

A prospective study on computed tomography guided fine needle aspiration cytology of peripheral lung lesions

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Abstract

Introduction: Percutaneous fine needle aspiration cytology (FnAC) of the lung is generally indicated for the diagnosis of pulmonary lesions. There are many hazards associated with performing thoracotomy for lung lesions. FnAC has become a diagnostic tool to assess the nature of radiographically demonstrable lung lesions. The general acceptance of FnA has been low but the appreciation of this method for lung lesions has been rapid due to the difficulty in otherwise diagnosing small peripheral lung lesions. Fear of neoplastic implantation in the needle track may have initially inhibited its use but have proven groundless. **Materials and Methods:** A total of 80 cases were included in the study. The study period was from January 2020 to December 2020. All patients presented with respiratory symptoms with a localized lung lesion clinically, which was confirmed radiologically. Patients were placed in the supine, prone, right lateral or left lateral position depending on the location of the lesion so that the lesion was nearest to the aspirator. **Results:** The diagnostic accuracy was 95% considering cytological criteria as the standard. The most common age group affected was 41–70 years (67.5%). However age groups in both extremes of life were affected less. The youngest patient was 20 years old whereas the oldest was 78 years old. Of the forty patients, twenty-seven were males and thirteen were females. A male preponderance was therefore noted in this study with a M:F ratio of 2.081. Table I shows the distribution of the cases. The predominant lesion found in this study was malignancy in twenty-four cases (60%), followed by an inflammatory lesion in twelve cases (30%). One case each was reported as suspicious of malignancy (2.5%) and as a granulomatous lesion (2.5%). **Conclusion:** Percutaneous, transthoracic FnAC is a relatively simple procedure with good patient acceptance and low morbidity. It is an accurate, safe and repeatable procedure in the diagnosis of difficult lung lesions. Ct scan has enabled the visualization of previously inaccessible tumors, which can now be guided by this procedure, leading to a greater yield of cytological material and a significantly greater predictability of true positive cases in malignant lesions. FnAC should be used earlier and more frequently to shorten the diagnostic interval and allow more prompt therapy for persistent lung lesions.

Keywords: Percutaneous fine needle aspiration cytology, small peripheral lung lesions, granulomatous lesion.

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Introduction

Percutaneous fine needle aspiration cytology (FnAC) of the lung is generally indicated for the diagnosis of pulmonary lesions. There are many hazards associated with performing thoracotomy for lung lesions. FnAC has become a diagnostic tool to assess the nature of radiographically demonstrable lung lesions[1]. The general acceptance of FnA has been low but the appreciation of this method for lung lesions has been rapid due to the difficulty in otherwise diagnosing small peripheral lung lesions. Fear of neoplastic implantation in the needle track may have initially inhibited its use but have proven groundless[2]. Recognition of the accuracy of FnAC and simpler methods of treating pneumothorax has brought this method within the reach of most hospital radiologists and pathologists[3]. Infections and other benign processes may be proven by this method but the main indication remains the diagnosis of suspected malignant intrathoracic lesions. All intrathoracic lesions including deep hilar lesions are now routinely and safely sampled using FnA under computerized tomography (Ct) guidance[4,5]. The present study was undertaken to determine the accuracy and efficacy of percutaneous FnAC in the diagnosis of various lung lesions.

Materials and methods

Study design

A prospective study

Study location

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Study duration

January 2020 to December 2020.

Sample size

80 cases.

A total of 80 cases were included in the study. The study period was from January 2020 to December 2020. All patients presented with respiratory symptoms with a localized lung lesion clinically, which was confirmed radiologically. Patients were placed in the supine, prone, right lateral or left lateral position depending on the location of the lesion so that the lesion was nearest to the aspirator. Lesions were considered peripheral when more than 2 cm in diameter and within 4 cm from the skin. Informed consent was obtained from the patient after a brief explanation of the technique. Premedication was generally avoided except in one patient who was old and anxious, where an atropine injection was given prior to FnAC. After aspiration, half of the slides were immediately fixed in 95% ethanol and Papanicolaou (Pap) stained. The rest were air-dried, later fixed in methanol and stained using the May Grünwald-Giewska (MGG) stain. The patient was watched carefully for signs of pneumothorax and a follow-up X-ray performed four hours after the FnAC to look for any such signs. The results were classified into five categories: (1) inflammatory, (2) Granulomatous lesion/ tuberculosis, (3) suspicious of malignancy, (4) Positive for malignancy, (5) inadequate for interpretation

