MedCrave
Step into the World of Research
Journal of Lung, Pulmonary & Respiratory Research

Research Article
Open Access
CrossMark

Role of FNAC in lung carcinoma and its histo-cytological correlation

Abstract

Aims and objective

i. To study morphological features of various types of Lung carcinoma.

ii. Cyto-histological correlation of these tumors.

iii. To evaluate sensitivity, specificity & accuracy of FNAC procedures.

Methods and material: We used Chest CT scan and Radiograph of patients for radiological data. We used H & E stain, Modiefied PAP stain and Modified Giemsa stain for slide preparation.

After cytological evaluation, We further divided positive cases into metastatic, Small cell carcinoma, Non small cell carcinoma and others category. Final diagnosis is based on HPE study, as we considered HPE study as GOLD standard. Immuno histochemistry was done in few cases where necessary.

Results: Diagnostic sensitivity and specificity of FNAC for Lung carcinoma was 91.5% and 72.5% respectively. Diagnostic Positive predictive value and Negative predictive value of FNAC for Lung carcinoma was 94.7% and 61.5% respectively.

Here we considered HPE study as GOLD standard. Accuracy of FNAC was 88.5% based on final HPE report.

Conclusion: FNAC is a simple, safe and reliable method with high diagnostic sensitivity for the diagnosis of lung cancer.

Keywords: FNAC, lung carcinoma, histo-cyto correlation

Volume 3 Issue 4 - 2016

Mitul B Modi,[1] Mitesh R Rathva,[1] Nupur R Shah,[2] Manasi Trivedi,[1] Harshad Patel[3]
[1]Department of Pathology, Gujarat University, India
[2]Department of Internal Medicine, Gujarat University, India
[3]Department of Orthopaedics, Gujarat University, India

Correspondence: Mitul B Modi, PG Resident, Department of Pathology, Gujarat Cancer Research Institute (GCRI), Gujarat University, Ahmedabad, Gujarat, India, Tel +919662010331, Email Mitul.modi7@gmail.com

Received: June 10, 2016 | **Published:** June 27, 2016

Introduction

Lung cancer, also known as carcinoma of the lung or pulmonary carcinoma, is a malignant lung tumor characterized by uncontrolled cell growth in tissues of the lung. Worldwide, lung cancer is the most common cancer in terms of both incidence and mortality.

If left untreated, this growth can spread beyond the lung by process of metastasis into nearby tissue or other parts of the body. Most cancers that start in the lung, known as primary lung cancers, are carcinomas that derive from epithelial cells. The main primary types are small-cell lung carcinoma (SCLC) and non-small-cell lung carcinoma (NSCLC). Treatment and long-term outcomes depend on the type of cancer, the stage (degree of spread), and the person's overall health.

Fine needle aspiration cytology (FNAC) is an accurate and sensitive way for the diagnosis of Lung mass lesions.[1,2]

FNAC not only distinguishes between benign and malignant lesions but also helps in tumor typing of Lung cancer. So initiation of specific therapy like chemotherapy or surgery, is possible without delay.

The special advantage of FNAC includes detection of those tumor types like small cell carcinoma, lymphomas which are more appropriately treated by chemotherapy rather than surgery.

Materials and methods

The study was taken in the Department of Pathology, Gujarat Cancer& Research Institute, during the period of July 2014 to November 2014.

There were consecutive cases over a period of 5 months. Retrospective study was undertaken patients having lung mass lesions suspected to be neoplastic by chest radiograph or CT scan were referred to our Institute.

A total 70 cases were included where we got adequate FNAC smear, histopathology reports and clinical history as sex, age and smoking history. Some cases were excluded, in which we did not get either FNAC or Biopsy report.

Air dried smears were stained with May-Grunwald-Giemsa (MGG) whereas alcohol fixed smear stained with modified Papanicolaou (PAP) stain for cytopathological evaluation of the lesions.

By cytological study we widely divided cases into Positive, Negative, suspicious and unsatisfactory groups. We further divided positive cases into metastatic, Small cell carcinoma, Non small cell carcinoma and others category.

Final diagnosis is based on HPE study, as we considered HPE study as GOLD standard. Immuno histochemistry was done in few cases where necessary.

IHC was performed on formalin fixed paraffin embedded tissue sections, using ABC technique with antigen epitope enhancement by heat. The Diaminibenzidine (DAB) reaction was used in final detection step. The slides were counterstained with Mayer's hematoxyline. The method for epitope retrieval was overnight incubation at 60 C. After antigen epitope enhancement, the staining was performed by fully automated machine VENTANA BENCHMARK XT. Appropriate positive and negative controls were included in ll stains to ensure the quality and consistency of staining results.

