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A Study on Assessment of Diagnostic Yield of Cell Block, FNAC and Invasive Biopsy in Lung Mass with Effusion

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ABSTRACT

BACKGROUND: Accurate diagnosis of histological subtype is of paramount importance in case of lung malignancy as it leads to variation in treatment and assessment of prognosis. Hence the current study was done to establish the yields of different diagnostic techniques to perform tests in institutes with lesser equipment.

METHODS: prospective observational study performed in 45 patients who presented with pleural effusions with an underlying lung parenchymal mass in department of respiratory medicine, GEMS&H, Srikakulam, Andhra Pradesh from August 2021 to August 2022 were included in the current study.

RESULTS: During the period of 12 months that is from August 2021 to August 2022 we came across 60 lung mass cases among them 45 presented along with pleural effusion. In them Cell block results were suggestive of malignant effusion in 13 out of 45 cases giving a yield of about 29% whereas the yield of FNAC (fine needle aspiration cytology) was 53% (24/45) giving a combined yield of 82% from cytological study. Biopsy was conclusive in all the cases with a yield of 100%.

CONCLUSION: The combined yield of cell block and FNAC is high even though in the current study the efficacy of cell block and FNAC is lower to that of biopsy. Core needle biopsy is preferable to traditional cytology procedures, according to the current study, but in locations without the necessary equipment or when a patient is unfit for the treatment, the first line of inquiry should always be pleural fluid cell block and FNAC

Keywords : Lung malignancy, cell block, FNAC, biopsy, pleural effusion

I. INTRODUCTION

Malignant effusion is defined as accumulation of a significant amount of exudative fluid in the pleural space, accompanied by malignant cells or tumor tissues (1). The majority of malignant pleural effusions are brought on by metastatic illnesses, the most frequent of which being lung cancer (2) and breast

cancer. All the cell types of lung carcinoma cause pleural effusions, but most commonly by adenocarcinoma (3,4).

Traditionally, the malignant pleural effusion diagnosis has been based on histological or cytological evaluation of tissue from pleural or lung mass biopsy samples. One of the first techniques for assessing bodily cavity fluids is the cell block (CB) approach. It can be utilised in conjunction with smears to make a more conclusive cytopathological diagnosis. The preservation of tissue architecture and the ability to produce several sections for use in specific stains and immunochemistry are its key benefits(5). Martin and Ellis first used FNAC for diagnostic purpose (6) and the procedure was first used by in 1883 Leyden and in 1986 by Menbriel as a diagnostic lung puncture for the detection of infections and malignancies (7). Standard cytology and biopsy have improved in terms of diagnostic yield in virtue of rapidly developing interventional and histopathologic procedures. Cell Blocks are the perfect bridge between the cytology and histopathology (8). Both cell block and core needle biopsy will aid in the precise histopathological diagnosis, which is mandatory in the present era of targeted therapy.

OBJECTIVES : In the present study we have tried to establish the diagnostic yield of pleural fluid cell block, FNAC and core needle biopsy in lung malignancies with effusion. To establish both their individual yield and combined yield

II. METHODS AND MATERIALS

A prospective observational study performed in 45 patients who presented with pleural effusions with an underlying lung parenchymal mass in department of respiratory medicine, GEMS&H, Srikakulam, Andhra Pradesh from August 2021 to August 2022 were included in the current study. Out of these 45 patients, 30 were males and 15 were females.

After obtaining detailed history, thorough clinical examination of respiratory system was done. Radiological investigations like chest x-ray, ultrasound chest, CT chest were done wherever required. Routine blood investigations were done along with Pleural fluid cytopathological and biochemical analysis, for cell block and Ultrasound or CT guided FNAC and biopsy of lung mass were done.

INCLUSION CRITERIA

- History and symptoms suggestive of malignancy
- Presence of moderate to massive pleural effusion
- Exudative effusions with lymphocytes 50-70%, inconclusive ADA
- Radiologically suggestive of lung mass or pleural mass
- Age > 18yrs and willing for the interventional procedures
- Patients fit for the interventional procedures

EXCLUSION CRITERIA

- Patients with effusion of other than malignant aetiology
- Patients with a known non pulmonary malignancy
- Patients with confirmed pulmonary malignancy

III.RESULTS AND DISCUSSION

During the study period of 12 months a total of 45 patients were included among them 30 were males and 15 were females. Being progressively increasing shortness of breath the most frequent complaint followed by chest pain, weight loss and loss of appetite. Amongst the 45 patients 32 were smokers and 13 were non-smokers. 20 patients reported biomass exposure. Massive effusion was seen in 26 and moderate in 19 patients.

CELL BLOCK RESULTS:

Table 1: table showing cell block results

MALIGNANT CYTOLOGY POSITIVE	32
MALIGNANTN CYTOLOGY NEGATIVE	13

FNAC RESULTS:

Table 2: table showing FNAC results

MALIGNANT CYTOLOGY POSITIVE	24
INADEQUATE SAMPLE	10
INCONCLUSIVE EVIDENCE	11

BIOPSY RESULTS:

Irrespective of the cell block and FNAC results all patients underwent biopsy of the lung masses. Some of them underwent CT guided biopsy and some USG guided biopsy. Biopsy was conclusive in all the 45 patients with Adenocarcinoma in 35 patients, Squamous cell carcinoma in 7 patients and Small cell carcinoma in 3 patients.

TEST VS DIAGNOSTIC YIELD

Table 3: table showing interventional procedure and its diagnostic yield

INTERVENTIONAL PROCEDURE	MALIGNANCY CONFIRMED	INADEQUATE SAMPLE/ INCONCLUSIVE RESULT	DIAGNOSTIC YIELD IN %
CELL BLOCK	13	32	29%
FNAC	24	21	53%
CELL BLOCK + FNAC	37	8	82%
BIOPSY	45	0	100%

IV. DISCUSSION

Cell block is a widely accepted procedure for its cellular yield and improved diagnostic accuracy. It is also an easy, inexpensive and can be done with minimum expertise. But in the current study cell block was inconclusive in 32 patients and the most common reason was inadequacy of cellular material in the sample contradicting the study done by Rani SSS et al (8). In case of FNAC the yield was a bit higher when compared to cell block. Still it couldn't conclude the diagnosis in 21 cases and again the reason was inadequate sample. The combined yield of cell block and FNAC was 82% which is quiet significant. Though guided biopsy procedures are expensive, need expertise and are less safer but the yield is almost 100% .

A study conducted by Ali SA et al (9) in 50 cases concluded that cyto-techniques (cell block and FNAC) had lesser sensitivity than the core needle biopsy and had the similar specificity as in the current study. In the current study adenocarcinoma subtype was most common as in studies done by SK Mondal et al (10) and Tan et al (11). Another study conducted by M.M. Makde et al (12) also concludes that diagnostic adequacy improved and approached to that of core needle biopsy when the both cyto-techniques are combined as in our study.

V. CONCLUSION

The combined yield of cell block and FNAC is high even though in the current study the efficacy of cell block and FNAC is lower to that of biopsy. Core needle biopsy is preferable to traditional cytology procedures, according to the current study, but in locations without the necessary equipment or when a patient is unfit for the treatment, the first line of inquiry should always be pleural fluid cell block and FNAC. The decision to perform a core needle biopsy should be made by the clinician based on the patient's condition, the findings of the cytological study, the

accessibility of the biopsy facilities, and other factors. It should not always be necessary.

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