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RESEARCH ARTICLE

ROLE OF FNAC IN DIAGNOSING LESIONS OF LUNG: A ONE YEAR CASE SERIES

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ABSTRACT

Objective: We conducted the study to evaluate the diagnostic accuracy of image guided FNAC of benign and malignant disorders of lung.
Materials and Methods: Over a period of one year 71 Sonography and CT-guided cases were collected.
Results: Out of 71 cases, 51 cases (72.85%) were male and 20(27.15%) were female. The youngest patient was 25 years old whereas the oldest was 92 years old. Malignancy was the predominant lesion found in this study with 48/71 cases (67%). Among the malignant lesions, adenocarcinoma was the commonest malignancy followed by squamous cell carcinoma. Eight cases (11.3%) were inadequate for interpretation.
Conclusion: Image-guided FNAC is safe and rapid procedure to evaluate neoplastic and non-neoplastic lesions of lung. Rapid diagnosis can lead to earlier initiation of therapy.

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INTRODUCTION

Fine-needle aspiration cytology (FNAC) was first used by Martin and Ellis as a diagnostic tool. (Martin and Ellis, 1930) FNAC is a simple, relatively safe, rapid, reliable technique for the diagnosis of pulmonary mass lesions, particularly with the aid of USG and computed tomography (CT) scan. Menbriel in 1986 introduced the technique as diagnostic lung puncture for detection of malignancy and infections. It became easier to locate and reach to affected lung area by guided FNAC. Guided FNAC distinguishes between benign and malignant lesions and it is also helpful in tumour typing of lung cancer. Guided FNAC of lung can detect various type of tumors like lymphoma, small cell carcinoma, squamous cell carcinoma that help in deciding the modality of treatment either chemotherapy or surgery. By diagnosing tumor type, specific therapy for the particular tumor can be initiated without delay. This procedure is almost minimum painful non-operative procedure as compared with biopsy for diagnosis of pulmonary mass. The single major rare complication of this procedure is pneumothorax. The presence of pathologist at the time of the procedure leads to reduction in the number of needle passes and increased adequacy of material. The present study was undertaken to detect the spectrum of benign and malignant lung lesions by the aid of USG and CT guided FNAC.

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MATERIALS AND METHODS

Our study was conducted in the Department of Pathology, in our medical college (Government Medical College, Kota, Rajasthan during the one year period from August 2013 to August 2014. There were 71 consecutive cases over a period of one year having pulmonary mass lesions suspected to be neoplastic by chest radiograph and/or CT scan were referred from different departments of Medicine, Surgery and Oncology. Guided FNAC of pulmonary mass lesions from each case were performed by our pathologist as outdoor procedure and also in presence of experienced radiologist after explaining the risks and benefits (informed consent) to the patient. Smears were prepared immediately from the sample in the Radiology room. Air-dried smears were stained with Giemsa stain. The results were categorised into four categories as: (1) Inflammatory (2) Benign (3) Malignant and (4) Inadequate for interpretation.

RESULTS

A total of 71 cases were included in the study. Majority of the cases were seen in 5th -7th decade (Table-1). The youngest patient was 25 years old whereas the oldest was 92 years old. The mean age in our study was 59.7 years. Out of 71 cases, 51 cases (72.85%) were male and 20(27.15%) were female (Table-2). Cytological examination showed that 48 cases (67.6%) were malignant and 15 cases (21.1%) were benign. The Male/Female ratio was 2.5:1 and among malignant cases was 5:1. There were 8 (11.25%) samples which were inadequate (Table-3).

