

## Diagnostic Efficacy of Malignant Cytology Smear and Cell Block Compared to Pleural Biopsy in Suspected Malignant Pleural Effusions

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### Abstract

**Introduction:-**A pleural effusion is an accumulation of fluid in the pleural space as a result of transudation or exudation from the pleural surfaces.Pleural effusion is a sign of disease and not adiagnosis by itself.Pleural effusion is a very common clinical problem encountered in day to day medical practice.Even though detecting of pleural effusion Is an easy thing ,the aetiological diagnosis of the pleural effusion is difficult to establish in a considerable number of cases.

**Aims Of Study:-**To study the diagnostic efficacy of pleural fluid cytology smear in suspected malignant pleuraleffusionsTo study the diagnostic efficacy of cellblock in suspected malignant pleuraleffusions.To study the diagnostic efficacy of pleural biopsy in suspected malignant pleuraleffusions.Comparison of diagnostic efficacy of the cytology smears vs cellblock vs Pleural biopsy in suspected malignant pleuraleffusions.To evolve a possible method of investigation and in the diagnostic algorithm of suspected malignant pleuraleffusions.

**Results :-**50 patients with suspected malignant pleural effusions based on clinical and radiological background were included in this study and underwent pleural biopsy with Abram's needle, cytology and cellblock examination.After completion of the study results of 50 patients have been analysed.The clinical data as per proforma was reviewed for all patients and following observations and results were documented.Descriptive statistics like mean, percentage (%) and standard deviation were used to express the data. Data is presented in tabular form and graphical form.The malignant pleural effusion occurred predominantly in males with a sex ratio of 3:1. Predominant age group in both sexes involved by malignant pleural effusions is 61 to 70.Malignant pleural effusions occurred predominantly in smokers (66%).More number of smokers in 51 to 70 years age group developed malignant pleural effusions. More number of non-smokers in 61 to 70 years age group developed malignant pleural effusions.Majority of pleural effusions occurred on right side (58%) . Right sided effusion predominated in all histological types .In males, cytology smear confirmed the diagnosisin 43.2%. Infemales, cytology smear confirmed the diagnosis in 61.5%.In males, cell block confirmed the diagnosis in 83.8%.In females; cell block confirmed the diagnosis in 92.3%.Thus, cell block seems to have the best diagnostic yield between the three modalities and the difference is highly significant

**Conclusion:-**In conclusion pleural fluid cellblock analysis is our preferred method of diagnostic evaluation in malignant pleuraleffusions as it is cost effective, and less invasive.

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### I. Introduction

A pleural effusion is an accumulation of fluid in the pleural space as a result of transudation or exudation from the pleural surfaces.Pleural effusion is a sign of disease and not adiagnosis by itself.Pleural effusion is a very common clinical problem encountered in day to day medical practice.Even though detecting of pleural effusion Is an easy thing ,the aetiological diagnosis of the pleural effusion is difficult to establish in a considerable number of cases.

## **II. Aims of Study**

1. To study the diagnostic efficacy of pleural fluid cytology smear in suspected malignant pleural effusions
2. To study the diagnostic efficacy of cellblock in suspected malignant pleural effusions.
3. To study the diagnostic efficacy of pleural biopsy in suspected malignant pleural effusions.
4. Comparison of diagnostic efficacy of the cytology smears vs cellblock vs Pleural biopsy in suspected malignant pleural effusions.
5. To evolve a possible mode of investigation and diagnostic algorithm of suspected malignant pleural effusions.

## **III. Materials And Methods**

It was a prospective analytical study conducted among 50 patients. Fifty cases of suspected malignant pleural effusions in Govt. Chest and communicable diseases hospital during period 2014 Dec to 2016 Oct were selected for study. patients with suspected malignant pleural effusions based on clinical and radiological background were included in this study and underwent pleural biopsy with Abram's needle, cytology and cellblock examination.