Following set of antibodies were used wherever required:

i. TTF-1, AE1, CEA, CK7, CK20, Chromogranin, Synaptophsin, p63, Vimentin, Desmoglein3.

ii. Positive Predictive value, Negative Predictive value and all other parameters were calculated using P (Chi square) method and relevant Statistical Analysis from 70 subjects' data.

iii. Correlation is studied by using Pearson correlation coefficient (R value) and p-value Fisher exact test. R value near to 1 shows good correlation and P<0.05 was taken as the cut off for significance.

Results

A total 70 cases were included in the study where we got both FNAC smear and histopathology report of lung masses.

Out of 70 cases, 53 were male and 17 were female.

General demographic findings of the study and common disease pattern have been given in Tables 1–4.

Diagnostic sensitivity and specificity of FNAC for Lung carcinoma was 91.5% and 72.5%.[1,2]

Here we considered HPE study as GOLD standard.

Positive predictive value 94.7%, Negative predictive value 61.5%

Accuracy of FNAC was 88.5% based on final HPE report Figures 1–4.

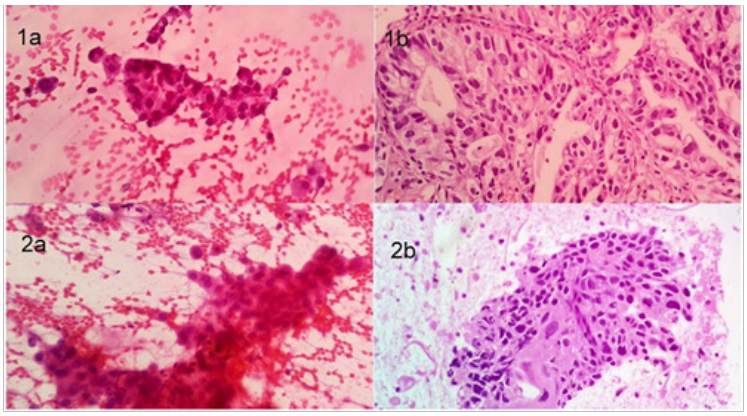

Figure 1 1A: Adeno carcinoma (PAP stain): Cells arranged in clusters & singly with eccentrically placed nuclei.

1B: Adeno carcinoma (HPE study): Malignant cells forming glandular pattern and showing intracytoplasmic mucin.

Figure 2 2A: Squamous cell carcinoma (PAP stain): Malignant squamous Cells arranged in clusters.

2B: Squamous cell carcinoma (HPE study): A cluster of malignant squamous cell showing cytoplasmic keratin and intercellular bridging s/o SCC.

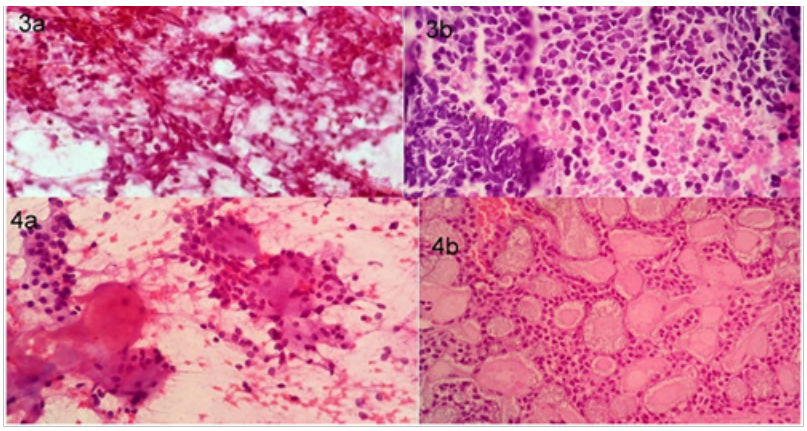

Figure 3 3A: Small cell carcinoma (PAP stain): Small sized cells arranged in clusters with scant or no cytoplasm.

3B: Small cell carcinoma (HPE study): Section shows clusters of small cells with hyperchromasia & nuclear molding with cytoplasm.

Figure 4 4A: Adenoid Cystic carcinoma (PAP stain): Small round

hyperchromatic cells with Prominent hyaline globules seen.

4B: Adenoid Cystic carcinoma (HPE study): Biopsy shows small round
hyperchromatic cells arranged in cribriform pattern & containing hyaline basement membrane material.

