



EFFICACY ORIENTED COMPARATIVE ANALYSIS OF BRONCHIOALVEOLAR LAVAGE, TRANSBRONCHIAL NEEDLE ASPIRATION AND IMAGE GUIDED FINE NEEDLE ASPIRATION FOR DIAGNOSIS OF PULMONARY LESIONS BASED ON CYTOMORPHOLOGICAL PARAMETERS IN RURAL AREA IN NORTH INDIA.

Pathology

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ABSTRACT

Pulmonary lesions encompass a wide variety of benign and malignant conditions. Lung cancer is a frequently diagnosed cancer worldwide. Although clinical data, location and radiological findings can narrow down the diagnostic possibilities, a cytological diagnosis is warranted before initiating the specific treatment for the malignant disease. The present study was undertaken with the aim to compare the sensitivity and specificity of BAL, TBNA and image-guided FNAC in the evaluation of patients with pulmonary lesions. The present study was conducted on 200 patients with pulmonary lesions. For diagnostic purposes various procedures like BAL, TBNA and image guided FNAC were performed and cytological examination was carried out. Among 200 cases, TBNA was done in 126 cases, BAL in 104 cases and image guided FNAC was performed in 74 cases. Using these cytological techniques, a diagnosis was obtained in 81% cases. The sensitivity and specificity of each technique was assessed. On cytological evaluation, 12% cases had a non-neoplastic diagnosis, whereas 69% cases, malignancy was diagnosed. However, in 19% cases no diagnosis was offered. The most common diagnosis amongst malignant lesions was non-small cell carcinomas. (Squamous cell carcinoma- 28%, Adenocarcinoma-23%) followed by small cell carcinoma (8%). Image-guided FNAC of pulmonary lesions is a simple, safe, economically viable technique with low morbidity and offers quick and early diagnosis. Our study revealed that TBNA and FNAC were comparatively better in the diagnosis when compared to BAL.

KEYWORDS

Image guided FNAC, Squamous cell carcinoma, TBNA, BAL

INTRODUCTION

Lung cancer comprises 17% of the total newly diagnosed cancer cases in males and causes 23% of total cancer related deaths.(1,2) Its prognosis depends on the stage of the cancer at the initial diagnosis, therefore, an early diagnosis, improves it. (3) Different modalities used for early diagnosis are radiological investigations, TBNA, bronchial biopsy, exfoliative cytology like bronchial washings, BAL and image guided FNAC.(4) Image-guided FNAC has a low complication rate and is highly sensitive for the diagnosis of non-palpable deep-seated lung lesions.(5-9) TBNA of the mediastinum is rapidly becoming a technique of choice for minimally invasive staging of lung cancer and BAL as a therapeutic procedure for clearing secretions in the alveolar spaces.(10-13) Subsequently, while correlating these cytological techniques false negative and false positive results can be reduced, thereby, improving the diagnostic efficacy. The present study is undertaken with the aim to study the efficacy of BAL, TBNA and image guided fine needle aspiration in the evaluation of patients with pulmonary lesions.

MATERIALS AND METHOD

The present study was conducted on 200 patients with pulmonary lesions over the time period of 3 years. Ethical clearance for the study was obtained from institute ethical committee. Informed consent was obtained from all the patients. For diagnostic purposes, procedures like BAL and TBNA were performed in the department of pulmonary medicine. Image-guided FNAC were done through percutaneous and transthoracic approach. Final diagnosis was made with the help of bronchoscopic findings, clinico-radiologic impressions, cytological findings and response to treatment.

RESULTS

Among these 200 cases, both BAL and TBNA were performed in 104 cases whereas in 22 cases TBNA alone was done. Among 74 cases of image-guided FNAC, 66 cases were ultrasound- guided and 4 cases were computed tomography (CT) guided (Table 1). Age of the patients was between 14 years to 80 years (mean 53.14 years). Male female ratio was 2.7:1 having a male pre-ponderance. Majority of patients had history of smoking. In our study, the most common presenting complaint was cough (73%) followed by shortness of breath (63%) and chest pain (53%). The lung lesions were central in 63% and the peripheral in 37% cases. Of the 200 cases, a firm diagnosis was offered in 162 cases using various cytological techniques. In 124 patients

where TBNA was performed, diagnosis was possible in 92 cases whereas in 34 cases no diagnosis could be arrived at. The sensitivity and specificity of TBNA was 86.3% and 83.3%. BAL was done in 104 cases and correct diagnosis was achieved in 28 cases. The sensitivity and specificity of BAL procedure in our study was 34.2% and 90.9%, respectively. In cases of image-guided FNAC, the correct diagnosis was obtained in 70 cases. Thus, the sensitivity and specificity of image-guided procedure was 97.2% and 100% respectively. The lesions were categorized as non- neoplastic, neoplastic and non-diagnostic. In non-neoplastic category, there were 12 cases each of granulomatous inflammation and non-specific inflammatory pathology. Of the 12 cases of granulomatous inflammation, 4 cases were Ziehl-Neelsen positive and thus, these were labelled as tuberculosis. In the neoplastic category, no benign lesion was encountered in the study. Study showed 138 malignant cases when 16 cases were diagnosed as small cell carcinoma, 56 cases squamous cell carcinoma, 46 cases adenocarcinoma and 8 cases poorly differentiated carcinoma (Table 2).

