

CT Guided FNAC of Lung Mass – A Retrospective Study of Disease Spectrum

*Ahmed Z,¹ Israt T,² Raza AM,³ Hossain SA,⁴ Shahidullah M⁵

Lung cancer is the major cause of cancer related deaths all over the world. CT guided FNAC of lung mass is an effective modality to diagnose lung cancer. The study was carried out in a specialized diagnostic center at the district of Feni, Bangladesh. A total of 100 cases were studied for a period of 2 years from July 2015 to July 2017. Aim of our study was to evaluate the pathological spectrum of diseases in the lesions of the lung through CT guided FNAC. Total 100 cases were evaluated retrospectively for a period of 2 years. Out of 100 cases 66% were male and 34% patients were female. Mean age was 54.34 years. In 56 cases lesions were at the right lung and in 44 cases were in left lung. 68% cases had malignant lesion and 32% cases were have inflammatory conditions. Squamous cell carcinoma was the predominant malignant tumour. Among the complications, 2 cases developed pneumothorax which were managed conservatively, 3 had chest pain, 3 had mild haemorrhage from the lesion area and 1 had breathlessness. All were managed conservatively. CT guided FNAC can diagnose pulmonary lesion fairly accurately leading to early diagnosis which causes less morbidity and mortality as treatment can be started early.

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Keywords: Computed tomography (CT), FNAC, Lung mass.

Introduction

Computed tomography (CT) guided fine needle aspiration cytology (FNAC) is a well known modality for characterization of lung masses. It has been used to differentiate lung masses into benign, malignant and inflammatory types. Furthermore its use has been extended in differentiating lung malignancy into different cytopathological types which aids in proper management of the malignant lesion. CT guided FNAC is widely recognized technique in evaluating lung mass. It is a simple less invasive diagnostic method of relatively low cost, with negligible mortality and limited morbidity.¹ In 1976 Haaga and Alfidi reported

CT guided biopsy and since then this procedure has been shown to be both effective and accurate. The diagnostic accuracy is reported to be more than 80% in benign disease and more than 90% in malignant disease.² Several post procedural complications have been reported for CT guided FNAC such as pulmonary hemorrhage, hemoptysis and pneumothorax. Pneumothorax has been observed to be 22% - 45% due to high sensitivity of CT in detecting pneumothorax.³ Relative contraindications to image guided FNAC are severe chronic obstructive airway disease, bleeding diathesis, contralateral pneumonectomy and pulmonary arterial hypertension.⁴

1. *Dr. Zaman Ahmed, Assistant Professor of Pathology, Abdul Malek Ukil Medical College, Noakhali. drzahmed74@gmail.com
2. Dr. Tasnim Israt, Assistant Professor of Pathology(CC), Cumilla Medical College, Cumilla.
3. Dr. AKM Maruf Raza, Associate Professor of Pathology, Jahurul Islam Medical College, Kishoregonj .
4. Dr. Shaikh Alamgir Hossain, Senior Consultant (Pathology), Bangladesh Secretariat Clinic, Dhaka.
5. Dr. Mohammad Shahidullah, Associate Professor (CC) of Medicine, Abdul Malek Ukil Medical College, Noakhali.

*For correspondence

In Bangladesh CT guided FNAC of lung lesion is relatively a newer diagnostic technique and done mostly in the major cities. The purpose of this study was to evaluate the disease spectrum of lung lesion by CT guided FNAC in a district level diagnostic center.

Methods

The study was carried out in a specialized diagnostic center in the district of Feni. A total of 100 cases were studied for a period of 2 years from July 2015 to July 2017. CT guided FNAC was performed by pathologist in co-ordination with radiologist. Risk and benefit were explained and informed consent taken from each patients or his/her relatives. Skin was cleaned by betadine and 22G spinal needle was introduced through percutaneous transthoracic approach. The exact position of lesion was established by CT scan with site, angle, depth and route of needle introduction was determined. After the needle placement, CT scan done to ascertain that the tip of the needle was within the mass. The aspirate was obtained by to and fro movement of needle within the mass. All slides were fixed in 95% ethyl alcohol and were stained with papanicolaou stain. All the slides were evaluated by an experienced pathologist. Patients were kept under observation for 2 hours to see any immediate complication.