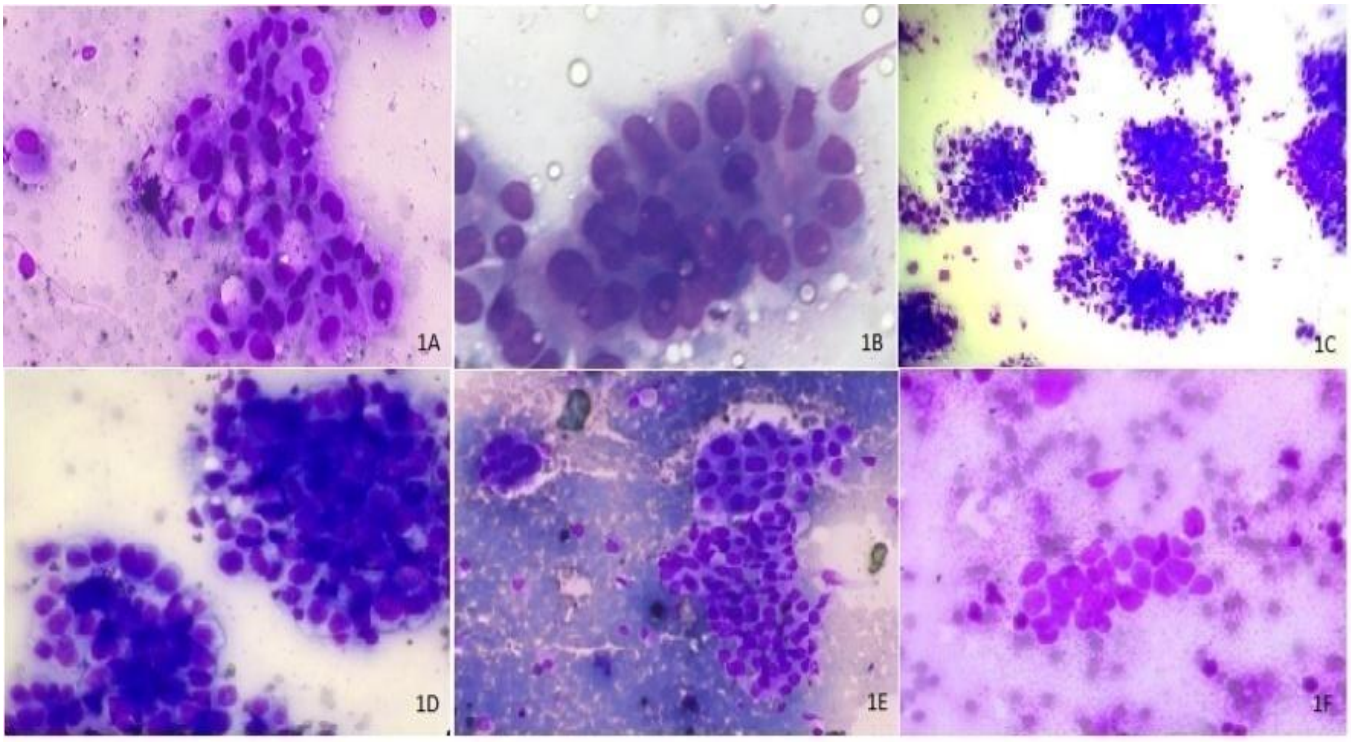

Figure 1. 1a AND 1b- Smears showing acinar pattern, vacuolated cytoplasm, eccentric nuclei favouring adenocarcinoma. 1c and 1d- Smears showing loose clusters of malignant squamous epithelium showing keratinized cytoplasm. 1d – cytosmears showing both squamous and adenomatous component. 1e- smear showing small sized cells wth scanty cytoplasm, coarse chromatin and nuclear moulding. (Geimsa stain, 40x)

