

## ORIGINAL ARTICLE

# ASSESSMENT OF CLINICAL PARAMETERS OF LUNG LESIONS AND THEIR ASSOCIATION WITH CT GUIDED FNAC DIAGNOSIS

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### ABSTRACT:

**Background:** The early and accurate diagnosis obtained by CT-guided FNAC helps to formulate immediate, effective management of thoracic mass lesions. The present study was planned to assess clinical parameters of lung lesions and their association with CT guided FNAC diagnosis. **Materials and method:** The study was conducted on 100 patients of either sex presenting (indoor and outdoor) to Department of Chest and Tuberculosis, Government Medical College and Rajindra Hospital, Patiala with signs and symptoms of respiratory illness and who were having thoracic lesions confirmed by chest radiograph and CT scan. A comparison was made between the cytological diagnosis and probable diagnosis made on basis of clinical and radiological features and the results were evaluated at the end of study. **Results:** Patients below age of 40 years were 23 in number, patients between age of 40 and 60 years were 47 in number, patients above age 60 years were 30 in number. Out of 100 patients, 29 were females and 71 were males. 72 patients out of 100 were having cough as one of their chief complaint; 41 patients out of 100 were having fever as one of their chief complaint; 37 patients out of 100 were having breathlessness as one of their chief complaint; 34 patients out of 100 were having chest pain as one of their chief complaint; 13 patients out of 100 were having hemoptysis as one of their chief complaint; 4 patients out of 100 were having hoarseness of voice as one of their chief complaint. Out of 16 cases of acute infection/inflammation, 5 were present in age range A (<40 years), 4 were present in age range B (40 to 60 years) and 7 were present in age range C (> 60 years of age). **Conclusion:** Majority of the patients who underwent CT guided FNAC were in the middle age group and 2/3<sup>rd</sup> of patients were males. The habit of smoking is strongly associated with malignant lung lesions confirmed by CT guided FNAC. Cough was the most common symptom present among patients in this study.

Key words: FNAC, hemoptysis, lung lesions.

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### INTRODUCTION:

Fine needle aspiration (FNA) is a method of taking cytology sample by means of a fine needle attached with a syringe. Fine needle aspiration cytology (FNAC) is a diagnostic technique which involves study of the cell smears prepared from FNA material. It is much easier and less traumatic technique than excision biopsy and widely employed in cytological diagnosis with good diagnostic accuracy. FNAC of deep organs needs the aid of ultrasonography or computed tomography as a guidance to perform it.<sup>1</sup> Even though FNAC has proven its role in the diagnosis of infections and other diffuse benign processes, the main indication remains the diagnosis of localized intrathoracic lesions suspected of being malignant,

particularly when less invasive investigations prove to be negative.<sup>2</sup>

Diagnosis of pulmonary lesions on the basis of history and physical examination is often challenging. Diagnostic imaging is therefore of paramount importance in this field. Radiology has, traditionally been considered the elective diagnostic procedure for these diseases. Nonetheless it is often not possible to differentiate inflammatory/infectious lesions from neoplastic disease. A correct cyto-histopathological diagnosis is therefore needed for an accurate diagnosis and subsequent prognostic and therapeutic plan. Other imaging modalities such as Fluoroscopy, Ultrasonography (US), Computerized Tomography (CT) and Magnetic Resonance Imaging (MRI) have to be considered as to the possibilities they offer to the

interventional radiologist in taking guided biopsy samples.<sup>3</sup> CT-guided FNAC of thoracic mass lesions is a safe, rapid, and reliable procedure with minimal complications. It provides very early diagnosis and exact sub classification of various lung tumours on the basis of cytomorphology. Benign non neoplastic lesions like tuberculosis can also be diagnosed with certainty by this technique. The early and accurate diagnosis obtained by CT-guided FNAC helps to formulate immediate, effective management of thoracic mass lesions.<sup>4</sup> Hence, the present study was planned to assess clinical parameters of lung lesions and their association with CT guided FNAC diagnosis.

