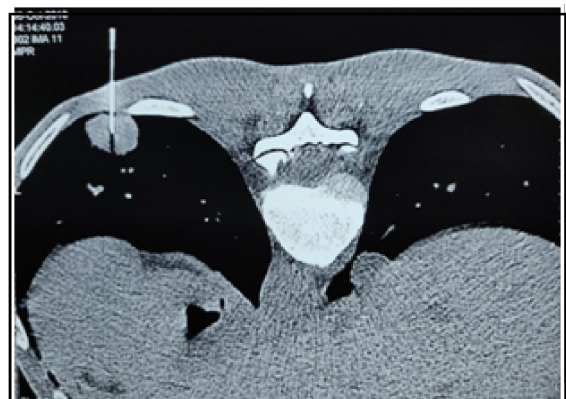*Fig 2.CT guided FNAC of another Left sided Lung lesion in Prone position.*

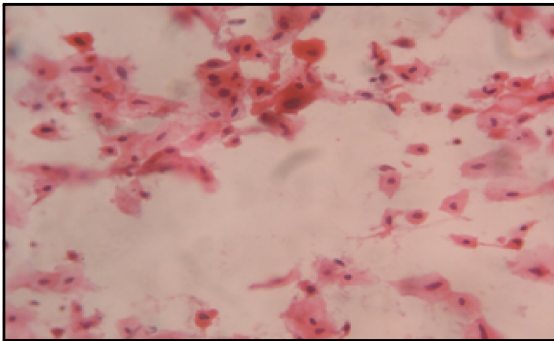*Fig. 3 . FNA smear depicting Squamous cell carcinoma Lung (Papanicolaou stain)*

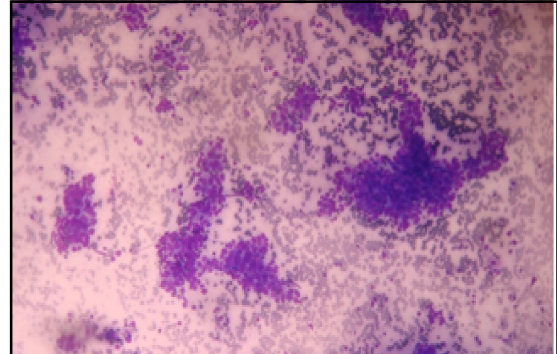*Fig. 4 . FNA smear depicting Adenocarcinoma Lung (MGG stain)*

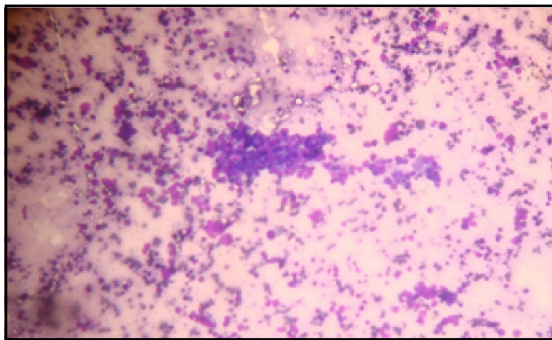*Fig. 5. FNA smear depicting Samall cell carcinoma Lung (MGG stain))*

Fig.6. FNA smear depicting Tuberculosis Lung (Papanicolaou stain)
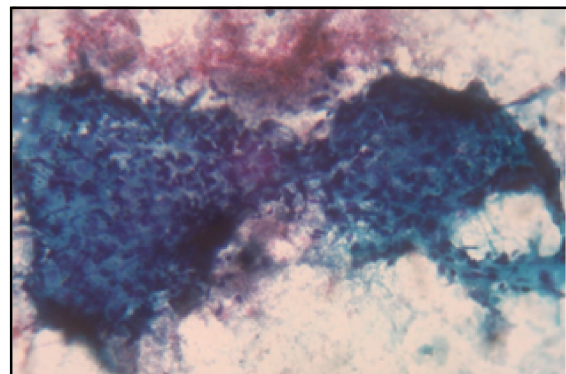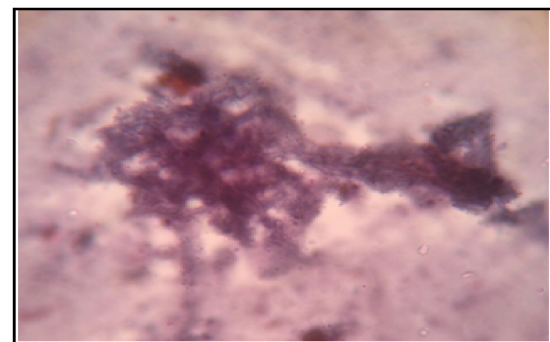

Fig. 7. FNA smear depicting Aspergillosis Lung (Papanicolaou stain)

