



PERCUTANEOUS COMPUTED TOMOGRAPHY GUIDED FINE NEEDLE ASPIRATION CYTOLOGY OF ADULT PATIENTS WITH DIFFERENT LUNG LESIONS : AN OBSERVATIONAL CROSS SECTIONAL STUDY WITH CLINICAL PATHOLOGICAL AND RADIOLOGICAL CORRELATION

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ABSTRACT

Introduction: In patients of inoperable. Bronchogenic Carcinoma due to local factors or patients general condition FNAC confirms diagnosis and tumour typing. The use of percutaneous computed tomography guided fine needle aspiration cytology (CT guided FNAC) have made early diagnosis of lung lesions and thus treatment like surgery or chemotherapy can be started earlier.

The concomitant use of all the sets of data like clinical history, radiological interpretation and location narrow down the diagnostic possibilities, cytological diagnosis is warranted before initiating the specific treatment for malignant diseases

Aims and objectives: To evaluate CT guided FNAC findings along with radiological presentations of patients with lung lesion.

Materials and Methods: 102 patients of diagnosed lung lesion on CT scan were admitted in Pulmonology Department, Burdwan Medical College and Hospital and CT Guided FNAC of the patients were done after fulfilling the inclusion and exclusion criteria. Half of the slides were fixed with ethyl alcohol for PAP smear and rest for MGG (May-Grünwald-Giemsa stain). Repeat CT done in all patients to check pneumothorax and haemothorax. Statistical analysis was done using appropriate methods.

Results: The diagnostic yield of CT guided FNAC came to be 99%. Complications were less chest pain 25%, haemoptysis 4.9% and pneumothorax 3.9%. Squamous cell carcinoma (46%) came to be more than Adenocarcinoma (31%) and 92% of the malignant patients had either smoking or biomass fuel exposure.

Conclusion: CT guided FNAC is a team work of clinicians, radiologist and pathologist and thus the safest and easiest to perform diagnostic modality for early diagnosis of lung lesions

KEYWORDS : CT Guided FNAC, Bronchogenic Carcinoma, Squamous Cell Carcinoma, Adenocarcinoma

INTRODUCTION

FNAC was first used by Marlin and Ellis as a diagnostic tool^[1]. More than three decades have passed, FNAC of pulmonary mass has gained worldwide momentum and acceptance as it has further enhanced the diagnostic usefulness and clinical-cytology in lung and mediastinal cancer diagnosis^[2].

FNAC has long been used for the non-surgical confirmation of primary as well as metastatic thoracic lesions. The special advantage of FNAC includes detection carcinoma, lymphomas more approximately treated by chemotherapy rather than surgery. Numerous literatures supported that CT guided FNAC is an accurate and sensitive way of diagnosing malignancy of the thorax^{[3],[4]}.

The procedure is also minimum painful, non-operative procedure as compared with biopsy for diagnosis of pulmonary mass, outweighs the single major rare condition of pneumothorax^[4].

Fine needle aspiration with computed tomography(CT) guidance has accuracy and sensitivity of 76-96% for the detection of malignancy in lung nodules^{[5],[6],[7],[8]}.

The modality selected to diagnose a suspected lung is based on the size and the location of the primary tumors^[9].

Fear of neoplastic implantation in the needle track have initially inhibited its use but have proven groundless^[10].

The use of CT guided FNAC have made early diagnosis of

lung lesions and thus treatment like surgery or chemotherapy can be started earlier.

The earlier tool of open lung biopsy was complicated and costly procedure and thus was avoided in many patients. Detection of benign lesions has increased over time after emerging of CT guided FNAC.

In patients of in operable lung cancer due to local factors or patients general condition FNAC confirms diagnosis and tumour typing^[11]

The concomitant use of all the sets of data like clinical history, radiological interpretation and location narrow down the diagnostic possibilities, cytological diagnosis is warranted before initiating the specific treatment for malignant diseases^[12]

AIMS AND OBJECTIVES OF RESEARCH:

- To evaluate CT guided FNAC findings of patients with lung lesion.
- To ascertain the clinical and radiological presentations of the same patient.
- To correlate the clinical pathological and radiological findings.

