

# Blind Transthoracic Fine Needle Aspiration Cytology as a Diagnostic Tool in Suspected Lung Cancer in Resource Poor North-Eastern Part of India.

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## ABSTRACT

**Background:** Unguided FNAC may be the only option left for accurate diagnosis of malignant lesions in the lung in resource poor settings. The present study was done with the aim of assessing the accuracy and utility of unguided transthoracic fine needle aspiration cytology in the diagnosis of lung cancer. **Methods:** An interventional study was taken up in the Department of Respiratory Medicine, JN Institute of Medical Sciences, Imphal. All patients admitted in the IPD with suspected malignant lung lesions during the period July 2017-Dec 2018 was included. After obtaining prior informed written consent fine needle aspiration was done from the duller area on chest wall by using a lumbar puncture needle under local anaesthesia. The slides prepared thereafter were alcohol-fixed and sent to the Department of Pathology, JNIMS for cytological examination. The patients were observed closely after the intervention to detect any complications. **Results:** Completed data sets could be obtained from 20 study subjects. Unguided fine needle aspiration cytology had a diagnostic yield of 75% for detecting malignant lesions in the lung. Only minor post-procedure complications were encountered in 10% of the patients. **Conclusion:** The unguided trans-thoracic fine needle aspiration cytology has many merits. It is rapid, safe, accurate and cost-effective for the diagnosis of intra-thoracic peripheral lesions. It can also be used as an outdoor procedure even in peripheral health centres in properly selected cases.

**Keywords:** Accuracy, complications, lung cancer, resource poor, unguided fine needle aspiration cytology, utility.

## INTRODUCTION

Non-resolving pneumonia is a common problem faced by physicians. Needle biopsy was first used as the diagnostic tool for peripheral lung lesions by Leyden in 1883. Three years later that Menetrier diagnosed lung carcinoma.<sup>[1]</sup> Martin and Ellis are considered to be the pioneers of modern needle aspiration technique. Manheim, a German doctor was the first to publish reports suggesting the use of fine needle with a small gauge.<sup>[2]</sup> However, due to serious complications, the technique was abandoned until 1960s when Nordenstrom B modified the technique using a thin 18-20 gauge needle which markedly reduced the incidence of complications.<sup>[3]</sup> Since then, many studies have reaffirmed fine needle aspiration cytology to be a valuable method in diagnosing lung lesions located in mid to peripheral lobes, based on chest x-ray and computed

tomography findings.<sup>[4,5]</sup> Fine needle aspiration cytology (FNAC) of the lung lesions can be either a guided one or a blind unguided one. The former needs sophisticated machine, transportation of patients with oxygen supply and hence is costly whereas the later one can be performed at the bedside without any extra cost. Moreover, in resource poor areas like the north-eastern part of India, the later technique may be the only option left.

### Aim and objectives:

The present study aimed to assess the accuracy and utility of unguided trans-thoracic fine needle aspiration cytology in the diagnosis of lung cancer.

## MATERIALS AND METHODS

An interventional study was taken up in the Department of Respiratory Medicine, JN Institute of Medical Sciences, Imphal. All patients admitted in the IPD with suspected malignant lung lesions during the period July 2017-Dec 2018 was included. The suspicion was based on clinical follow-up and chest x-ray, ultrasonography and computed tomography. First, the socio-demographic

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backgrounds of the patients, their smoking status, associated co-morbidities, main clinical presentation and location of lesion of interest were recorded by using structured questionnaire.

After obtaining prior informed written consent fine needle aspiration was done from the duller area on chest wall by using a lumbar puncture needle under local anaesthesia. The slides prepared thereafter were alcohol-fixed and sent to the Department of Pathology, JNIMS for cytological examination. The patients were observed closely after the intervention to detect any complications. Any post-procedure complication developing was recorded and managed as per protocol. Later on, the cytology reports were collected and recorded.

Data obtained were entered and analyzed by using SPSS v.21. Descriptive statistics like mean, standard deviation and proportions were used for the analysis.