Statistical analysis

Microsoft Excel 2016 was used to generate tables. Only descriptive statistics were used to infer results.

Results

Out of 100 cases 66 were male and 34 were female. Age group was from 25 years to 90 years with mean age of 54.34 years. In 56 cases lung lesion was in right lung and 44 cases were in left lung. Among 56 right lung lesion 45 were male and 11 were female. In 44 left lung lesion 31 were male and 13 were female (Table I).

Among 100 cases, 32 cases were inflammatory or benign lesion. Among the benign lesion, tubercular inflammation were the most common, accounting for 15 cases followed by chronic non specific inflammation 14 cases, suppurative inflammation 2 cases and Benign cystic lesion 1 case. 68 cases were malignant with squamous cell carcinoma exceeding adenocarcinoma, 35 and 25 cases respectively. Small cell carcinoma were 6 cases and poorly differentiated carcinoma were 3 cases (Table II).

Among the complications, 2 cases developed pneumothorax who were managed conservatively, 3 had chest pain, 3 had mild haemorrhage from the lesion area and 01 had breathlessness. All were managed conservatively (Table III).

Figure I show a radiological picture showing needle tip at the lesional site. Figure II and figure III show picture of cytopathological slides of tubercular granuloma and adenocarcinoma respectively.

Table I: Lung lesion by site and sex (n=100)

Sex	Site		Total (%)
	Right lung	Left lung	
Male	45	31	66 (66%)
Female	11	13	34 (24%)
Total	56 (56%)	44 (44%)	100 (100%)

Table II: Spectrum of disease in lung lesion on CT guided FNAC (n=100)

Disease	Number of cases	%
Squamous cell carcinoma	35	35
Adenocarcinoma	25	25
Small cell carcinoma	06	6
Undifferentiated carcinoma	02	2
Tubercular granuloma	15	15
Chronic nonspecific inflammation	14	14
Suppurative inflammation	02	2
Benign cystic lesion	01	1
Total	100	100

Table III: Complication of CT guided FNAC in this study (n=9)

Complication	Number of cases	%
Pneumothorax	02	22.2%
Chest pain	03	33.3%
Mild hemorrhage from overlying skin	03	33.3%
Breathlessness	01	11.1%
Total	09	100%

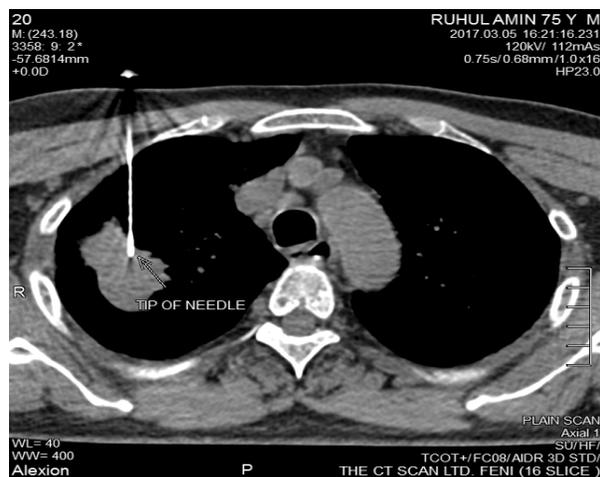


Figure 1. Showing needle inside the lung lesion

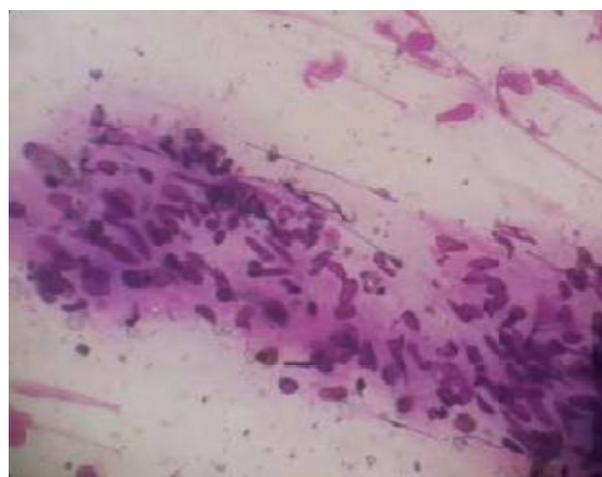


Figure 2. Showing tubercular granuloma in lung (Paps stain, 40X)