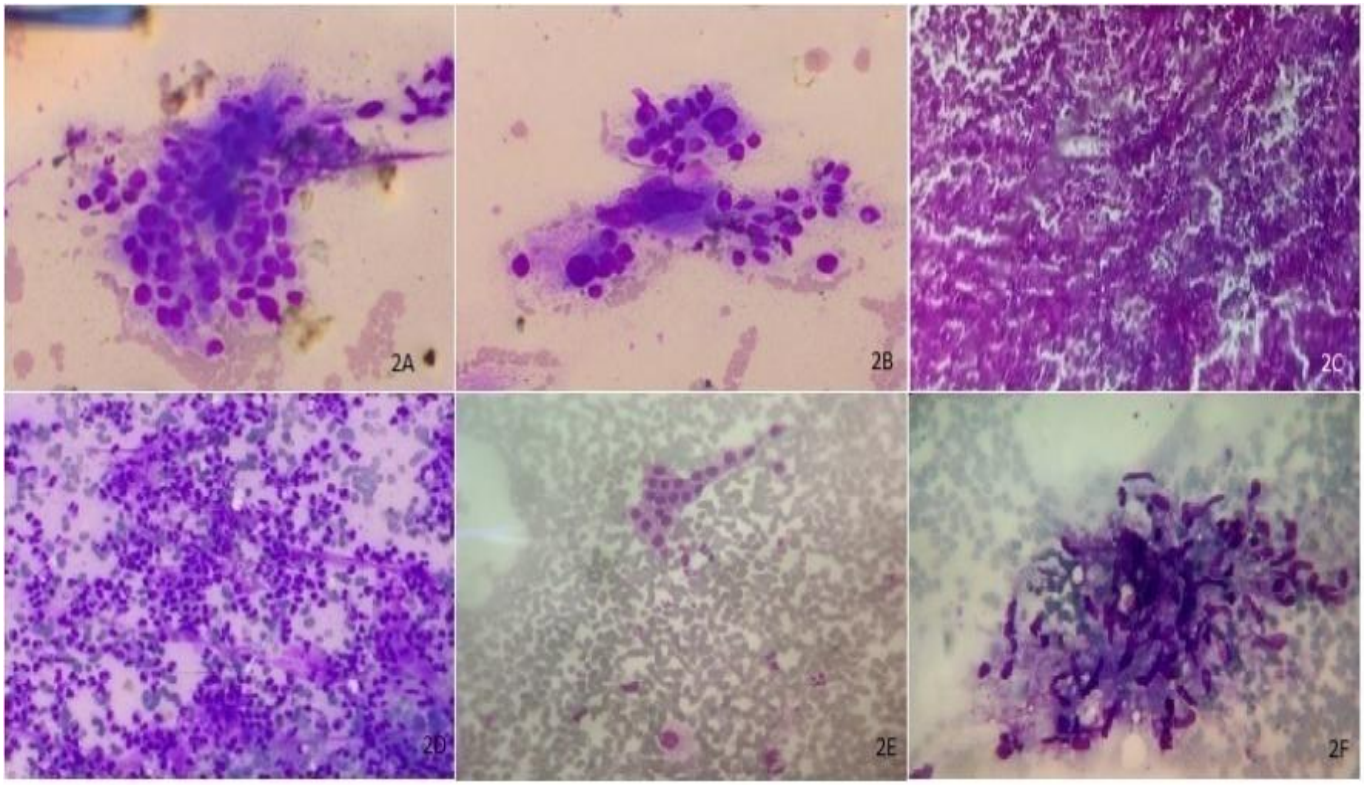

Figure 2. 2a and 2b: Cytosmears showing large, pleomorphic cells with abundant cytoplasm favouring Large Cell Carcinoma.2c and 2d- histopathology showing actinomycosis. Its cytosmears revealed chronic non specific inflammatory infiltrate. 2e- smears showing granuloma comprised from epithelioid cells. (Giemsa, 40x)

Table 1. Demographic study

Category	Total no.	Percentage
Age		
<40	04	5.63%
40-50	08	11.26%
50-60	20	28.2%
60-70	23	32.39%
70-80	16	22.53%
80-90	02	02.81%
<90	01	01.40%

Table 2. Male : Female Ratio

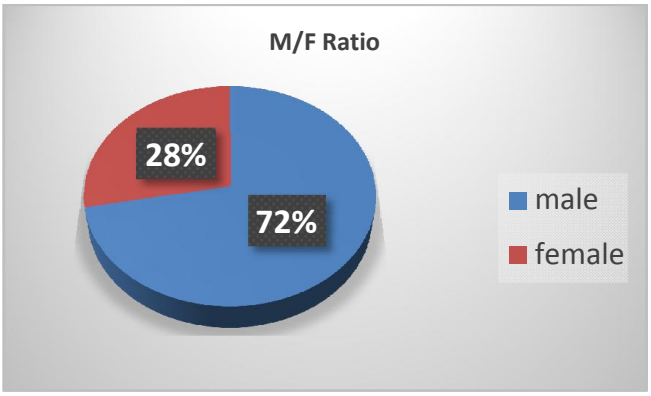

Table 3. Case distribution (total n=71)

Diagnosis	Number	Percentage
Inadequate	8	11.25%
Benign /non inflammatory	4	5.6%
Inflammatory	11	15.49%
Malignant	48	67.60%