**INCLUSION CRITERIA:** The following criteria were observed while selecting the patients. Malignant Pleural Effusions were suspected in

1. Recurrent massive pleural effusions.
2. Pleural effusions with ipsilateral mediastinum with underlying collapse.
3. Haemorrhagic pleural effusions.
4. Pleural effusions with suspected mass lesions.
5. Pleural effusions with associated lesions like
  - a. Rib Destruction
  - b. Clubbing
  - c. Secondaries elsewhere or secondaries in opposite lung.
  - d. Primary elsewhere.
  - e. Hilar and mediastinal lymphadenopathy.
  - f. Extrathoracic lymphadenopathy,  
E.g. Scalene group, cervical and axillary lymphadenopathy.

Radiological features suggestive of malignant pleural effusion were 1) massive pleural effusion with central or ipsilateral shift of mediastinum

- 2) Mass with collapse and pleural effusion

**EXCLUSION CRITERIA:** patients with

1. Bleeding diathesis
2. Serious comorbidities like chronic liver disease, congestive heart failure, chronic renal failure, severe hypoxia, uncooperative patients.
3. local cutaneous lesions such as pyoderma and herpes zoster etc.

All the patients selected for the present study were subjected to the following INVESTIGATIONS;

1. Bleeding time and clotting time to exclude any bleeding diathesis, as pleural biopsy is considered to be an invasive technique
2. Sputum direct smear for acid fast bacilli on 2 consecutive days to rule out pulmonary tuberculosis.
3. Skiagram of the chest, posterior - anterior and bucky film (High penetrated film) for localization of underlying mass lesions or rib erosions.
4. In Selected cases USG chest & abdomen.
5. In Selected cases CECT chest

## **IV. Results And Analysis**

50 patients with suspected malignant pleural effusions based on clinical and radiological background were included in this study and underwent pleural biopsy with Abram's needle, cytology and cellblock examination. After completion of the study results of 50 patients have been analysed. The clinical data as per proforma was reviewed for all patients and following observations and results were documented. Descriptive statistics like mean, percentage (%) and standard deviation were used to express the data. Data is presented in tabular form and graphical form. The malignant pleural effusion occurred predominantly in males with a sex ratio of 3:1. Predominant age group in both sexes involved by malignant pleural effusions is 61 to 70. Malignant pleural effusions occurred predominantly in smokers (66%). More number of smokers in 51 to 70 years age group developed malignant pleural effusions. More number of non-smokers in 61 to 70 years age group developed malignant pleural effusions. Majority of pleural effusions occurred on right side (58%). Right sided

effusion predominated in all histological types. In males, cytology smear confirmed the diagnosis in 43.2%. In females, cytology smear confirmed the diagnosis in 61.5%. In males, cell block confirmed the diagnosis in 83.8%. In females; cell block confirmed the diagnosis in 92.3%. Thus, cell block seems to have the best diagnostic yield between the three modalities and the difference is highly significant

**Table 1: Incidence of Malignancy in Smokers Vs Non Smokers**

AGE RANGE	SMOKERS	PERCENTAGE	NON SMOKERS	PERCENTAGE
21-30	0	0	2	4
31-40	2	4	4	8
41-50	6	12	2	4
51-60	6	12	3	6
61-70	17	34	5	10
71-80	2	4	1	2
TOTAL	33	66	17	34

Malignant pleural effusions occurred predominantly in smokers (66%). More number of smokers in 51 to 70 years age group developed malignant pleural effusions. More number of non-smokers in 61 to 70 years age group developed malignant pleural effusions.

**TABLE 2: Radiologic Findings on CECT of Chest**

CT FINDINGS	NO. OF PATIENTS (N=40)	PERCENTAGE
PLEURAL EFFUSION	40	100
MASS	19	47.5
COLLAPSE	5	12.5
HILAR ADENOPATHY	14	35
RIB EROSIONS	2	5
COMBINED (MASS, EFFUSION, COLLAPSE)	5	12.5

CECT chest was done in 40 patients of which hilar adenopathy was detected In 14 cases. Mass was seen in 19 cases and lung collapse in 5 cases.

