

## Research Article

# Comparative study of computed tomography guided fine needle aspiration cytology and trucut biopsy in diagnosis of lung cancer: a report of 81 cases

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## ABSTRACT

**Background:** Lung cancer is the major cause of cancer related deaths all over the world. CT guided FNAC and/or Biopsy of lung mass is an effective modality to diagnose lung cancer, especially in peripherally situated lesions. This study was planned to compare the role of CT guided lung FNAC and Biopsy in diagnosis of Lung cancer.

**Methods:** This is a cross sectional study, done in department of respiratory medicine of a tertiary care teaching hospital of Rajasthan over a period one year. All the patients with suspected mass lesion on chest X-ray and clinical symptoms suggestive of lung cancer were included in the study. CT guided FNAC and biopsy were done in each patient after explaining the risks.

**Results:** CT guided procedures were done in 81 patients of suspected lung cancer. CT guided FNAC yielded positive results in 75 patients while it was negative in 6 patients. CT guided lung biopsy was positive in all patients. Squamous cell carcinoma was most common type encountered malignancy.

**Conclusions:** CT guided lung FNAC and Biopsy is a simple and safe method with high diagnostic accuracy for diagnosis of Lung cancer.

**Keywords:** Lung cancer, CT guided FNAC, Biopsy, Squamous cell carcinoma

## INTRODUCTION

Lung cancer is the most commonly diagnosed malignancy across the globe, especially in males. It is the leading cause of cancer related deaths with an average 5 year survival rate of 16.8%.<sup>1</sup> CT guided fine needle aspiration cytology (FNAC) and Biopsy are simple methods to diagnose lung cancer in a vast majority of patients, especially in peripherally situated lesions. FNAC was first used by Martin and Ellis as a diagnostic tool.<sup>2</sup> FNAC can sub classify the type of bronchogenic carcinoma and the vast majority of lung malignancies can be confidently diagnosed with cyto-morphological characterization in right clinical context.<sup>3</sup> The purpose of our study was to evaluate the diagnostic utility of CT

guided FNAC and to compare it with biopsy in diagnosis of lung cancer.

## METHODS

This is a cross sectional study, done in department of respiratory medicine, Geetanjali Medical College and Hospital, Udaipur, Rajasthan over a period of 12 months from august 2014 to July 2015. Study was approved by Institutional ethical committee. All the patients with suspected mass lesion on chest X-ray and clinical symptoms suggestive of lung cancer were included in the study. Written consent was taken from each patient. Clinical history was taken in detail and routine blood investigations were sent, including BT, CT and INR.

Patients with severe emphysema, bleeding diathesis, uncontrolled cough and suspected hydatid cyst were excluded from study. CT guided FNAC and Biopsy were done in each patient after explaining the risks. 22 gauge spinal needle was used for aspiration. Biopsy of the lesion was done using BARD Biopsy gun. Aspirated materials were subjected to cytological examination and reported into 3 groups, as:<sup>4</sup>

Positive for malignancy (PFM) when cytology showed diagnostically malignant cells

Suggestive for malignancy (SFM) when cytology showed atypical cells with no definite evidence of malignancy

Negative for malignancy (NFM) when cytology did not reveal malignant or atypical cells.

**RESULTS**

A total of 81 patients were included in study. 68 (83.95%) cases were Male and 13 (16.04%) cases were female with male to female ratio of 4.25: 1. Lesions were right sided in 45 patients (55.55%), left sided in 3 patients (41.97%) and bilateral in 2 patients (2.46%). Age ranged from 35-80 yrs with mean age of presentation was 60.98 yrs. 66 patients were smoker and 15 patients were nonsmoker. Among nonsmoking patients, 8 were having Squamous cell carcinoma, 6 were having Adenocarcinoma and 1 patient was having metastasis from Breast carcinoma

CT guided FNAC was positive in 75 patients. Biopsy was positive in all patients.

CT guided FNAC examination revealed 58 cases positive for malignancy (71.60%), 17 cases suggestive for malignancy (20.98%) and 6 cases negative for malignancy (7.40%). Specific subtype of lung cancer among 58 positive for malignancy (PFM) patients is shown in table 1.

**Table 1: Result of CT guided FNAC.**

|                                 |                    |
|---------------------------------|--------------------|
| <b>Positive for malignancy</b>  | <b>58 (71.60%)</b> |
| Squamous cell carcinoma         | 36                 |
| Adenocarcinoma                  | 17                 |
| Small cell carcinoma            | 2                  |
| Large cell carcinoma            | 2                  |
| Metastasis                      | 1                  |
| Suggestive for malignancy (SFM) | 17 (20.98%)        |
| Negative for Malignancy (NFM)   | 6 (7.40%)          |

CT guided biopsy was positive in all patients. Small cell carcinoma was seen in 5 patients while Non-small cell lung carcinoma was seen in 75 patients. Result is shown in table 2.

