Role of Needle Aspiration Biopsy in the Diagnosis of Mass in Chest

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Patients presenting at Mayo Hospital Chest Surgery Ward (Teaching Unit) who had mass lesion in the lung on X Ray were included in this study. Neele aspiration biopsy was done in all patients except for 05 cases. A total of 105 cases were studied between January 1997 to June 1999. Out of these, 80 were male, and 25 were female. There ages ranged between 10- 90 years. Fine needle aspiration was also carried out in 101 out of 105 cases yielding an overall diagnostic value of 67.33%. It revealed tissue in 62 cases (61.39%), fluid in 28 cases (27.72%). Positive yield of needle aspiration biopsy in centrally located lesion was up to 23.53% whereas in peripherally located lesion mounted to 76.19%. This study revealed that needle aspiration biopsy of peripheral lung lesions or larger lesions is a very safe, quick and reliable method for establishing the diagnosis of mass chest. Moreover it showed better results in peripherally located lesions.

Key words: Needle aspiration biopsy, mass in chest.

As in other branches of medicine, a careful and detailed history and physical examination are the cornerstones of accurate diagnosis in the patients with respiratory system disorders. Lungs are a common site for various inflammatory as well as malignant diseases. Primary Ca. of lung is on increase day by day and the bronchogenic carcinoma is the most commonly diagnosed malignancy throughout the world.

Despite good clinical assessment, availability of x-rays facilities and laboratory investigations, a number of lung lesions are either misleading or remain undiagnosed. Examination of the tissue is the only mean of definite diagnosis, which can be obtained easily with needle aspiration biopsy.

Percutaneous needle biopsy is one of the most commonly used procedures. The history encompassing needle biopsy of lung is biphasic. Needle aspiration biopsy of the lung was first performed by Leyden (1883)[18] who used it to establish etiology of pneumonias. Three years latter Menetrier (1886)[19] for the first time using the same technique diagnosed a case of carcinoma of lung

The indications for the procedure were:

Medical contraindication to thorocotomy, Metastatic disease confirmation, Bilateral or other inoperable diseases, to establish diagnosis before thorocotomy, tissues diagnosis of Ca. for preparation for radiation and to obtain material for tissue.

The contraindications were; pulmonary hypertension, bleeding diathesis, aortic aneurysm, hydatid cyst and arterio-venous malformation.

Material and Methods

A Prospective study was conducted at Department of Chest Surgery (Teaching Unit) Mayo Hospital Lahore, from January 1997 to June 1999. The basic criteria for selection of the cases was the presence of radio-opaque shadow on chest roentgenogram. There was no restriction of age and sex.

Preparation of the patient involved careful explanation of the technique, written consent for the procedure and recent postero-anterior and lateral chest radiographs. After locating the lesion with recent PA and Lateral X-rays chest, a 16G LP needle was introduced under local anesthesia. This was then attached with a 10cc disposable syringe and on reaching the mass, suction was applied and few in and out movements were made. The needle was taken out and the specimen was then send to pathology laboratory for cytological examination.

Results

A mass lesion or a pulmonary infiltrate on a chest X-ray is a common clinical problem. A careful clinical and radiological examination may suggest the diagnosis strongly, however, a histological diagnosis almost invariable is required before embarking on treatment. A total of 105 patients with clinical and radiological evidence of opacity on chest were included in this study. The diagnosis of each of these categorized cases was made on the basis of the results of Needle aspiration biopsy. Out of these 105 cases, 80 were males and 25 females. Their ages ranged between 10 and 90 years.

Of these 105 cases in this series

Pulmonary lesions	86 cases (81.90%)
Mediastinal lesions	16 cases (15.24%)
Chest wall lesions	3 cases (2.86%)
Total	105 cases (100%)

The Histological diagnosis of a lung lesion enables appropriate management to commence. The methods employed to reach the diagnosis should be reliable, safe, technically simple and if possible, in expensive. Needle aspiration biopsy fulfills all these criteria. All the 105 cases were examined carefully and FNAC was performed in101cases (96.19%) It was not performed in 4 cases due to suspicion of Hydatid cyst, which was latter, confirmed by ultrasonography and by Indirect Haemagglutination test for Echinococcus Granulosis. These were then treated by thoracotomy.

Of all the 101 cases, Needle aspiration biopsy revealed tissue in 62 cases (61.39%), fluid in 28 patients (27.72%) whereas mass could not be hit in 11 cases

(10.89%). Table No. 1.

Table 1. Diagnostic yield of needle aspiration biopsy in 101 cases in relation with location of lesion on chest x-ray

	Central	Peripheral
No. of cases	17(16.8%)	84(83.2%)
No. of cases diagnosed	4(23.5%)	64(76.2%)
Malignant	2(11.8%)	41(48.8%)
Non malignant	2(11.8%)	23(27.4%)
Inconclusive	8(47.1%)	14(16.7%)
Lesion not hit	5(29.4%)	6(7.41%)

Needle aspiration Biopsy was not performed in 4 cases with hydatid lung disease.