Table 1- Distribution of cases according to procedure performed

PROCEDURE PERFORMED	CASES
TBNA + BAL	104
TBNA	22
IMAGE GUIDED FNAC	74
TOTAL	200

Table 2- Cytomorphological diagnosis of 200 cases

Cytomorphological Diagnosis	Cases
Squamous cell carcinoma	56
Adenocarcinoma	46
Small cell carcinoma	16
Granulomatous inflammation	12
Non specific inflammation	12
Poorly differentiated carcinoma	8
Adenosquamous carcinoma	2
Large cell carcinoma	2
Adenoid cystic carcinoma	2
Hodgkins disease (pulmonary)	2
Carcinoid tumor	2
Anaplastic large cell lymphoma	2
Non diagnostic	38
Total	200

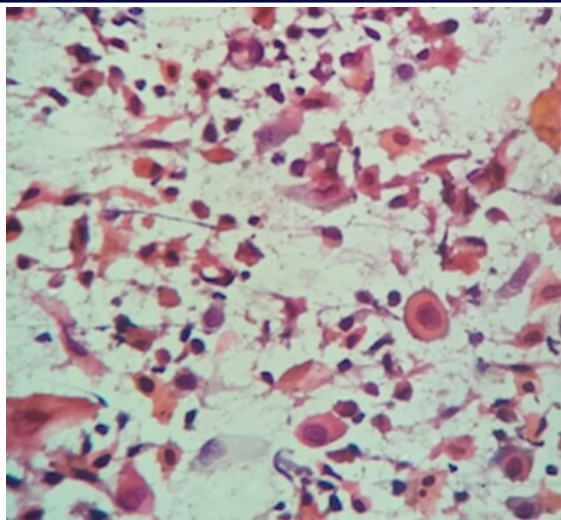


Fig. 1- Smear showing malignant squamous cells with orangeophilic cytoplasm and dark hyperchromatic nuclei (X400, PAP)

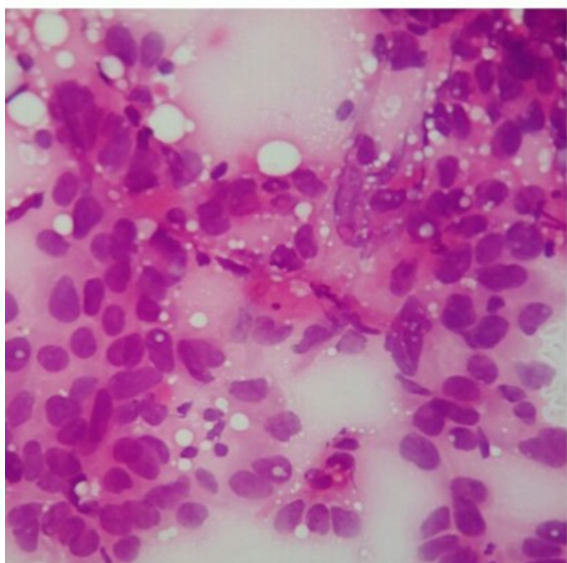


Fig. 2- Smear showing dispersed malignant cells of adenocarcinoma exhibiting nuclear pleomorphism and gland formation (X400, H&E)

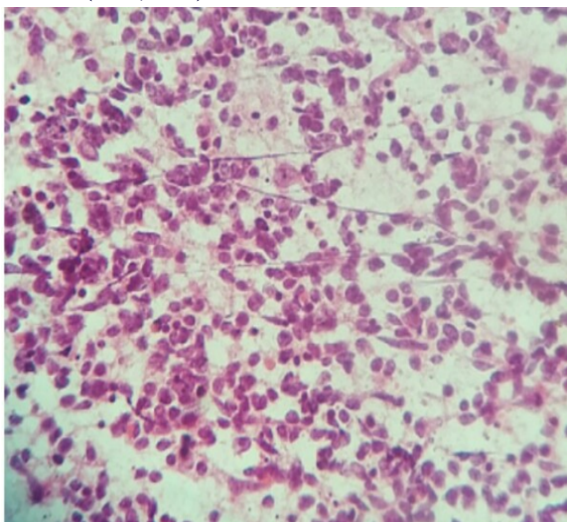


Fig. 3- smear showing small cell carcinoma cells with hyperchromatic nuclei exhibiting nuclear streaking and nuclear moulding (X100, H&E)

