

Study of Image Guided FNAC of Lung At A Tertiary Care Hospital.

Dr. Parth Bhatt^{1*}, Dr. Milan Purohit², Dr. Payal Shah³, Dr. Deepa Jethwani⁴,
Dr. Gauravi Dhruva⁵

¹ 3rd year resident, ^{2,4} Associate Professor, ³ Assistant Professor, ⁵ Professor and Head, Department of Pathology, P.D.U. Medical College, Rajkot-360001, Gujarat, India.

Abstract:

Introduction: Fine Needle Aspiration Cytology (FNAC) is an interpretative art with histopathology as its scientific base. Fine Needle Aspiration Cytology is the first line of diagnostic procedure in diagnosing lung malignancies and confirming metastasis. **Materials and Methods:** A retrospective study was carried out in pathology department of P.D.U. Medical College & hospital. Data of 58 patients who underwent image guided FNAC between August 2015 to July 2016 was obtained. All the cases were referred to Pathology department for guided FNAC from the TB & Chest department. Image guided (USG/CT) FNAC was carried out as an outpatient procedure after explaining all the risks and benefits and taking informed consent from each patient. FNAC was performed by 22-24 gauge needle attached to a 10 ml syringe for superficial masses and a 9-cm, 20-22 gauge spinal needle for deep-seated masses. The spread glass material was immediately fixed in 95% alcohol for H&E staining. Few slides with material were kept air dried, which were used for MGG staining. The lesions were divided into benign/inflammatory, malignant and unsatisfactory categories. **Results:** Total 58 cases were studied in which image guided FNAC was done for lung lesion. There were total 13 benign/inflammatory cases against 42 malignant cases. 3 cases were unsatisfactory so they were excluded. In present study predominantly male patients were affected. Majority of cases were present in the age group of 40 - 70 years. **Conclusion:** Image guided FNAC is a simple, rapid and safe procedure with high diagnostic accuracy in the evaluation of chest lesions.

Key Words: Lung; cytology; guided FNAC

Introduction:

The art and science of cytology and cytopathology has been implemented and recognized as early as the 18th and 19th centuries¹. Leyden in 1883 and Menbriel in 1986 introduced the technique and diagnostic lung puncture for detection of malignancy and infections². CT guided Fine Needle Aspiration Cytology became first line of diagnostic procedure in diagnosing lung malignancies and confirming metastasis³. It is a simple and safe procedure. Pneumothorax, haemorrhage, chest pain and hemoptysis are usually encountered complications and very few require active management⁴.



* Corresponding Author:

Dr. Parth Bhatt,
E-mail: parth.berba.23@gmail.com

The aim of this study is to identify various types of lung lesions diagnosed by image guided

FNAC.

Materials and Methods

A retrospective study was carried out in pathology department of P.D.U. Medical College & hospital. Data of 58 patients who underwent image guided FNAC between August 2015 to July 2016 was obtained. All the cases were referred to Pathology department for guided FNAC from the TB & Chest department.

Image guided (USG/CT) FNAC was carried out as an outpatient procedure after explaining all the risks and benefits and taking informed consent from each patient. FNAC was performed by 22-24 gauge needle attached to a 10 ml syringe for superficial masses and a 9-cm, 20-22 gauge spinal needle for deep-seated masses. The spread glass material was immediately fixed in 95% alcohol for H&E staining. Few slides with material were kept air dried, which were used for MGG staining.

All the patients were kept under observation after the procedure.

Results

58 cases in which image guided FNAC was taken were included in the study. The lesions were divided into benign/inflammatory, malignant and unsatisfactory for interpretation.

There were total 13 cases that fell into benign/inflammatory/inflammatory category against 42 cases that fell into malignant category. 3 out of 58 aspirations were unsatisfactory and were excluded.

Category	No. of cases
Benign/Inflammatory	13
Malignant	42
Unsatisfactory	3
Total	58

Table 1: Age incidence for benign/inflammatory lesions

Age (years)	No. of cases (%)
21-30	1 (7.7%)
31-40	0
41-50	3 (23.1%)
51-60	5 (38.5%)
61-70	1 (7.6%)
71-80	3 (23.1%)
Total	13 (100%)

Out of 13 benign/inflammatory lesions, 2 were Koch's inflammation, rest showed acute on chronic inflammation. Youngest patient was 30 years old and the FNAC showed inflammatory lesion.