MATERIALS AND METHOD

A) Study design : cross sectional observational study

B) Study setting and Time lines : Patients present with respiratory symptoms with a localized lung lesion clinically and confirmed radiologically.

C) Place of study : Out Patient Department, Department of Pulmonary Medicine, BMCH.

E) Study population : adult patients presenting with respiratory complains and radiologically confirmed lung lesions to out patient dept of Pulmonary Medicine , BMCH.

F) Sample size :102 patients

G) Controls : not required

H) Inclusion criteria :

1: adult patients presenting with respiratory symptoms and diagnosed lung lesion by CT scan.

I) Exclusion criteria :

1. Patients not co-operating in the procedure.
2. patient is very sick with unstable vitals.
3. Patient with high INR (> 1.5)
4. Patient on anti-coagulant therapy.
5. Lesion adjacent to a vital structure.

J) Study parameters/ Variables : A. General

- 1) Age
- 2) Gender
- 3) Smoking status
- 4) Occupation
- 5) religion
- 6) residence
- 7) family income

B. Clinical variables:

- 1) cough
- 2) sortness of breath
- 3) chest pain
- 4) fever
- 5) weight loss
- 6) hoarseness of voice
- 7) haemoptysis
- 8) lymphadenopathy

C. Radiological variables

1. Location
2. Size
3. Number
4. Margin
5. Necrosis
6. Calcification
7. Enhancement pattern
8. Special tissue character
9. Extent
10. Lymph nodal status
11. Doubling time

D. Pathological variables

- a. A. benign
- b. malignant
- c. infective
- d. granulomatous.
- e. inconclusive

E complications

- a. chest pain
- b. pneumothorax.
- c. haemothorax.
- d. haemoptysis

K) Study tools :

1. Questionnaire including history and clinical examination
2. Laboratory reports
3. Chest x ray/ CT scan reports
4. FNAC reports

6). Statistical Analysis =

The collected data are rechecked for completeness and consistency and then be compiled.

Analysis done by MS WORD and MS EXCEL.

Methodology

Patients were evaluated for clinical stability and then decision regarding the procedure was taken. The procedure along with its complications is explained to the patient and his relatives. Consent is taken as documentary evidence. Patient is shifted to the CT scan room. Procedure was done in presence of radiologist and pathologist. Target is to get the shortest route to the lesion avoiding vital structures and to cause minimal injury to the lung. Necrotic areas to be avoided, bullous and suspected vascular tumour not to be punctured. Preliminary scanogram supine (non contrast CT thorax) is done to localize the lesion. Then decision regarding prone and supine position is taken. And patient is positioned accordingly. Metallic chain is applied horizontally over the decided section of CT. CT repeated and exact location for needle introduction over the chest is marked with skin marker. Dressing and draping done aseptically without moving the patient. Local anaesthesia with 2 lignocaine given. 22 G spinocaine is then introduced according to the calculated distance and angulation. Ct done again to confirm the position of needle.

Aspiration is done by negative suction and to and fro movement of the needle. Aspirated material poured over glass slides and thin smear slides were made. Half of the slides are fixed with ethyl alcohol for PAP smear and rest for MGG (May-Grünwald-Giemsa stain). Repeat CT done in all patients to check pneumothorax and haemothorax. Other staining is done accordingly as required like AFB stain and fungal stain.

