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Original Research Article

COMPARATIVE EVALUATION OF LUNG CANCER BY CT GUIDED FINE NEEDLE ASPIRATION CYTOLOGY AND TRUCUT BIOPSY

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ABSTRACT

Background: Lung carcinoma is the most common type of malignancy all around the globe, especially in males. Lung cancer is the most common cause of cancer-related deaths, and the average five-year survival rate of lung cancer is near about 17%. **Material & Methods:** The present cross-sectional observational study was conducted over a period of one year with a sample size of 54 was calculated at a 95% confidence interval. All the patients, who had suspected mass lesion finding on chest X-ray and clinical correlation suggestive of lung carcinoma were undergone for CT guided FNAC and Biopsy. **Results:** CT guided FNAC examination revealed that 39 study participants were positive for malignancy (72.22%), among 10 study participants results were suggestive for malignancy (18.52%) and among 5 study participants results were negative for malignancy (9.25%). Biopsy results were positive for malignancy among all study participants. Results showed that small cell carcinoma was positive among 4 (7.41%) study participants while non-small cell lung carcinoma was positive among 49 (90.74%) study participants. The sensitivity of CT guided FNAC and Biopsy in the evaluation of lung cancer was found 90.74% and 100% respectively. The specificity of CT guided FNAC was 100% for the diagnosis of lung carcinoma. **Conclusion:** CT guided lung FNAC is a safe, accurate and highly specific and also well-tolerated procedure which confirms the diagnosis of Lung cancer. Though the specificity of FNAC is high for diagnosing Lung carcinoma, still Biopsy had high sensitivity and would be preferable diagnosis Lung cancer and its various subtypes.

Keywords: Lung cancer, CT guided FNAC,

INTRODUCTION

Lung carcinoma is the most common type of malignancy all around the globe, especially in males. Lung cancer is the most common cause of cancer-related deaths, and the average five-year survival rate of lung cancer is near about 17% **(1)**. Lung carcinoma is usually diagnosed or suspected based on abnormal radiographic findings, often in correlation with symptoms which were due to either local or systemic effects of the malignancy itself. The diagnostic procedure used for the diagnosis of suspected lung carcinoma is depended upon the location and the size of the primary tumor in the lung and the presence of possible metastatic spread and the choice of the treatment plan **(2)**.

Among the various diagnostic modalities, implementation of computed tomography (CT) guided fine needle aspiration cytology (FNAC) for the suspected lung tumor is an accepted globally and good diagnostic method proven by various researches **(3)**. Lung carcinoma which is inoperable and leads to local tumor symptoms and with complications which affect the patient's general condition, CT guided FNAC reveals the tumor type and confirms the diagnosis. CT guided FNAC is quite helpful in cases where bronchoscopy results and sputum cytological results are not significantly diagnostic, and there is a decision to make about treatment options. CT guided FNAC also diagnostic in the cases where there is indeterminate solitary pulmonary nodule without the

clear-cut radiological signs of benignity or malignancy **(4)**.

CT guided FNAC and Biopsy, both are simple methods of diagnosis of lung carcinoma among the majority of patients and mainly if the lesions are peripherally situated **(5)**. FNAC was first used as diagnostic modality by Martin and Ellis. CT guided FNAC is a very useful diagnostic tool in diagnostic sub differentiation of bronchogenic carcinoma and other types and subtypes of lung carcinomas which can be confidently identified with cytopathological characterization with clinical correlation **(6)**. The present study aimed to comparatively evaluate the CT guided FNAC and trucut biopsy in the diagnosis of lung carcinoma.

MATERIALS & METHODS

The present cross-sectional observational study was conducted at the department of pathology and radiology of our tertiary care hospital. The study duration was of one year from August 2017 to July 2018. A sample size of 54 was calculated at 95% confidence interval at 10% acceptable margin of error by epi info software version 7.2. All the patients, who had suspected mass lesion finding on chest X-ray and clinical correlation suggestive of lung carcinoma were included in the study. Clearance from Institutional Ethics Committee was taken before the start of the study. Written informed consent was taken from each study participant. Clinical examination and detailed history were recorded, and routine blood investigations were done, also including BT, CT, and INR. Patients with bleeding diathesis, severe emphysema, suspected hydatid cyst, and uncontrolled cough were excluded from the study.