Cyto-histopathological discordance is seen in 3 patients. While FNAC showed squamous cell carcinoma in all 3 patients, biopsy yielded adenocarcinoma in 2 patients and small cell carcinoma in 1 patient. The sensitivity of FNAC and Biopsy in diagnosis of lung cancer was 92.59% and 100% respectively. Thus  $\chi^2$  value was found to be 6.23 at 95% confidence level ( $p < 0.05$ ). Thus there is significant association between biopsy and FNAC.

**Table 2: Results of CT guided lung biopsy.**

|   |                    |
|---|--------------------|
| <b>Non-small cell lung carcinoma</b>                                  | <b>75 (92.59%)</b> |
| Squamous cell carcinoma   | 50                 |
| Adenocarcinoma  | 23                 |
| Large cell carcinoma  | 2                  |
| Small cell lung carcinoma   | 5 (6.17%)          |
| Metastasis  | 1 (1.23%)          |
| One patient was having metastasis in both lungs from Breast carcinoma |                    |

Pain chest was the main complaint noted after the procedure, seen in 10 patients. Minimal pneumothorax was seen in 3 patients that were managed conservatively without need of Intercostal tube drainage.

**DISCUSSION**

Lung cancer is the major type of cancer diagnosed worldwide and it is the major cause of cancer mortality in males. The diagnosis of lung cancer depends upon examination of Fine needle aspirated sample and/or Biopsy sample taken from the lesion. Bronchoscopy is useful to obtain FNA/biopsy sample in centrally situated lesions while computed tomographic guided procedure is useful in peripherally located lesions.

CT guided FNAC is safe and has high sensitivity and specificity with a high diagnostic accuracy with few complications.<sup>5,6</sup> Diagnostic accuracy ranges from 64-97%.<sup>7,8</sup> In our study sensitivity of FNAC was found to be 92.59% which is comparable with the result reported by Li H et al (96%) and Jaya Shanker et al (>91%).<sup>8,9</sup>

A total of 81 patients were evaluated in our study. Majority of patients were male with male to female ratio of 4.25:1. Age ranged from 35-80 yrs. These data are similar with the study done by Das et al.<sup>10</sup> The earliest age of onset was 35 yrs in 3 patients, 2 males with squamous cell carcinoma and small cell carcinoma in each, and 1 female with Adenocarcinoma. Majority of patients had past or present history of smoking (81.48%). Mean age of presentation was 60.98 yrs which is similar to a study done by Noronha et al.<sup>11</sup> We found Non-small cell lung carcinoma, proven on CT guided biopsy, in 75 patients (92.59%) and small cell carcinoma in 6 patients. These findings are similar to the studies done by Shetty et al and Singh et al.<sup>12,13</sup>

CT guided FNAC yielded positive result in 75 patients. Out of these 75 patients, specific type of lung cancer was confirmed in 58 patients. In 17 patients, FNAC was positive for malignant cells but specific typing could not be done. Out of 58 patients, squamous cell carcinoma was seen in 36 patients, adenocarcinoma in 17, small cell and large cell carcinoma in 2 patients each. One patient was having Metastasis in both lungs due to Breast carcinoma. The sensitivity of FNAC for diagnosing malignancy was found to be 92.59% in our study. This finding is similar to the study done by Singh et al, Stanley et al and Basnet et al.<sup>7,13,14</sup>

CT guided biopsy was positive in all patients. Small cell carcinoma was seen in 5 (6.17%) patients while non-small cell lung carcinoma was seen in 75 (92.59%) patients. Among 75 NSCLC patients, Squamous cell carcinoma was seen in 50 (61.72%) patients, Adenocarcinoma in 23 (28.39%) and Large cell carcinoma in 2 (2.46%) patients. 1 patient was having metastasis from Breast carcinoma. These findings were similar to the findings of Basnet et al who found Squamous cell carcinoma in 50 % cases, 14 adenocarcinoma in 28% cases and large cell carcinoma in 2% patients. Reported sensitivity of CT guided trucut biopsy in our study was 100%. The reported sensitivity of CT guided lung biopsy ranges from 82 to 99%.<sup>15,16</sup>

Pain chest and minimal pneumothorax were among the few complications noted but all the patients were managed conservatively without any intervention. The chances of pneumothorax increase with increase in tumor distance from surface and with smaller sized lesions.

## CONCLUSION

CT guided lung FNAC is a safe and well tolerated procedure which confirms the diagnosis in most of the cases of Lung cancer. Though the sensitivity of FNAC is good for diagnosing Lung cancer, still Biopsy would be preferable because it has better sensitivity and specificity and it helps in differentiation of Lung cancer in various subtypes.

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