#### **MATERIALS AND METHODS:**

The study was conducted on 100 patients of either sex presenting (indoor and outdoor) to Department of Chest and Tuberculosis, Government Medical College and Rajindra Hospital, Patiala with signs and symptoms of respiratory illness and who were having thoracic lesions confirmed by chest radiograph and CT scan. Any other investigation if required was also carried out prior to CT guided FNAC of lung lesions.

#### **Inclusion criteria:**

1. All patients referred to the department of Department of Chest and Tuberculosis with undiagnosed Chest and Lung lesion on chest X-ray.
2. CT scan of thorax confirming the Chest/Lung lesions.

#### **Exclusion criteria:**

1. Abnormal coagulation profile (INR>1.5)
2. Severe thrombocytopenia (platelet count < 50,000/mm<sup>3</sup>)
3. Bullous emphysema
4. Pulmonary hypertension
5. Inaccessible metastatic disease
6. Dyspnea at rest

**Procedure:** CT guided FNAC was carried out after explaining the risks and benefits of the procedure. Written consent was obtained from every case. Proper aseptic care was taken by cleaning the skin surface with povidone iodine before every FNAC. Aspiration was done using 20G 88mm lumber puncture or needle/18G 3.9cm long needle through percutaneous and transthoracic approach, identifying the lesion in exact section by CT scan after measurement of the site of entry of the needle, route of the needle, and the distance between skin and lesion on CT scan. The patient's position was supine, prone, or lateral decubitus depending on location of thoracic mass lesions.<sup>5</sup>

Local anaesthetic 2% xylocaine if required was infiltrated at the site of puncture. The needle was then inserted during suspended respiration, directing the tip of needle towards the lesion. A repeat slice of the area of interest was taken to check the exact position of its tip. The stylet was then withdrawn and the needle was advanced into the mass with a rotating motion to inflict trauma for

obtaining adequate tissue to hub. 20 ml syringe was attached and aspirate was obtained by to and fro rotating movements of needle within the lesion and 10 to 15 smears were prepared immediately in CT scan room. Air dried smears were sent to Pathologist for cytological diagnosis. A repeat scan of the area of interest was taken to look for pneumothorax or excessive bleeding in doubtful cases.<sup>5</sup> A comparison was made between the cytological diagnosis and probable diagnosis made on basis of clinical and radiological features and the results were evaluated at the end of study.

#### **RESULTS:**

**Table 1** shows the classification of the age of the patients into three groups. Patients below age of 40 years were 23 in number, patients between age of 40 and 60 years were 47 in number, patients above age 60 years were 30 in number. **Table 2** shows sex distribution of the patients. We observed that out of 100 patients, 29 were females and 71 were males. **Table 3** shows distribution of patients according to their chief complaints. 72 patients out of 100 were having cough as one of their chief complaint; 41 patients out of 100 were having fever as one of their chief complaint; 37 patients out of 100 were having breathlessness as one of their chief complaint; 34 patients out of 100 were having chest pain as one of their chief complaint; 13 patients out of 100 were having hemoptysis as one of their chief complaint; 4 patients out of 100 were having hoarseness of voice as one of their chief complaint. **Table 4** shows the correlation of the final diagnosis made on CT guided FNAC with the age of the patients. Out of 16 cases of acute infection/inflammation, 5 (31.3%) were present in age range A (<40 years), 4 (25%) were present in age range B (40 to 60 years) and 7 (43.8%) were present in age range C (> 60 years of age). Out of 38 cases of tuberculosis, 14 (36.8%) were present in age range A (<40 years), 19 (50%) were present in age range B (40 to 60 years) and 5 (13.2%) were present in age range C (> 60 years of age). Out of 36 cases of malignancy, 2 (5.6%) were present in age range A (<40 years), 19 (52.8%) were present in age range B (40 to 60 years) and 15 (41.7%) were present in age range C (> 60 years of age) [**Fig 1**]. **Table 5** shows correlation of various complaints of the patients with final diagnosis on CT guided FNAC. Out of 16 cases of acute infection/inflammation, 13 (81.3%) were having cough as one of the chief complaint. Out of 38 cases of tuberculosis, 30 (78.9%) were having cough as one of the chief complaint. Out of 36 cases of malignancy, 23 (63.9%) were having cough as one of the chief complaint. Out of 16 cases of acute infection/inflammation, 11 (68.8%) were having fever as one of the chief complaint. Out of 38 cases of tuberculosis, 16 (42.1%) were having fever as one of the chief complaint. Out of 36 cases of malignancy, 12 (33.3%) were having fever as one of the chief complaint [**Fig 2**].