After explaining the procedure and all risks and benefits, all participants were scheduled for CT guided FNAC and trucut Biopsy. For FNAC 22 gauze spinal needle was used, and Biopsy of the mass lesion was conducted by using BARD Biopsy gun **(7)**. Collected materials and samples were subjected to cytopathological examination and classified into 3 groups, Positive for malignancy (PFM) when there was cytology reported malignant cells, Suggestive for malignancy (SFM) when cytology there was cytology reported atypical cells with no definite evidence of malignancy and Negative for malignancy (NFM) when the cytolo-pathological reports did not reveal malignancy or presence of any atypical cells. Data were categorized and entered in the MS Excel 2010 spreadsheet and Epi Info software v7. Data analysis was done using SPSS v22. Qualitative data were expressed as the percentage (%), and Pearson's chi-square test was used to find out statistical differences between the study groups and sensitivity, specificity (sp), positive predictive value (ppv) and negative predictive value (npv) were obtained. If the expected cell count was < 5 in more than 20% of the cells, then Fisher's exact test was used. All tests were done at alpha (level significance) of 5%; means a significant association present if the p-value was less than 0.05.

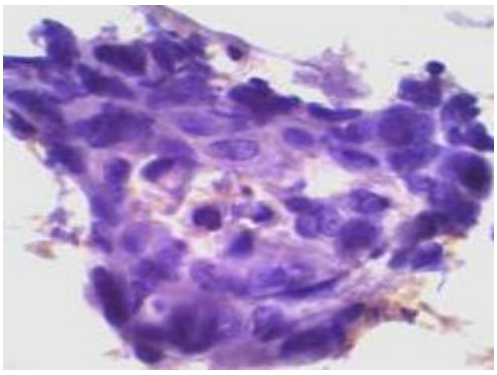
RESULTS

In the present study, a total of 54 study participants were enrolled. Out of them 44 (81.48%) patients were male, and 10 (18.52%) patients were female, and the male to female sex ratio was 4.4: 1. Age of study participants was raged from 31- 74 years of age with the mean age of 58±8.2 years. Lesions were predominately on the right side and present among 33 (61.11%) patients, and bilateral lesions were present among 4 (7.4%) patients. Out of the total 54 study participants, 44 participants were a smoker, and 10 participants were a non-smoker. Among nonsmoking study participants, 6 participants had Squamous cell carcinoma, 3 study participants had Adenocarcinoma, and 1 study participants had metastasis from Breast Carcinoma. Study findings reported that CT guided FNAC was positive in 49 study participants. Biopsy results were found to be positive for malignancy among all study participants. Results of CT guided FNAC examination revealed that 39 study participants were positive for malignancy (72.22%), among 10 study participants results were suggestive for malignancy (18.52%) and among 5 study participants results were negative for malignancy (9.25%). (Table 1)

Table 1: Distribution and the cytological evaluation result of CT guided FNAC.

cytological evaluation		**Results**
Positive for malignancy (PFM)	Squamous cell carcinoma	24
	Adenocarcinoma	11
	Small cell carcinoma	2
	Large cell carcinoma	1
	Metastasis	1
	Total	**39 (72.22%)**
Suggestive for malignancy (SFM)		10 (18.52%)
Negative for Malignancy (NFM)		5 (9.25%)

Fig 1: Showing FNAC results of squamous cell carcinoma of the lung.



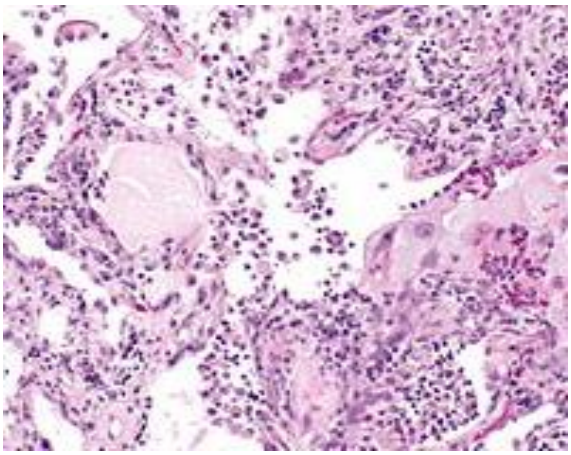
Biopsy results were positive for malignancy among all study participants. Results showed that small cell carcinoma was positive among 4 (7.41%) study participants while non-small cell lung carcinoma was positive among 49 (90.74%) study participants. Cyto-histopathological non-demarcated findings were found among 3 study participants. Among these three patients, results of CT guided FNAC reported that squamous cell carcinoma in all three patients but on the biopsy two patients had adenocarcinoma and one patient had small cell carcinoma. (Table 2)

The sensitivity of CT guided FNAC and Biopsy in the evaluation of lung cancer was found 90.74% and 100% respectively. The specificity of CT guided FNAC was 100% for the diagnosis of lung carcinoma. Chi-square value was found to be 11.41 at 95% confidence level with a significant p-value ($p<0.05$). Hence, there was significant association present between CT guided FNAC and Biopsy and positive lung carcinoma finding.

