

Percutaneous CT guided true cut lung Biopsy: Efficacy in Histo Morphological Diagnosis and Complications, A Prospective Study

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Abstract: *CT guided percutaneous needle biopsy is an indispensable tool with high diagnostic accuracy in the detection of pulmonary malignancy. It plays a vital role in clinching the evidence of malignancy, grading, differentiating between primary and secondary, and planning for treatment. This article tries to establish the relative usefulness of CT guided lung biopsy in diagnosis of pulmonary malignancies that was later confirmed by use of immunohistochemistry. This prospective study was conducted in a private hospital over a period of one year. All the patients with suspected pulmonary mass lesion on chest X-ray and clinical symptoms suggestive of lung cancer were included in the study. CT guided true cut biopsy was done in each case after obtaining informed consent. Patients were observed for post operative complications. HP study as well as IHC study was done to categorise nodules. **Results:** All biopsies taken under CT guidance showed pictures of malignancy on IHC study. Primary adenocarcinoma was most common type encountered. **Conclusion:** CT guided biopsy is a simple and safe technique with high efficacy and less complications in diagnosis and differentiation of lung nodules.*

Keywords: Pulmonary malignancy, lung biopsy, immune histochemistry, computed tomography

1. Introduction

Primary lung cancer, a leading cause of death is most common in males with an average 5 year survival rate of 16.8 %.(1). CT guided percutaneous needle biopsy is a simple method in the evaluation of pulmonary nodules because of its high diagnostic accuracy. It plays a critical role in obtaining pathological proof of malignancy, differentiating not merely SCLC and NSCLC but whether the later is an adeno or squamous cell carcinoma by IHC study. Thus facilitating plan for clinical treatment and decision making for surgeons and medical onchologist.(2)

2. Material and Methods

This prospective study was conducted in a private hospital in Cuttack, Odisha , over a period of one year i.e from January 2016 to December 2017. All the patients with clinically suspected mass lesions in CECT thorax were included in this study. Written consent was taken from each patient, clinical history was taken, routine haematological investigations including PT, INR and APTT was done. CT abdomen and pelvis was done to exclude other primary malignancies. Details of their age, sex, site, size and depth of lesion were assessed from CT thorax. Before proceeding for biopsy all cases were discussed with the radiologist.

Techniques of biopsy –

1) Patient selection and pre procedural evaluation - Prior to performing a lung biopsy all patients had CT scan to exclude extra pulmonary disease which helps in excluding metastatic pulmonary nodules.

- 2) Relative contraindications to true cut lung biopsy include un-cooperative patients, positive pressure ventilation, severe interstitial lung disease, small lesions close to diaphragm and central lesions adjacent to large vessels or bronchi.
- 3) Patients positioning was based on location of the lesion, size of the lesion, Prone position was preferred. BARD automated biopsy gun with 18 gauge needle was used for obtaining specimen. After skin preparation 2% lignocaine was infiltrated at the site of puncture. Biopsy was done under CT guidance and sample was transferred immediately to formalin for fixation. Prior to this imprint smear was taken for quick cytological evaluation. Post biopsy patients were monitored for complications like pneumothorax , pulmonary haemorrhage and air embolism.(3,4,5,6,7,8)

Histo morphological evaluation of core biopsy specimen was done as per the algorithm given by WHO 2015 .Blue book. IHC study was done for further conformation (9,10,11).

3. Results

A total of 25 patients were included in this study out of which 17 cases were male, 8 cases were female (Table – 1). Most lesions were right sided comprising 17 cases and 6 case left side, 2 cases with bilateral involvement. Age ranged from 4-79 years with mean age 50 years. 5 patients were smokers and 20 were non- smokers. Initial histomorphology study showed 23 cases of non small cell lung carcinomas, 1 small cell lung carcinoma and 1 metastatic lesion (Table-2). On further study out of the 23 NSCLC 17 cases were adenocarcinoma, 2 case squamous

cell carcinoma, 3 poorly differentiated carcinoma, one neuroendocrine tumor later confirmed by IHC as poorly differentiated carcinoma, one PNET and one metastatic (Table – 3). All the adenocarcinomas were subjected to TTF- 1 to show the primary tumor not a metastatic. Poorly differentiated carcinomas were subjected to TTF-1 and CK20 to differentiate primary from metastatic tumour. Marker study was done on cases with morphological diagnosis of carcinoid/poorly differentiated carcinomas with IHC, which showed TTF-1 negative, CK20 positive, synaptophysin and chromogranin negative indicating a poorly differentiated metastatic tumour.

Table 1: Patient Demography

Male:female ratio	Male Female	17 08	68% 32%
Age	4yrs to 79yrs	Mean age 50yrs.	
Smoking	Smokers	05	20%
	Non smokers	20	80%
Site	Right site	17	68%
	Left site	06	24%
	Bilateral	02	08%

Table 2: Results of CT guided lung biopsy.

Non small cell carcinoma	23	92%
Small cell carcinoma	1	4%
Metastatic	1	4%

Table 3: Categorisation of Non small cell carcinoma

Adeno carcinoma	17	73.91%
Squamous cell carcinoma	02	8.69%
Poorly differentiated	04	17.39%
PNET	01	04.34%
Metastatic	01	04.34%

CT guided biopsy was positive for malignancy in all patients. Chest pain was the main complaint noted in all patients following the procedure. Minimal pneumothorax was noted in two patients and managed conservatively keeping them under observation.

4. Discussion

Lung cancer is the major cause of mortality in male population. Percutaneous CT guided lung biopsy is an accurate, effective and safe method of obtaining tissue for diagnosis. This method has a high specificity and sensitivity with a high diagnostic accuracy with minimal complications. Histo pathologic features along with IHC confers a better specificity and sensitivity and helps in differentiation of lung cancers into various subtypes.

25 patients were evaluated in our study. Majority of patients were male with a male to female ratio 17:8. Age ranged from 4-79 years. This data is similar to study done by Das et al (12). The earliest age of onset is 4 years in two patients with PNET. Majority of male patients had adenocarcinoma (73.9%) without any history of smoking. This finding contrast the study done by Nornhe et al (13) who found majority patients had a history of smoking. We found non-small cell carcinoma in 23 patients (92%), small cell carcinoma in 1 patient (4%). This finding is similar to the studies done by Shetty et al (14).

Among the 23 patients of non small cell carcinoma we found adenocarcinoma in 17 cases (73.91%), the predominant type mostly in non-smokers. Squamous cell carcinoma in 2 cases (8.69%), poorly differentiated carcinoma in 4 cases, (17.39%), PNET in 1 case (4.34%), and metastatic carcinoma in 1 case (4.34%). These findings are different from findings of Rishi kumar Sharma et al who found squamous cell carcinoma as predominant type among the smokers. Reported sensitivity of CT guided true cut biopsy in our study was 100 %.

5. Conclusion

CT guided true cut biopsy is a safe and well tolerated technique with minimal complications, better specificity and sensitivity. It confirms the diagnosis and helps in categorisation of lung cancers into various subtypes both morphologically and immune histochemically.

Abbreviations

SCLC – Small Cell Lung Carcinoma
 NSCLC – Non Small Cell Lung Cancer
 PNET – Primitive Neuroendocrine Tumour
 IHC – Immuno histo Chemistry
 CECT – Contrast Enhanced Computed Tomography.

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