**TABLE 1: AGE RANGE OF THE PATIENTS**

Age Range	No. of Patients	Percentage
(<40 Years)	23	23%
(40 to 60 Years)	47	47%
(>60 Years)	30	30%
<b>Total</b>	<b>100</b>	

**TABLE-2: SEX DISTRIBUTION OF THE PATIENTS**

Sex of Patients	No. of Patients	Percentage
Male	71	71%
Female	29	29%
<b>Total</b>	<b>100</b>	<b>100%</b>

**TABLE-3: DISTRIBUTION OF PATIENTS ACCORDING TO THEIR CHIEF COMPLAINTS**

Chief Complaint	No. of Patients	Percentage
Cough	72	72%
Fever	41	41%
Breathlessness	37	37%
Chest Pain	34	34%
Hemoptysis	13	13%
Hoarseness of Voice	4	4%

**TABLE 4: CORRELATION OF AGE OF THE PATIENTS WITH FINAL DIAGNOSIS ON CT GUIDED FNAC**

Age Range	FINAL DIAGNOSIS ON CT GUIDED FNAC				Total Patients
	Inflammatory/ Infective	Tuberculosis	Malignancy	Inconclusive	
A (<40 years)	5 (31.3%)	14 (36.8%)	2 (5.6%)	2 (20%)	23
B (40 to 60 years)	4 (25%)	19 (50%)	19 (52.8%)	5 (50%)	47
C (>60 years)	7 (43.8%)	5 (13.2%)	15 (41.7%)	3 (30%)	30
<b>Total</b>	<b>16</b>	<b>38</b>	<b>36</b>	<b>10</b>	<b>100</b>