Table 2: Age incidence for malignant lesions

Age (years)	No. of cases (%)
41-50	9(21.4%)
51-60	15(35.7%)
61-70	12(28.6%)
71-80	4(9.5%)
81-90	2(4.8%)
Total	42(100%)

Mean age of presentation of malignant lesions was 61 years with most of them falling into 6th and 7th decade of life. Youngest patient was 41 years old, FNAC of which showed small cell carcinoma.

Table 3: Sex distribution

Sex	Benign/inflammatory	Malignant
Male	11(84.6%)	39(92.9%)
Female	2(15.4%)	3(7.1%)
Total	13(100%)	42(100%)

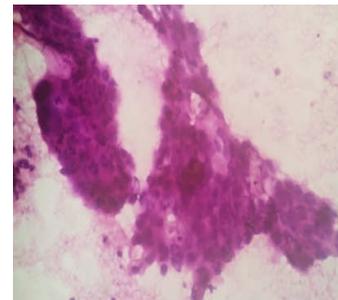
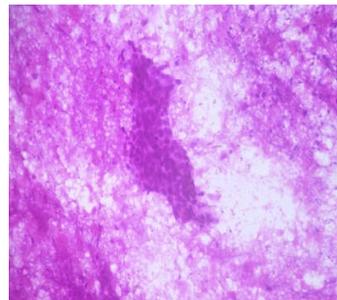
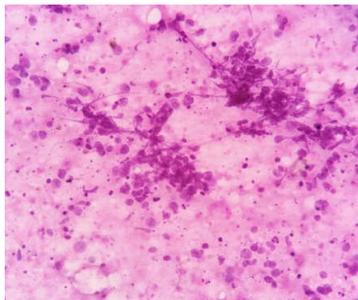
As we can see that in our study male:female ratio in malignant lesions is 13:1 which may be due to more incidence of smoking and chronic obstructive pulmonary disease in males.

Table 4: Malignant lesions

Cytomorphological classification	No. of cases (%)
Small cell carcinoma	4(9.5%)
Squamous cell carcinoma	23(54.6%)
Adenocarcinoma	9(21.5%)
Poorly differentiated carcinoma	3(7.2%)
Metastatic tumours	3(7.2%)
Total	42(100%)

4 out of 42 malignant lesions were small cell carcinomas (Image-1), 35 were non small cell carcinomas. Out of 35 non small cell carcinomas 23 were Squamous cell carcinomas (Image-2) and 9 were Adenocarcinoma (Image-3).

Image-1 Small Cell Carcinoma. Image-2 Keratinizing Squamous Cell Carcinoma. (40X) Image-3 Adenocarcinoma (40X)



3 lesions were diagnosed as metastatic because primary tumour was known. 1 of the 3 metastatic tumour was from renal cell carcinoma and other two were metastatic adenocarcinomas.

Discussion

Fine needle aspiration is generally applied to localized lesions of lung, its use being limited to diffuse parenchymal disease. The main objective of guided FNAC is to diagnose malignancy although it can be used for definitive diagnosis of some benign neoplasms and infections such as Koch's⁵. Among the imaging modalities, CT is the most popular⁶. Other modalities include fluoroscopy and ultrasonography.

Among the FNAC of malignant lesions male:female ratio of 13:1 was observed. This difference is explained on the basis of higher incidence of predisposing factors like smoking, chronic obstructive pulmonary disease (COPD) and alcoholism in males⁷.

The mean age of presentation was 60 years which is comparable to other studies⁸. We had 41.8% cases of Squamous cell carcinoma followed by 16.4% cases of Adenocarcinoma which is quite different from Singh et al⁹. The incidence of malignancy in our study is 76%. Malignancies have been found to range from 69.5% to 96.5% in the published literature.