Results

The diagnostic accuracy was 95% considering cytological criteria as the standard. The most common age group affected was 41–70 years (67.5%). However age groups in both extremes of life were affected less. The youngest patient was 20 years old whereas the oldest was 78 years old. Of the forty patients, twenty-seven were males and thirteen were females. A male preponderance was therefore noted in this study

with a M:F ratio of 2.081. Table I shows the distribution of the cases. The predominant lesion found in this study was malignancy in twenty-four cases (60%), followed by an inflammatory lesion in twelve cases (30%). One case each was reported as suspicious of malignancy (2.5%) and as a granulomatous lesion (2.5%). The material was inadequate for interpretation in two cases (5%). Out of twenty-four FNA-proven cases of malignancy, twenty were males (83.33%) and only four were females (16.66%). Hence, there was a

significant male preponderance in malignant cases with a M:F ratio of 5:1. Table 2 shows the cytological typing of malignant lesions. The most common malignant lesion seen was adenocarcinoma in twelve cases (30%). Two of these were diagnosed as bronchioloalveolar carcinoma. Squamous cell carcinoma was diagnosed in nine cases (22.5%) whereas three cases were classified as undifferentiated carcinomas (7.5%).

Table 1: Distribution of cases

S.No	Diagnosis	Number	Percentage (%)
1	Inflammatory	24	30%
2	Granulomatous	2	2.5%
3	suspicious of malignancy	2	2.5%
4	Positive for malignancy	48	60%
5	inadequate for interpretation	4	05%
6	Total	80	100%

Table 2: Cytological typing of malignant lesions

Typing	Number	Percentage (%)
Adenocarcinoma:	24	30%
• Conventional	20	25%
• bronchioloalveolar	4	5%
squamous cell carcinoma	18	22.5%
undifferentiated carcinoma	6	7.5%
Total	48	60

Discussion

Fine needle aspiration of intrathoracic organs is generally applied to localized lesions, its use being limited in the diagnosis of diffuse parenchymal disease. Proof of malignancy is the usual aim of such a procedure although it can be used for definitive diagnosis of some benign neoplasms and infections such as tuberculosis[6]. Different imaging modalities such as fluoroscopy, ultrasonography, and computed tomography have been used by various authors. Computed tomography is widely used nowadays. The present study consisted of forty-three aspirations performed on forty patients. In three cases (7.5%), repeat aspiration helped to obtain adequate material as the material was inadequate in the first instance. The aspiration was repeated in these cases as there was a strong suspicion of malignancy on clinical and radiological examination. Different studies cite a repeat aspiration rate of 13% for an inconclusive first aspiration. It is also stated that an unsatisfactory aspiration must be repeated, particularly when there is strong suspicion of possible malignancy[7]. In two cases (5%), the material was inadequate for interpretation but aspiration could not be repeated either because the patient was uncooperative or lost to follow up. Various studies have shown the rate of inadequate sampling to vary from 8.8% to 25.4%. The reasons quoted are faulty technique, necrosis, tumor location and patient compliance[8]. Three cases were diagnosed as undifferentiated carcinoma in the present study (7.5%). undifferentiated carcinoma constitutes 7-15% of lung cancers. As no immunocyto-chemical studies were done in the present study, the above three cases were diagnosed as undifferentiated carcinoma and no further typing could be done. Complications were encountered in only one case (2.5%), which developed dyspnoea following FNA. no fatalities were reported in the present study. However major complications have been reported by previous workers, the commonest complication being pneumothorax[9]. Other carcinomas of the lung i.e. small cell carcinoma, giant cell carcinoma and adenosquamous carcinoma were not found in this study. The possible explanation can be the relative rarity of these neoplasms. Small cell carcinoma accounts for 10-20% whereas both giant cell carcinoma and adenosquamous carcinoma make up less than 5% of lung malignancies. The site of occurrence of small cell carcinoma is further a hindrance to its diagnosis by FNA. It occurs predominantly in the central portions of the lung, in the major bronchi[10].

Conclusion

Conflict of Interest: Nil Source of support: Nil

Percutaneous, transthoracic FNA is a relatively simple procedure with good patient acceptance and low morbidity. It is an accurate, safe and repeatable procedure in the diagnosis of difficult lung lesions. CT scan has enabled the visualization of previously inaccessible tumors, which can now be guided by this procedure, leading to a greater yield of cytological material and a significantly greater predictability of true positive cases in malignant lesions. FNA should be used earlier and more frequently to shorten the diagnostic interval and allow more prompt therapy for persistent lung lesions.

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