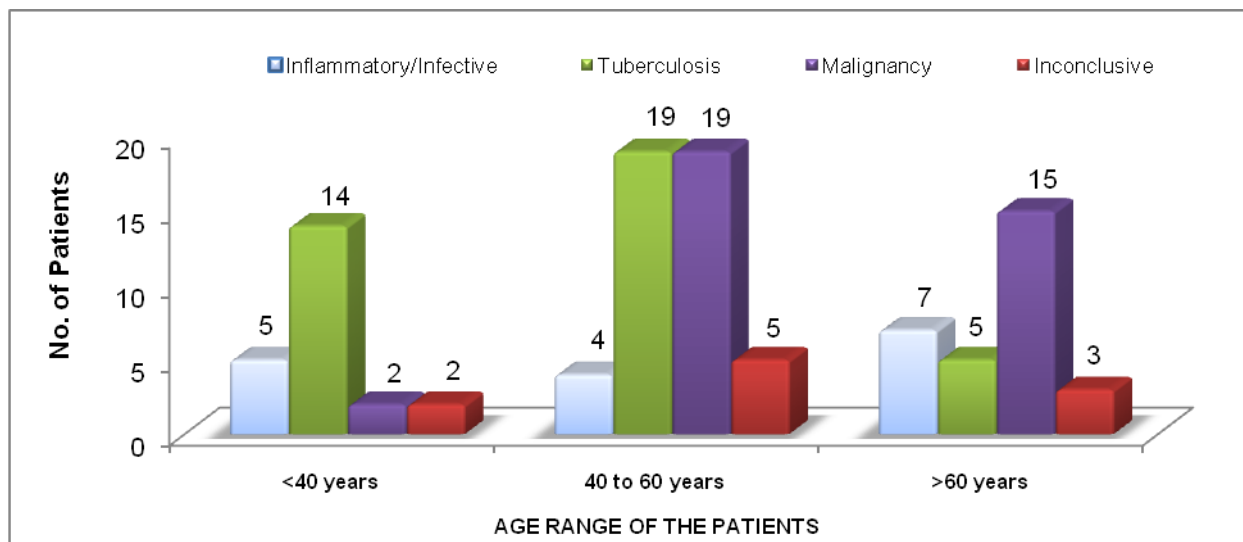
**STATISTICAL ANALYSIS**

Chi-Square Tests			
	Value	df	p value
Pearson Chi-Square	20.599(a)	8	.008

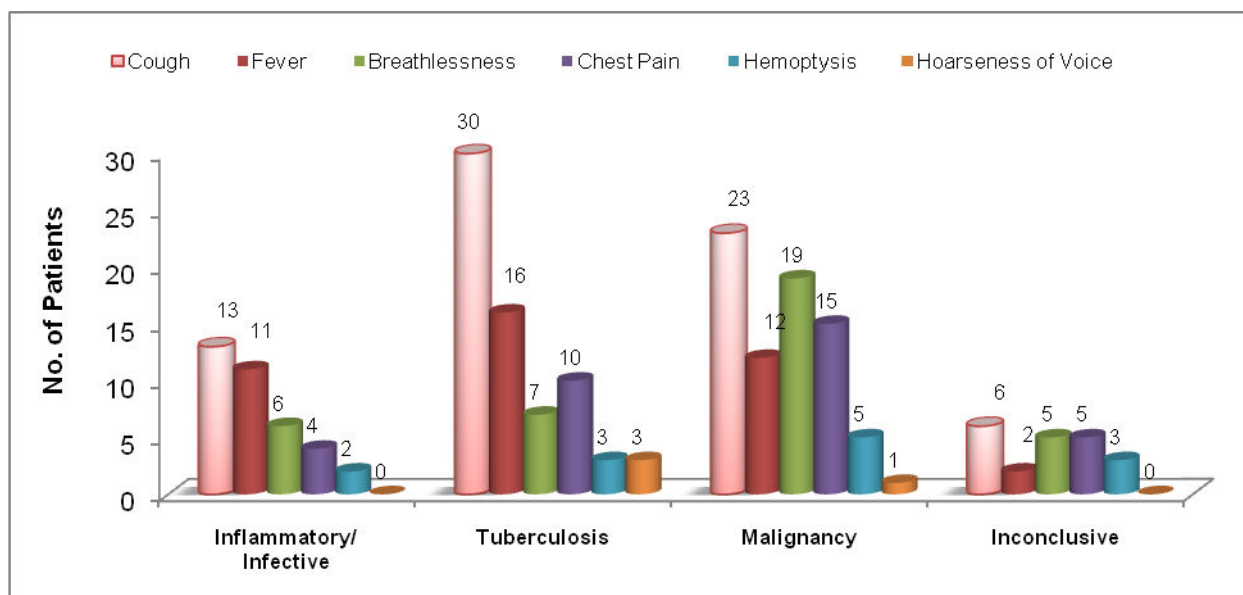
**TABLE 5: CORRELATION OF VARIOUS COMPLAINTS OF THE PATIENTS WITH FINAL DIAGNOSIS ON CT GUIDED FNAC**

Chief Complaint	Final Diagnosis on CT Guided FNAC				p value
	Inflammatory/ Infective	Tuberculosis	Malignancy	Inconclusive	
Cough	13 (81.3%)	30 (78.9%)	23 (63.9%)	6 (60%)	.447
Fever	11 (68.8%)	16 (42.1%)	12 (33.3%)	2 (20%)	.071
Breathlessness	6 (37.5%)	7 (18.4%)	19 (52.8%)	5 (50%)	.037
Chest Pain	4 (25%)	10 (26.3%)	15 (41.7%)	5 (50%)	.225
Hemoptysis	2 (12.5%)	3 (7.9%)	5 (13.9%)	3 (30%)	.321
Hoarseness of Voice	0	3 (7.9%)	1 (3.3%)	0	.580

**FIGURE 1: CORRELATION OF AGE OF THE PATIENTS WITH FINAL DIAGNOSIS ON CT GUIDED FNAC**



**FIGURE 2: CORRELATION OF VARIOUS COMPLAINTS OF THE PATIENTS WITH FINAL DIAGNOSIS ON CT GUIDED FNAC**



**DISCUSSION:**

The study was conducted on 100 patients of either sex presenting (indoor and outdoor) to Department of Chest and Tuberculosis, Government Medical College and Rajindra Hospital, Patiala with signs and symptoms of respiratory illness and who were having thoracic mass lesions confirmed by chest radiograph and CT scan. The aim was to assess clinical parameters of lung lesions and relate them with CT guided FNAC diagnosis.