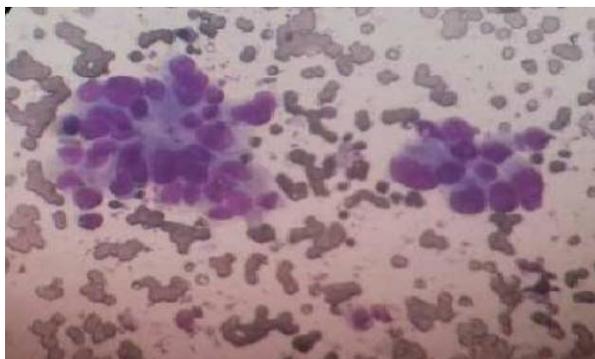


Figure 3. Showing adenocarcinoma of lung (Paps stain, 40X)

Discussion

CT guided transthoracic needle aspiration cytology is safe and accurate method for diagnosis and categorization of malignant and benign lesion. Accuracy of procedure varies in range from 64% to 97%.³ In this present study, 100 cases were studied over a period of 2 years time period. Conclusive cytodiagnosis were made in all the 100 cases. Most Patients tolerated the procedure well. Most common complaint was pain at the procedure site and mild bleeding at the skin puncture site which subsided without medicine in 2 hours. Two cases had pneumothorax which was mild and resolved conservatively. No chest tube insertion was needed. All the cases were adult. The mean age was 54.34 years similar to other studies. Mondal et al and Singh et al in their study found mean age 56.6 years and 56.4 years respectively, which is similar to our study.^{5,6} This indicates lung mass lesion especially malignant lung tumour come to clinical attention at middle to old age. There was male preponderance (66%) among the patients undergone FNAC for lung lesion. In this study, out of 100 patients male patient were 66% and female patient were 34%. Percentage of male patients in the studies by Saha et al⁷ 78.9% and Tan et al⁸ 71.1%. Bandyopadhyay et al⁹ found male patient 80.6% which is high to other study and also high comparing to this study.

Out of the 100 cases, 32% were inflammatory or benign condition and 68% cases were malignant tumour. Mondal et al had benign lesion in 8.07% and malignant lesion in 91.93%.cases.⁵ This high percentage of malignant patient in this study and study done by Mondal et al probably due to as most of the inflammatory conditions are now a days effectively treated by antibiotics. The tuberculosis cases and malignant cases are non responsive to antibiotics and they suffer chronically and come to diagnostic CT guided FNAC.

The incidence of squamous cell carcinoma (35% cases) was higher than adenocarcinoma (25% cases) in our study similar to the study by Shah S.¹⁰ In their study, most common tumour was squamous cell carcinoma (45%) followed by adenocarcinoma (22%), small cell carcinoma (16%) and large cell carcinoma (8%).¹¹ In his study adenocarcinoma was the most common malignant tumour. In that study, adenocarcinoma cases were 30%, squamous cell carcinoma 22.5% and undifferentiated carcinomas was 7.5%. The proportion of adenocarcinoma has risen in the last fifteen years. Adenocarcinoma is the most common histological type in women and the rising proportion of women in the lung cancer population is undoubtedly a factor in the relative increase in the incidence of adenocarcinoma.¹²

Conclusion

CT guided FNAC is a well accepted, simple, accurate, safe and cost effective method for diagnosing a lung lesion with low morbidity rates. Combined with CT the aspiration needle can be guided safely into the lesion to improve the diagnosis of the cytological material. CT guided FNAC provides early diagnosis and sub classification of the lung masses hence directing the clinicians in proper management. Complication due to this

procedure is not high and can be managed conservatively.

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