Table 2: Distribution and cytological evaluation of the results of CT guided lung biopsy

cytological evaluation		Results
Non-small cell lung carcinoma	Squamous cell carcinoma	32
	Adenocarcinoma	15
	Large cell carcinoma	2
	Total	**49 (90.74%)**
Small cell lung carcinoma		4 (7.41%)
Metastasis		1 (1.85%)

Fig 3: Showing Squamous cell carcinoma of the lung. H&E stain.



DISCUSSION

In the present study, the sensitivity of CT guided FNAC and Biopsy in the evaluation of lung cancer was found 90.74% and 100% respectively. Chi-square value was found to be 11.41 at 95% confidence level with a significant p-value ($p<0.05$). Hence, there was significant association present between biopsy and positive lung carcinoma finding. A study conducted by Yadav R et al. among patients with intrathoracic masses and found that Diagnostic accuracy of CT-guided FNAC was ranged from 85.7% to 93.33% for small to large lesions. They reported that CT-guided FNAC is an accurate and safe diagnostic procedure for intrathoracic mass lesions **(8)**. A similar study conducted by Gangopadhyay M et al. among patients of mass lesions of lung reported that CT-guided FNAC had the sensitivity of 96% and specificity of 100% for the diagnosis of lung carcinoma **(9)**. Garg L et al. did a study in which patients of intrathoracic mass lesions found that the sensitivity and specificity of CT-guided FNAC for a diagnosis of lung malignancy was 92.6 & 100% respectively which was nearly similar to results of the present study **(10)**.

In the present study, a total of 54 study participants were enrolled. Out of them 44 (81.48%) patients were male, and 10 (18.52%) patients were female, and the male to female sex ratio was 4.4: 1. Age of study participants was raged from 31- 74 years of age with the mean age of 58±8.2 years. Lesions were predominately on the right side and present among 33 (61.11%) patients, and bilateral lesions were present among 4 (7.4%) patients. Out of the total 54 study participants, 44 participants were a smoker, and 10 participants were a non-smoker. Among nonsmoking study participants, 6 participants had Squamous cell carcinoma, 3 study participants had Adenocarcinoma, and 1 study participants had metastasis from Breast Carcinoma. A study conducted by Roy S et al.

reported similar results compared to the present study that the mean age of their study participants was 58 years and the Male to female ratio was 4:1. Majority of the intrathoracic mass lesions were peripheral and right-sided **(11)**. Another similar study conducted by Kumar P et al. among patients of lung cancer reported that the total number of study participants were 489 patients, with a mean age group of 55 years, among the 256 patients (52%) who were non-smokers and 233 patients (48%) who were smokers. 135 study participants had used/using chewable tobacco products. The male to female sex ratio was 3.5:1 **(12)**.

In the present study, findings reported that CT guided FNAC was positive in 49 study participants. Biopsy results were found to be positive for malignancy among all study participants. Results of CT guided FNAC examination revealed that 39 study participants were positive for malignancy (72.22%), among 10 study participants results were suggestive for malignancy (18.52%) and among 5 study participants results were negative for malignancy (9.25%). A study conducted by Shetty S et al. among patients of lung carcinoma reported in their study that Squamous cell carcinoma (SCC) was the most common cytological subtype of lung cancer which was followed by adenocarcinoma and small cell carcinoma. They reported a higher male to female ratio with smoking being the most predominant associated risk factor **(13)**.

In the present study, biopsy results were positive for malignancy among all study participants. Results showed that small cell carcinoma was positive among 4 (7.41%) study participants while non-small cell lung carcinoma was positive among 49 (90.74%) study participants. Cyto-histopathological non-demarcated findings were found among 3 study participants. Among these three patients, results of CT guided FNAC reported that squamous cell carcinoma in all three patients but on the biopsy two patients had adenocarcinoma and one patient had small cell carcinoma. A study conducted by Beslic S et al. among patients of lung carcinoma reported in their study that CT guided biopsies of lung mas lesions were an accurate and safe diagnostic procedure in the detection of lung cancer with an accuracy of 96.8% **(14)**.

CONCLUSION

We concluded from the present study that CT guided lung FNAC is a safe, accurate and highly specific and also well-tolerated procedure which confirms the diagnosis of Lung cancer. Though the specificity of FNAC is high for diagnosing Lung carcinoma, still Biopsy had high sensitivity and would be preferable diagnosis Lung cancer and its various subtypes.

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