9.75% of patients and poorly differentiated carcinoma in 7.31 % of patients (*Fig.4&5*). Metastasis and tuberculosis was found in 4.87% patients each, while aspergillosis was present in 2.43 % of patients. Non diagnostic cytology was reported in 14.63% of patients and biopsy was advised in these patients (*Table No.3*). Out of 2 patients of metastasis, one eventually was diagnosed with colonic carcinoma and the other was diagnosed as RCC. Among the 18 patients diagnosed with squamous cell carcinoma, 10 patients had well differentiated squamous cell carcinoma, 5 patients had moderately differentiated squamous cell carcinomas and 3 patients had poorly differentiated squamous cell carcinoma. Two patients who turned out to be tuberculosis, had a past history of ATT intake 5 and 10 years back respectively (*Fig 6*). The patient who had aspergillosis also had history of ATT intake 18 years back (*Fig. 7*). The percentage of patients with malignancy was 78.04 % in our study and 32 patients out of 41 patients

had malignancy. Only 3 cases in our study developed minor complication in the form of mild pneumothorax, which was diagnosed on check CT scan done after the procedure. The follow-up chest X-ray done after 24 hours was normal in these patients and they were discharged. None of the patients had haemoptysis or another complication.

Discussion

The primary aim of conducting a CT guided FNAC in a patient of lung mass is to diagnose and rule out malignancy. Once malignancy is diagnosed, then the next

Table No.1 Age Wise Distribution

Age	No. of cases	Percentage
0-20	0	0
21-40	1	2.43
41-60	6	14.63
61-80	33	80.48
81-100	1	2.43

Table No.2 Sex Wise Distribution

	No of cases	Percentage
Male	34	82.92
Female	7	17.07

Table No.3 Side of Lung Involvement

	No of cases	Percentage
Right Lung	18	43.90
Left Lung	23	56.09

Table No.4 Cytological Diagnosis

Cytological Diagnosis	No. of cases (N=41)	Sex		Laterality	
		Male	Female	Right	Left
Squamous cell carcinoma	18 (43.92)	13	5	7	11
Adenocarcinoma	5 (12.19)	5	0	2	3
Small cell carcinoma	4 (9.75)	4	0	2	2
Poorly Differentiated Carcinoma	3 (7.31)	2	1	1	2
Metastasis	2 (4.87)	2	0	1	1
Tuberculosis	2 (4.87)	2	0	1	1
Aspergillosis	1 (2.43)	1	0	1	0
Non Diagnostic	6 (14.63)	5	1	3	3

most important step is to categorize lesion as small cell carcinoma or non-small cell carcinoma. This categorization is important for the management of the lung cancer and it is possible to do so in most cases.In the present study, the age group of the patients ranged from 40 years to 82 years. We did not have patients in younger age group unlike other studies by Ghildiyal et al, Ahmad et al and Pavani et al, which had patients ranging from second decade of life to ninth decade of life (1, 7, 8). All our patients with malignant disease were more than 40 years old and majority of our patients were males, as seen in other studies (7,8,9,10,11). After examining the PAP stained and MGG-stained smears, we had categorized them into malignancy, benign & non diagnostic unlike the broad categorization into five groups by Ghildiyal *et al* (1). We categorised the malignant lesions into squamous cell carcinoma, adenocarcinoma, small cell carcinoma, poorly differentiated carcinoma and metastasis (*Fig 3,4 &5*). We also further sub classified

the squamous cell carcinoma into well differentiated squamous cell carcinoma, moderately differentiated squamous cell carcinoma and poorly differentiated squamous cell carcinoma. Although the percentage of patients with tuberculosis was only 4.87%, tuberculosis remained the commonest benign pathology diagnosed in our study. A higher percentage (14.63%) of patients were reported to be non-diagnostic in our study. This may be due to lack of viable aspirate in the smear due to haemorrhage or necrosis. The percentage of malignant cases in our study was significantly higher (78.04%) than all other available studies for comparison (1). The reason for higher percentage of patients with malignancy in our study was primarily because the patients who underwent the procedure were clinically or radiologically suspected to be malignant.

Adenocarcinoma has replaced squamous cell carcinoma as the commonest lung malignancy in changing trends in incidence of lung cancer in many studies worldwide (11).

In our study, squamous cell carcinoma remained to be the most common lung malignancy (*Fig .3*). This is likely due to a very high percentage (82.92%) of male patients in our study along with history of smoking in very high percentage of these patients (90%). Although studies by Razia *et al,* Ahmad *et al* and Chandra *et al* reported squamous cell carcinoma to be the commonest lung malignancy (2, 7 & 12), some other studies showed equal or comparable percentages of adenocarcinoma and squamous cell carcinoma patients (1). Pneumothorax is the commonest complication of CT guided FNAC of lung masses with variable rate of development in various studies (13, 14, 15, 16, 17, 18). The extremely low rate of this complications in our study can be explained from the fact that experienced radiologists performed these CT guided procedures and most of the lesions in these cases were large in size and peripheral in location.

Conclusion

CT guided FNAC remains a safe and simple procedure of immense diagnostic and management value in patients suspected to have lung malignancy. Clinicoradiological correlation with cytological findings should be done in all cases. The classification of non-small cell carcinoma in to squamous cell carcinomas and adenocarcinoma also helps in choosing the targeted therapy for such carcinomas.

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