Out of 100 patients, 23 (23%) were < 40 years of age, 47 (47%) were between 40-60 years of age and 30 (30%) were above 60 years of age. Hence maximum number of patients were in age group of 40-60 years (47%) which

was comparable to study conducted by Madan and Bannur<sup>6</sup> (2010) in which 41-70 years (67.5%) was the most commonly affected age group. The mean age of the patients was 51.24 years with age range of 11-85 years. This was comparable to study conducted by Pandey et al<sup>7</sup> (2009) in which the mean age was 52 years and Shaheen et al<sup>8</sup> (2005) with a mean age of 52.3 years. The study included 71 (71%) males and 29 (29%) female patients with male to female ratio of 2.4:1 which was comparable to 2.1:1 in a study by Basnet et al<sup>9</sup> (2008) and 2.3:1 in a study by Jayashanker et al<sup>10</sup>(2010). Out of 29 females, 5 (17.2%) were having malignant pathology and 19 (65.5%) were having benign pathology in form of acute

inflammation or tuberculosis while among the 71 male patients malignant pathology was present in 31 (43.7%) and 35 (49.3%) were having benign pathology showing a significant male preponderance with a M:F ratio of 6.2:1 for malignant pathology. Similar observations were made by Madan and Bannur<sup>11</sup> with a male preponderance for malignancy with a M:F ratio of 5:1. This difference is explained on the basis of higher incidence of predisposing factors like smoking, COPD and alcoholism in males. Among the males, benign and malignant cases were almost equal in number, the reason may be that male being more active member of the family, has a chance of exposure to infectious agents also.

In this study the total number of smokers both active and passive was 47% which was less as compared to 74.4% in a study done by Rehana<sup>12</sup>. This may be due to greater number of female patients in our study which constituted one third of total patients. Out of 47 smokers, 45 (95.7%) were males and only 2 (4.3%) were females. This is because of higher incidence of smoking among males in this part of the country. Similar profile was seen in study conducted by Madan and Bannur<sup>11</sup> (2010) in which all 16 male patients were smokers. Out of 47 smokers, 29 (61.7%) were having malignancy as the final diagnosis made by CT guided FNAC and out of total 36 cases of malignant pathology, 29 (80.6%) were present in smokers. The above data clearly shows a statistically significant relationship of malignancy lung with smoking. Among the smokers, squamous cell carcinoma was the commonest malignancy with 11 cases (37.9%) followed by non small cell malignancy with 10 cases (34.5%). These findings correlated with the results of previous authors. The relationship with smoking is strongest for squamous cell carcinoma. Cough was the most common symptom present among patients in this study seen in 72% of patients which was similar to study conducted by Gangopadhyay et al<sup>2</sup> (2011) in which cough was present in 71.2% of patients. Cough was followed by fever, breathlessness, chest pain, hemoptysis and hoarseness of voice present in 41%, 37%, 34%, 13% and 4% of patients, respectively. 18% of patients were also having miscellaneous complaints like loss of weight, loss of appetite, vomittings, headache and backache. On general physical examination 75% patients were having pallor as a positive finding followed by clubbing and lymphadenopathy in 22% and 5% of patients, respectively. Positive findings on examination of the respiratory system were present in 95% of the patients. No significant pattern or difference of presenting symptoms as well as of findings on general physical

examination was noted among patients having benign or malignant disease. Similar were the observations in studies conducted by previous authors.

#### CONCLUSION:

From the above results, we conclude that majority of the patients who underwent CT guided FNAC were in the middle age group and 2/3<sup>rd</sup> of patients were males. The habit of smoking is strongly associated with malignant lung lesions confirmed by CT guided FNAC. Cough was the most common symptom present among patients in this study.

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