Table 2. Diagnostic yield of needle aspiration biopsy (NAB) done in 101 cases

	No. of cases	%age
Needle aspiration biopsy (NAB) done	101	100
NAB revealed tissue	62	61.39
Nab revealed fluid	28	27.72
NAB revealed no tissue, no fluid	11	10.98
NAB positive for malignant lesion	43	42.57
NAB positive for non malignant lesions	25	24.75
Inconclusive	22	21.78
Mass not hit	11	10.98

Table 3. Histological variety of 43 malignant cases on needle aspiration biopsy

	No. of cases	%age
Squamous cell carcinoma	15	34.88
a. Well differentiated	6	
b. Moderately differentiated	5	
c. Poorly differentiated	4	
Small cell anaplastic	14	32.56
Adenocarcinoma	6	13.95
Malignant cells	4	9.30
Lymphoma (non Hodgkin's)	2	4.65
Fibrosarcoma	1	2.33
Unclassified carcinoma	1	2.33
Total	43	100

Regarding the histology of 25 non-malignant cases (23 peripheral and 2 central) chronic non-specific inflammation was on the top with 10 cases (40%), Tuberculosis was second with 9 cases (36%) etc.

Table. 4. Histological variety of 43 non malignant cases on needle aspiration biopsy

	No. of cases	%age
Chronic non specific inflammation	10	40
Tuberculosis	9	36
Lung abscess	2	8
Glomangioma	1	4
Dermoid cyst	1	4
Chyle	1	4
Squamous hyperplasia	1	4
Total	25	100

An overall diagnostic accuracy was achieved in 67.33% of cases. Positive yield of Needle aspiration biopsy in centrally located lesion is 23.5% (malignant 11.8%, non-malignant 11.8%), whereas in peripherally located lesions yield is 76.2% (malignant 48.8%) non-malignant (27.4%).

Complications

The incidence of complications with this procedure were:
1. Pneumothorax 2 patients (1.98%)
2. Haemoptysis 3 patients (2.97%)

Two patients had pneumothorax with severe chest pain. Chest intubation had to be done in one case only which was removed after 48 hours as the lung fully expanded while in other case the lung expanded by itself within 36 hours.

Discussion

In this study Needle Aspiration was done on 101 cases (96.19%) out of which in 62 cases (61.39%) tissue was revealed, and fluid in 28 patient. (27.72%) whereas lesion could not be hit in 11 cases (10.98%) (Table 1) .Coleman, Driver and Gishen (1982)[7] recommended needle aspiration biopsy as an excellent alternative to other more established techniques, (Bronchosopic biopsy, Brushings, Transthoracic core needle biopsy, open lung biopsy and lymph node biopsy), particularly in the diagnosis of a peripherally located lesions and achieved an overall accuracy in 83%.

The use of Fibreoptic Bronchoscope has revolutionized the diagnosis of lesion in chest but this is not so successful in peripherally located lesions. The lesions are difficult to diagnose but this has been overcome with the introduction of needle aspiration and it has gained tremendous popularity in the last two decades. When FNA is performed with proper care the sensitivity is as high as up to 80% and specificity more than 90% for malignant diseases but this is considerably less accurate for benign diseases. The diagnostic yield of FNA in lung lesions varies from 49% to 97% (Johnston, 1984, D Veale, J Gilmant, Gibson J.G., 1988, J. Polak 1989). The results are comparable to our own study. In our study an overall diagnostic accuracy was achieved in 67.33%. Radio logically,

Centrally located lesion 17 cases (16.83%)
Peripherally located lesion 84 cases (83.17%)

Positive diagnostic yield of Needle aspiration biopsy in centrally located lesion is 23.5% (malignant 11.8%, non-malignant 11.86%) whereas peripheral placed lesion yield is 76.2% (malignant 48.8%,
non-malignant 27.4%)

From the above-mentioned statistical data it is concluded that for peripherally located lesion needle aspiration biopsy proved to be the best procedure.

Conclusion

The overall diagnostic yield of needle aspiration Biopsy is 68/101 (67.33%).

In this study the diagnostic yield of needle aspiration

biopsy in the peripheral lesions in much higher as compared to central lesions. The procedure could save the patients from subjection to an unnecessary major surgical procedure i.e. exploratory thoracotomy. The procedure should be safe, less expensive, and less painful, less time consuming, reliable worth recommending procedure. The complication rate is low. Hence it is recommended that needle aspiration biopsy should be performed more frequently whenever indicated.

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