Cytologically small cell carcinoma presents as dispersed and few clusters of small round malignant cells with little or no cytoplasm with streaking of nuclear material and apoptotic bodies as shown in Image-1, Squamous cell carcinoma presents as malignant cells having refractile eosinophilic cytoplasm with abundant keratin material in background as shown in Image-2 & Adenocarcinoma presents as malignant cell forming acinar pattern as shown in Image-3.

Literature reveals that 70% of the primary lung cancers are diagnosed as non-small cell carcinomas, whereas small cell carcinomas are found to comprise around 20% of all primary lung tumors¹⁰. In our study small cell carcinoma incidence was 7.3%, where as non small cell carcinomas were 92.7%. It is essential to differentiate between small cell and non small cell carcinomas because for individuals with small cell carcinoma at a limited-stage that is treated with combination chemotherapy plus chest radiation, a complete response rate of 80% and survival of 17 months have been reported.¹¹

Perhaps the greatest advantage of fine needle aspiration is safety. However, pneumothorax remains the most common complication of CT-guided lung FNAC. Core needle biopsy (CNB) is a relatively more invasive procedure for intrathoracic lesions with the added advantage of histopathologic examination. However, FNAC and CNB have shown comparable results for diagnosing malignant epithelial lesions, while the latter fares better in diagnosing non-epithelial malignancies and benign/inflammatory specific lesions¹².

Conclusion

Various lung lesions can be easily diagnosed with guided FNAC(USG/CT). It is safe and rapid method with minimal discomfort to patient. Primarily it differentiates malignant from benign/inflammatory lesions. Among malignant lesions differentiation of small cell carcinoma to non small cell carcinoma is helpful in further management of the patient.

References

1. Frable WJ. Integration of surgical and cytopathology: A historical perspective. *Diagn Cytopathol.*1995; 13:375–8

2. Shah S, Shukla K, Patel P. Role of needle aspiration cytology in diagnosis of lung tumours. A study of 100 cases. *Indian J Pathol Microbiol* 2007; 50: 56-58.
3. Orell SR, Sterrett GF, Walters MN. *Manual and Atlas of Fine Needle Aspiration Cytology*, Third edition ed. Edinburg, London: Churchill Livingstone; 1999.
4. Basnet SB, Thapa GB, Shahi R, Shrestha M, Panth R. Computed tomography guided percutaneous transthoracic fine needle aspiration cytology in chest masses. *JNMA J Nepal Med Assoc* 2008; 47: 123-127.
5. Madan M, Bannur H. Evaluation of FNAC in lung diseases. *Turk J Pathol.* 2010;26:1-6
6. Gouliamos AD, Giannopoulos DH, Panagi GM, Fletoridis NK, Deligeorgi-Politi HA, Vlahos LJ. Computed Tomography-Guided Fine Needle Aspiration of Peripheral Lung Opacities: An Initial Diagnostic Procedure, *Acta Cytol.* 2000 May-Jun; 44(3):344-8.
7. Damjanov I, Linder J. *Anderson's Pathology*, 10th ed. St. Louis: Mosby; 1996.
8. Gangopadhyay M, Chakrabarti I, Ghosh N, Giri A. Computed tomography guided fine needle aspiration cytology of mass lesions of lung: Our experience. *Indian J Med Paediatr Oncol* 2011;32:192-6
9. Singh JP, Garg L, Detia V. CT guided transthoracic needle aspiration cytology in difficult Thoracic mass lesions, not approachable by USG. *IJRI* 2004; 14: 395-400.
10. Wu X, Groves FD, McLaughlin CC, Jemal A, Martin J, Chen VW. Cancer incidence patterns among adolescents and young adults in the United States. *Cancer Causes Control.* 2005; 16:309-20.
11. Janne PA, Freidlin B, Saxman S, Johnson DH, Livingston RB, Shepherd FA, et al. Twenty-five years of clinical research for patients with limited-stage small cell lung carcinoma in North America. *Cancer.* 2002 Oct 1. 95(7):1528-38.
12. Gong Y, Sneige N, Guo M, Hicks ME, Moran CA. Transthoracic fine-needle aspiration vs concurrent core needle biopsy in diagnosis of intrathoracic lesions: A retrospective comparison of diagnostic accuracy. *Am J Clin Pathol.* 2006; 125:438-44.