Citation: Modi MB, Rathva MR, Shah NR, et al. Role of FNAC in lung carcinoma and its histo-cytological correlation. *J Lung Plume Respir Res.* 2016;3(4):109–112. DOI: 10.15406/jlprr.2016.03.00090

Table 1 Demographic description of the study

Subject	Total No	Percentage
Age		
<40 years	04	5.7%
40-49 years	11	15.7%
50-59 years	26	37.2%
60-69 years	25	35.7%
>70 years	04	5.7%
Sex		
Male	53	75.7%
Female	17	24.3%
Smoking		
Smoker	45	64.2%
Non smoker	25	35.8%

Table 2 Distribution of lung lesions according to cytological study

FNAC	Male	Female	Smoker	Non smoker
Positive	41	11	37	15
Metastatic	02	01	02	01
Small Cell Carcinoma	03	00	01	02
Non small cell carcinoma				
Adenocarcinoma	26	06	26	06
Squamous Cell Ca	04	03	03	04
Others	01	01	01	01
Poorly Differentiated Ca	05	00	04	01
Suspicious	02	02	02	02
Negative	03	02	03	02
Unsatisfactory	07	02	03	06

Table 3 Distribution of lung lesions according to histological study

Biopsy	Male	Female	Smoker	Non smoker
Positive	47	12	41	18
Metastatic	03	00	02	01
Small Cell Carcinoma	04	00	03	01
Non Small Cell Carcinoma				
Adenocarcinoma	23	09	22	10
Squamous Cell Ca	11	02	09	04
Others	02	01	02	01
Poorly Differentiated Ca	04	00	03	01
Negative	07	04	04	07

Table 4 Cytological and histological correlation

Biopsy	Positive	Negative
FNAC		
Positive	54	03
Negative	05	08

Discussion

FNAC is an accurate and safe method for evaluation of lung mass. It enable categorization of malignant lesion in majority of cases. All cases were adults. The peak age of incidence (50-59years) was the same as the documented in recent studies.[3,4]

The mean age in our study was 55.3years.[4,5]

The malignant cases formed largest category including Non small cell carcinoma, small cell carcinoma, metastatic carcinoma and poorly differentiated carcinoma. There was male predominance (75.7%) compared to female in our study. Among the patients (64.2%) was active smokers. Among the malignant lesion, the most common was Adenocarcinoma (47.14%) followed by squamous cell carcinoma (18.5%) and small cell carcinoma (5.71%).

The incidence of Adenocarcinoma was significantly higher than that of squamous cell carcinoma.

Adenocarcinoma, squamous cell carcinoma and small cell carcinoma can be effectively diagnosed by cytology. A high degree of accuracy in cytological typing can be great importance in these days where no confimatory histology is abailable. Maximum cases of lung malignancy were primary while 3 cases represented as metastatic carcinoma from different sites.

No major complication was found when FNAC was done in our study. In our study, FNAC showed almost perfect agreement with histological diagnosis. So FNAC was found to be highly accurate.

Citation: Modi MB, Rathva MR, Shah NR, et al. Role of FNAC in lung carcinoma and its histo-cytological correlation. *J Lung Plume Respir Res.* 2016;3(4):109–112. DOI: 10.15406/jlprr.2016.03.00090

FNAC is an accurate and safe method for the evaluation of lung nodules and it enables sub classification of bronchogenic carcinomas in the vast majority of cases. It is also useful for the diagnosis of tuberculous pulmonary nodules.[6]

Hence FNAC diagnosis alone can be used with confidence to select treatment modalities and to avoid unnecessary surgeries in patients with lung malignancies. FNAC is a simple, safe and reliable method with high diagnostic sensitivity for the diagnosis of lung cancer.

Conclusion

FNAC is a simple, safe and reliable method with high diagnostic sensitivity for the diagnosis of lung.

Acknkowledgements

We all would like to thank the Director of Gujarat University and our institutions' for allowing us to publish this article.

Conflict of interest

The author declares no conflict of interest.

References

1. Mullan CP, Kelly BE, Ellis PK, et al. CT–guided fine–needle aspiration of lung nodules: Effect on outcome of using coaxial technique and immediate cytological evaluation. *Ulster Med J*. 2004;73(1):32–36.
2. Cox JE, Chiles C, McManus CM, et al. Transthoracic needle aspiration biopsy: Variables that affect risk of pneumothorax. *Radiology*. 1999;212(1):165–168.
3. Shah S, Shukla K, Patel P. Role of needle aspiration cytology in diagnosis of lung tumors. A study of 100 cases. *Indian J Pathol Microbiol*. 2007;50(1):56–58.
4. Saha A, Kumar K, Choudhuri MK. Computed tomography–guided fine needle aspiration cytology of thoracic mass lesions: A study of 57 cases. *J Cytol*. 2009;26(2):55–59.
5. Sing JP, Garg L, Setia V. Compared tomography (CT) guided transthoracic needle aspiration cytology in difficult thoracic mass lesions – not approachable by USG. *Indian J Radiol Imaging*. 2004;14(4):395–400.
6. Tan KB, Thamboo TP, Wang SC, et al. Audit of transthoracic fine needle aspiration of the lung: Cytological sub classification of bronchogenic carcinomas and diagnosis of tuberculosis. *Singapore Med J*. 2002;43(11):570–575.

Citation: Modi MB, Rathva MR, Shah NR, et al. Role of FNAC in lung carcinoma and its histo-cytological correlation. *J Lung Plume Respir Res*. 2016;3(4):109–112. DOI: 10.15406/jlprr.2016.03.00090