**Table 3: Site of Primary Malignancy**

PRIMARY	NUMBER OF PATIENTS
LUNG	40
GIT	2
LYMPHOMA	3
BREAST	4
CERVIX	1

**TABLE 4: Routine Pleural Fluid Analysis**

SL.NO	PARAMETERS	MIN	MAX	MEAN	SD
1	TC	400	3000	1802	701.4
2	NEUTROPHIL (%)	0	70	30.2	19.4
3	LYMPHOCYTE (%)	30	100	68.1	18.6
4	PROTEIN	3.4	7.0	5.4	1.1
5	SUGAR	50	95	68.8	12.9
6	ADA	12	70	34.8	16.3

**Table 5: Diagnostic Yield Of blind Closed pleural biopsy**

PLEURAL BIOPSY	NUMBER OF PATIENTS	PERCENTAGE
POSITIVE	27	54
NEGATIVE	23	46

In males, pleural biopsy confirmed the diagnosis in 54.1%. In females; pleural biopsy confirmed the diagnosis in 53.8%.

**Table 6:** Diagnostic yield of Cytology Smear

CYTOLOGY SMEAR	NUMBER OF PATIENTS	PERCENTAGE
POSITIVE	24	48
NEGATIVE	26	52

In males, cytology smear confirmed the diagnosis in 43.2%. In females, cytology smear confirmed the diagnosis in 61.5%.

**Table 7:** Diagnostic yield of cell block

CELL BLOCK	NUMBER OF PATIENTS	PERCENTAGE
POSITIVE	43	86
NEGATIVE	7	14

In males, cell block confirmed the diagnosis in 83.8%. In females; cell block confirmed the diagnosis in 92.3%.

**Table 8:** Results of Comparison of Diagnostic Yield

DIAGNOSTIC MODALITY	NUMBER(N=50)	PERCENTAGE
CYTOLOGY	24	48
CELL BLOCK	43	86
PLEURAL BIOPSY	27	54
COMBINED YIELD	46	92

Thus, cell block seems to have the best diagnostic yield between the three modalities and the difference is highly significant.

**TABLE 9:** Results of Cytology Vs Cell Block

CYTOLOGY (24)	CELL BLOCK (43)	NUMBER	PERCENTAGE
POSITIVE	POSITIVE	24	48
POSITIVE	NEGATIVE	0	0
NEGATIVE	POSITIVE	19	38
NEGATIVE	NEGATIVE	7	14

**Table 10:** Results of Cytology Vs Pleural Biopsy

CYTOLOGY (24)	BIOPSY (27)	NUMBER	PERCENTAGE
POSITIVE	POSITIVE	11	22
POSITIVE	NEGATIVE	13	26
NEGATIVE	POSITIVE	16	32
NEGATIVE	NEGATIVE	10	20

**Table 11:** Results of Cell Block Vs Pleural Biopsy

CELL BLOCK (43)	BIOPSY (27)	NUMBER	PERCENTAGE
POSITIVE	POSITIVE	24	48
POSITIVE	NEGATIVE	19	38
NEGATIVE	POSITIVE	3	6
NEGATIVE	NEGATIVE	4	8