RESULTS:

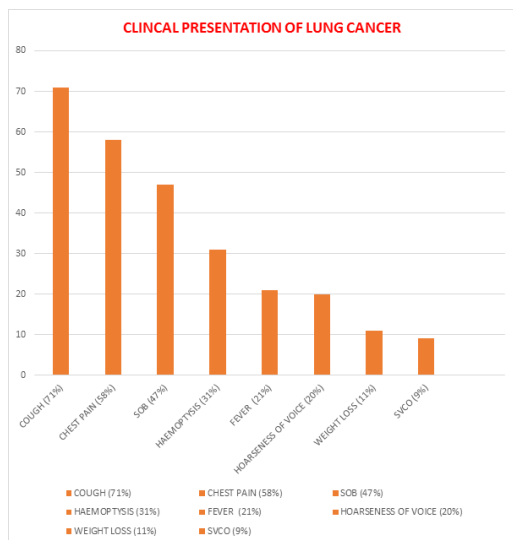
STATISTICAL DISTRIBUTION OF ALL CASES.

- a. Benign : 21 patients = 20.6%
- b. Malignant: 80 patients = 78.4%
- A. Non small cell carcinoma : 54 patients = 52.9% of all lesions and 67.5% of malignant lesions
- a. squamous: 25 patients = 24.5% of all lesions and 31.5% of malignant lesions
- b. adenocarcinoma : 17 patients = 16.6% of all lesions and 21.25% of malignant lesions.
- B. small cell carcinoma: 14 patients = 13.75% of all lesions and 17.5% of malignant lesions.
- c. others 12 patients.

BENIGN LESIONS	21	%
1. TUBERCULOUS	6	28
2. ACUTE INFLAMMATION	5	23.8
3. HYDATID CYST	2	9.5
4. GRANULOMATOUS	2	9.5
5. ABSCESS	2	9.5
6. ASPERGILLOSIS	1	4.7
7. BENIGN SPINDLE CELL NEOPLASM	1	4.7
8. CHONDROID HAMARTOMA	1	4.7
9. SOLITARY FIBROUS TUMOUR	1	4.7
MALIGNANT LESIONS	80	
1. SMALL CELL (SCC)	14	17.5%
2. NON SMALL CELL (NSCLC)	54	67.5%
A. SQUAMOUS	25 (46.3%)	
B. ADENO	17 (31.5%)	
C. UNCLASSIFIED NSCLC	12 (22.2%)	
3. OTHERS	12	15%

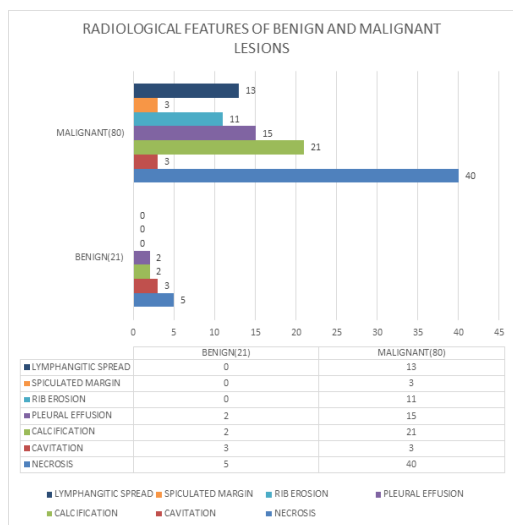
- 1) 1. SYNOVIAL SARCOMA
2. METASTATIC MELANOMA
3. PLASMACYTOMA
4. THYMOMA
5. HODGKIN'S LYMPHOMA
6. PULMONARY MYXOID SARCOMA
7. MALIGNANT EPITHELIAL CELL TUMOUR
8. POORLY DIFFERENTIATED CARCINOMA
9. METASTATIC RENAL CARCINOMA
10. CARCINOID
11. NEUROENDOCRINE TUMOUR(2)

THE CLINICAL PRESENTATION OF MALIGNANT PATIENTS: cough (71%) is the most common presentation followed by chest pain(58%) ,shortness of breath(47%) , haemo ptysis (31%) , fever (21%) , hoarseness of voice(20%) , weight loss (11%) and SVCO in 9%.