## RESULTS

Altogether completed data sets could be obtained from 20 patients. There was no refusal to participate in the study. The mean age (SD) of the study-subjects was 71.35 (8.139) years. There was equal number of males and females. By community, 14 (70%) were Hindus, Christians and Muslims being 4 (20%) and 2 (10%) respectively. Majority study subjects were smokers (17; 85%) and two (10%) were alcohol consumers.

More than half of study participants (11; 55%) had associated co-morbidities [Table 1]. Post-tuberculosis was the commonest followed by Chronic Obstructive Pulmonary Disease (COPD) and anaemia.

**Table 1: Distribution of study subjects by associated co-morbidities**

Co-morbidity	No. of patients (%)
Post-tuberculosis	5 (25.0)
COPD	2 (5.0)
Anaemia	2 (5.0)
Pleural effusion	1 (2.5)
Hypertension + Diabetes	1 (2.5)
No co-morbidity	9 (45.0)

The main clinical presentations were dyspnoea, cough and haemoptysis. Chest pain, loss of appetite and hoarseness of voice were also found [Table 2].

**Table 2: Distribution of study subjects by main presentation**

Main clinical presentation	No. of patients (%)
Dyspnoea	5 (25.0)
Cough	5 (25.0)
Haemoptysis	4 (20)
Haemoptysis + Chest pain + Cough	3 (15.0)
Loss of appetite	2 (10.0)
Hoarseness of voice	1 (5.0)

Out of all the study-subjects the lung mass was found to be located on the right lung in a majority of

them (13; 65%) while in the remaining seven cases it was found on the left lung.

Altogether, there were two post-procedure complications (10%). The complications encountered were one each of haemoptysis and chest pain needing analgesics.

In 15 of the 20 slides sent for histological examination, lung carcinoma was confirmed. Thus, compared to the provisional diagnosis made before the intervention, unguided trans-thoracic aspiration cytology had a diagnostic yield of 75%. The various types of malignancies were squamous cell carcinoma and adenocarcinoma in 10 and 05 patients respectively. The remaining 05 turned out to be inflammatory lesions.

## DISCUSSION

Sahu K et al in their study done among 115 patients of intra-thoracic lesions presenting as pulmonary nodules found unguided fine needle aspiration cytology to be having 76 positive cases with a diagnostic yield of 66%. Even from deep-seated lesions Esam MAR et al in their study in Sudan showed very good results with ultrasound guided fine needle aspiration cytology, the diagnostic accuracy being 81.8%.<sup>[7]</sup> Our present study of blind unguided FNAC with 75% diagnostic yield is an encouraging figure. Kulkarni V et al in their study in 2014 found very satisfying results with it. According to their study, the technique had a sensitivity, specificity, positive predictive value and negative predictive value of 95.65%, 100%, 100% and 82.33% respectively. Gupta R et al when deployed the same intervention among 22 patients by using 22 gauge 8 cm lumbar puncture needle could detect 19 cases of lung malignancy (eight each of squamous cell carcinoma and poorly differentiated small cell carcinoma and another three with adenocarcinoma) giving an accuracy of 86.36%.<sup>[8]</sup>

Computed tomography guided trans-thoracic fine needle aspiration cytology is definitely better than the unguided procedure with a reported sensitivity of 94% and specificity of 100% even in sonographically non-approachable lung masses.<sup>[9]</sup> But such interventions may be only a dream for resource poor health institutions.

The current study finding of minor post-procedure complication in 10% is slightly more than as reported by Gupta R et al.<sup>[8]</sup> The very small size of the study sample in both the studies might explain the discrepancy.

## CONCLUSION

All lung consolidations may not be pneumonia and hence may not respond to antimicrobials. Around one-fifth of such non-responding lung infiltrates may be due to non-infectious cases. Tissue/cytology is the key to correct diagnosis in such cases not responding

to antibiotics. The unguided trans-thoracic fine needle aspiration cytology has many merits. It is rapid, safe, accurate and cost-effective for the diagnosis of intra-thoracic peripheral lesions. It can also be used as an outdoor procedure even in peripheral health centres in properly selected cases. Further research with greater sample sizes is recommended so as to get clearer picture.

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