## V. Discussion

Malignant pleural effusion is a common clinical problem in patients with neoplastic disease. The development of a malignant pleural effusion is a common complication and is an indication of advanced stages of cancers like lung, breast and stomach cancer. The development of malignant ascitic effusion is due to ovary, colon, liver and pancreatic carcinoma. Thus, the examination of body fluids like pleural fluid for the presence of malignant cells has been accepted as a routine laboratory procedure for detection of metastasis of unknown primary origin<sup>8,22</sup>. A malignant pleural effusion is diagnosed by detecting exfoliated malignant cells in pleural fluid or demonstrating these cells in pleural tissue obtained by percutaneous pleural biopsy, thoracoscopy or thoracotomy. The simplest and minimally invasive way to establish the diagnosis of pleural malignancy is with pleural fluid cytology and cell block. Thoracoscopy is the investigation of choice in pleural effusions where a diagnostic pleural aspiration is inconclusive. However, thoracoscopy has several limitations. It is a costly investigation and requires expertise for performance. It also requires backup of thoracic surgery<sup>20,21</sup>. Obviously it cannot be performed routinely in a resource poor country like India. Closed pleural biopsy is less sensitive than pleural fluid cytology or thoracoscopy in evaluation of malignant pleural effusions. However it can be

easily performed with minimal procedure related complications. Moreover about 7-12% of patients with malignant pleural effusion can be diagnosed by pleural biopsy when cytology is negative<sup>11,23</sup>. So closed pleural biopsy is frequently advised in pleural effusions where cytology is negative. The most frequent complication after a closed pleural biopsy is pneumothorax. However, the incidence of pneumothorax and the requirement for tube thoracostomy are comparable after thoracentesis and pleural biopsy<sup>34</sup>.

## VI. Conclusion

In conclusion pleural fluid cellblock analysis is our preferred method of diagnostic evaluation in malignant pleural effusions as it is cost effective, and less invasive.

## References

- [1]. Pereyra MF, San-Jose E, Ferreira L, et al. Role of blind closed pleural biopsy in the management of pleural exudates. *Can Respir J*. 2013;20:362–366.
- [2]. Maturu VN(1), Dhooria S, Bal A, Singh N, Aggarwal AN, Gupta D, Behera D, Role of medical thoracoscopy and closed-blind pleural biopsy in undiagnosed exudative pleural effusions: *J Bronchology Interv Pulmonol*. 2015 Apr;22(2):121-9
- [3]. Pandit S, Chaudhuri AD, Datta SB, et al. Role of pleural biopsy in etiologic diagnosis of pleural effusion. *Lung India*. 2010;27:202–204.
- [4]. Bhattacharya S, Bairagya TD, Das A, et al. Closed pleural biopsy is still useful in the evaluation of malignant pleural effusion. *J Lab Physicians*. 2012; 4:35–38.
- [5]. Shivakumarswamy U, Arakeri SU, Mahesh H Karigowdar MH, Yeliker BR. Diagnostic utility of the cell block method versus the conventional smear study in pleural fluid cytology. *J Cytol*, 2012;29:11-15.
- [6]. Ghosh I, Dey SK, Das A, Bhattacharjee D, Gangopadhyay S, Cell block cytology in pleural effusion. *Journal of the Indian Medical Association*, 2012, 110(6):390-2, 396.
- [7]. How SH, Chin SP, Zal AR, Liam CK. Pleural effusions: role of commonly available investigations. *Singapore Med J*. 2006; 47(7):609-13.
- [8]. Thapar M, Mishra RK, Sharma A, Goyal V. A critical analysis of the cell block versus smear examination in effusions. *J Cytol*, 2009;26:60.
- [9]. Nathan NA, Narayan E, Smith MM, Horn MJ. Cell block cytology. Improved preparation and its efficacy in diagnostic cytology. *Am J Clin Pathol*, 2000;114:599–606.
- [10]. Gaur DS, Chauhan N, Kusum A et al. Pleural fluid analysis-role in diagnosing pleural malignancy. *J cytol*, 2007;24:183-88.

Dr.KVV Vijaya kumar,MD. “Diagnostic Efficacy of Malignant Cytology Smear and Cell Block Compared to Pleural Biopsy in Suspected Malignant Pleural Effusions.” *IOSR Journal of Dental and Medical Sciences (IOSR-JDMS)*, vol. 18, no. 9, 2019, pp 54-58.