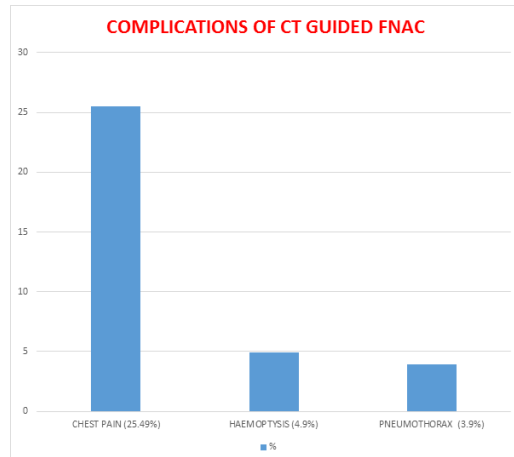
Radiological Features Of Different Lesions

Necrosis was associated with 50% of malignant lesions and 23% of benign lesions. Necrosis was only 7.1% in small cell carcinoma whereas 55.55% with NSCLC. Lymphangitic spread and rib erosion was found only in malignant lesions. Cavitation was found in 8% of squamous cell carcinoma and 33% of tubercular lesions.



COMPLICATIONS: complications were few in number . All the complications were managed conservatively.

- Chest pain : 26 patients = 24.5%
- Haemoptysis: 5 patients = 4.9%
- Pneumothorax: 4 patients = 3.9%



RELATION BETWEEN SMOKING AND DIFFERENT LESIONS

CELL TYPE	SMOKER	BIOMASS	TOTAL (SMOKER + BIO MASS)
BENIGN(21)	8(38%)	9(42%)	17(70%)
MALIGNANT(80)	61(76.25%)	13(16%)	74(92.5%)
NSCLC(54)	43(79%)	9(16.67%)	52(96%)
SQUAMOUS(25)	18(72%)	4(16%)	22(88%)
AENO(17)	14(82%)	3(17.7%)	17(100%)
SMALL CELL(14)	11(78%)	1(7.1%)	12(85%)

DISCUSSION

In our study diagnosis was made on 101 patients : diagnostic yield 99% and 1 patient was inconclusive diagnosis. Among the 101 patients most were malignant which corroborates with Mukherjee et. al study.^[13]

52.9% were NSCLC, among them 13.73% were small cell carcinoma, 24.5% were squamous cell carcinoma and 16.66% were adenocarcinoma. Similar findings were in Mondal SK, Nag D et al. study.^[14]

In our study conclusion or diagnosis was made in 101 out of 102 cases i.e. 99% and pneumothorax in 4 cases or 3.9% cases.. singh et. al study showed diagnosis in 100% cases and pneumothorax in 2.8% cases^[15].

In our study the clinical presentation of malignant patients: showing cough as the most common presentation followed by chest pain ,shortness of breath, haemoptysis, fever, hoarseness of voice, weight loss and SVCO. This corroborates with Gupta, Jyoti Valecha et al^[16] study.

Among malignant lesions most patients were smokers, proportion of smokers were maximum in SCC. Average pack years was more in Malignant lesions which corroborates with the study by Sanjay Piplani, Rahul Mannan et al.^[17]

Squamous lesions were placed centrally and had cavitory change. Necrosis was associated with more with malignant lesions than benign lesions. Necrosis was more in NSCLC. Lymphangitic spread and rib erosion was found only in malignant lesions.

CONCLUSION

- The diagnostic yield of CT guided FNAC was 99%. Incidence of SCC was more than Adenocarcinoma and majority of the patients with malignancy had either smoking or biomass fuel exposure. The centrally located lesions were more in squamous cell carcinoma than the adenocarcinoma. Complications were minimal and were all managed conservatively.
- CT guided FNAC is a team work of clinicians ,radiologist and pathologist and thus the safest and easiest to perform diagnostic modality for early diagnosis of lung lesions.

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