Table 4. Spectrum of malignancy according to gender

Type of malignancy	Male (no. of cases)	Female (no. of cases)
Adenocarcinoma	12	07
Squamous cell carcinoma	15	01
Small cell carcinoma	04	00
Large cell carcinoma	02	00
Metastatic carcinoma	04	00
Undifferentiated carcinoma	02	00
Adenosquamous carcinoma	01	00
Total	40	08

Table 5. Types of lung carcinoma on cytology

Typing	Number	Percentage
Adenocarcinoma	19	26.76%
Squamous cell carcinoma	16	22.53%
Small cell carcinoma	04	5.6%
Large cell carcinoma	02	2.8%
Metastatic carcinoma	04	5.6%
Undifferentiated carcinoma	02	2.8%
Adenosquamous carcinoma	01	1.4%

In our study, cytological diagnosis showed maximum number of cases belonging to adenocarcinoma (26.76%).The other diseases spectrum were squamous cell carcinoma (22.53%), inflammatory lesions (15.49%), small cell carcinoma (5.6%), metastatic carcinoma (5.6%), benign noninflammatory lesions (5.6%), large cell carcinoma (2.8%), undifferentiated carcinoma (2.8%) and adenosquamous carcinoma (1.4%). Among the malignant lesions, most common carcinoma (Table-4) was adenocarcinoma 19(26.76%) followed by squamous cell carcinoma 16(22.53%). There was male preponderance in both adenocarcinoma (1.7:1) and squamous cell carcinoma (15:1). Among females, Adenocarcinoma was the commonest malignancy seen. 7 out of 8 females positive for malignancy were diagnosed as adenocarcinoma (Table-4). Hence cytological diagnosis were made in 63 out of 71 cases (88.73%) and incidence of malignancy was 67.60%.

DISCUSSION

Use of cytologic methods in the diagnosis of pulmonary malignancies dates back to the mid-1800s when sputum was examined for exfoliated neoplastic cells. Hamplen recorded the first series in the early 1900s in which 13–25 patients were effectively diagnosed with pulmonary malignancies via examination of sputum. (Linder, 2000) With the developments in the field of thoracic oncology pathologists have to classify lung cancers into small cell and non-small cell with further categorising into squamous and adenocarcinoma, as the treatment modalities are now based into histological types. These types can be easily accessed by means of FNAC and preliminary line of management can be planned. FNAC is not only useful in diagnosing malignancy but certain inflammatory conditions like tuberculosis can be easily detected and anti tubercular therapy can be rapidly started. In our study of 71 cases over the period of one year the peak incidence of pulmonary diseases was seen in seventh decade. Cytological diagnosis was made in 63 out of 71 cases (88.73%) and high incidence of malignancy (67.60%) which was comparable with that found in other studies was seen. (Arslan *et al*., 2002; Garpestad *et al*., 2001) Lung cancers are the most common cause of death due to cancer in men and are now increasingly seen in females. In our series also there was male preponderance with the ratio of 5:1.Squamous cell carcinoma was the most common lung tumour seen in males in our study. However among females Adenocarcinoma was found to be the commonest. This goes with literature attributing to smoking habits of males, tobacco chewing and diseases like COPD. (Kumar *et al*., 2015) Time and again FNAC has proved its usefulness in diagnosing inflammatory and neoplastic conditions. Although CT Scan is very popular method for diagnosis (Gouliamos *et al*., 2000), FNAC helps in further classifying these lesions to benign and malignant and thus avoiding unnecessary need of thoracotomy. Lung carcinoma are separated into small cell carcinomas and nonsmall cell carcinomas. For small cell carcinomas intensive chemotherapy is advised whereas the non-small cell carcinomas are to be treated surgically. FNAC can accurately diagnose these categories and help in planning better and early management of these patients. In our study in 8 (11.25%) cases samples were inadequate. However, aspiration could not be repeated either because of tumour location or patient incompliance. Other studies have shown the rate of inadequate sampling varying from 8.8% to 25.4% (3,4,5) which is concordant with our studies. The reasons quoted are faulty technique, necrosis, tumour location and patient compliance. (Orell *et al*., 2012)

Conclusion

There is increasing role of cytology in diagnosing both neoplastic and non-neoplastic lesions of lung. Performing FNAC is much easier and helps in prompt diagnosis and management of patients.

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