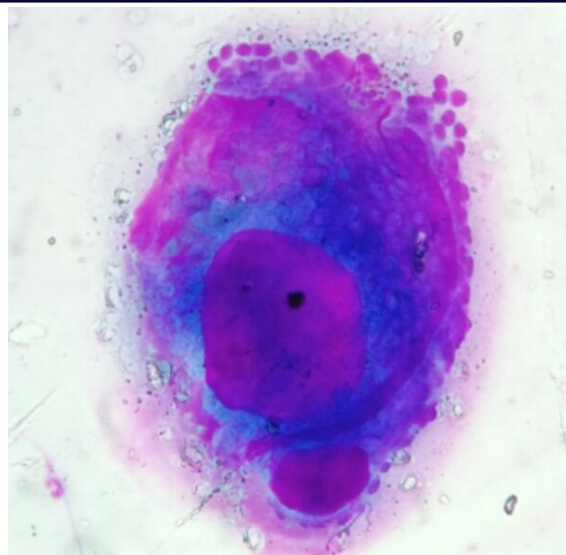


Fig. 4- Smear showing three dimensional cluster of adenoid cystic carcinoma cells with homogenous hyaline globules (X400, MGG)

DISCUSSION

The present study was done on 200 cases of pulmonary lesions using various cytological techniques. The mean age of the patients under study was 53.14 years which is comparable to studies done by Sareen et al.(3) Bhat et al(4) and Rohtagi et al.(12) There was male preponderance of pulmonary lesions as mentioned by majority of the studies of the literature. The male: female ratio of present study was 2.7:1. Bodh et al(14) found in their study that male: female ratio is 3.35:1 whereas Sareen et al(3) showed male: female ratio of 8.4:1. Cough and shortness of breath was the most common complaints. Similar findings were observed in the study by Sareen et al.(3) Both TBNA and BAL were performed in 104 cases of radiologically suspected lung lesions. The sensitivity and specificity of BAL procedure was 34.2% and 90.9%, respectively. The sensitivity of our study correlated however, the specificity was slightly higher than the study done by Bhat et al.(4) In present study, 28 cases were correctly diagnosed, 2 cases was false positive and 54 cases were false negative. The main reason for false negative cases was due to non-representative material or paucicellular smears. The cytological sampling by BAL procedure depends on exfoliated cells from the lesion. False positive cases can result from misinterpretation of cellular changes in inflammatory conditions such as pneumonia of long duration (atypical macrophages) and squamous metaplasia. In the present study, there were 2 false positive cases due to misinterpretation of squamous metaplasia as suspicious of malignancy. As there were fewer number of false positive cases, this was the strength of BAL cytology in the present study. TBNA was performed in 126 cases and the correct diagnosis was achieved in 88 cases. There were 4 false positive cases due to misinterpretation of squamous metaplasia as dysplastic squamous cells suggestive of malignancy. In a study conducted by Ye T et al.(10) the sensitivity and specificity of TBNA was 95.08% and 100%, respectively which was slightly higher than our study. Current diagnosis was possible in 70 of the 74 cases of image guided FNAC. No false positive case was reported on the cytology, therefore, giving specificity as close to 100% and the sensitivity of 97.2%. In a study done by Sareen et al.(3) the sensitivity and specificity of CT guided FNAC were found to be 87.25% and 100%, respectively which correlated well with our study. There were 2 false negative cases in present study that on repeated aspirations yielded necrotic material only. The diagnosis was later confirmed on biopsy as squamous cell carcinoma. Squamous cell carcinoma (Fig. 1; 28% cases) was the most common malignancy followed by adenocarcinoma (Fig. 2; 23% cases) and small cell carcinoma (Fig. 3; 8% cases). In western world, adenocarcinoma is the most common malignancy of the lung.(15) However, most of the Indian studies mentions squamous cell carcinoma to be the most frequently occurring lung malignancy. In the present study, 8 cases were diagnosed as poorly differentiated carcinoma without further subtyping due to the presence few viable anaplastic cells in a necrotic background. The other less common malignancies diagnosed in our study were adenosquamous carcinoma, large cell carcinoma, adenoid cystic carcinoma, carcinoid, Hodgkin's

disease with pulmonary involvement and anaplastic large cell lymphoma (fig. 4). Hence, for central lesions, TBNA is the preferred technique whereas the peripheral lesions are best approached with image-guided FNAC, however, BAL is the safest procedure.(16,17)

CONCLUSION

Image-guided FNAC of pulmonary lesion is a simple, safe, economically prudent technique with low morbidity and leading to quick and early diagnosis. It was found in our study that TBNA and FNAC are comparatively more efficient than BAL even though BAL and TBNA can be done in one sitting.

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