



Pulmonary Medicine

DIAGNOSTIC EFFICACY OF SMEAR-CYTOLOGY & CELL BLOCK COMPARED TO PLEURAL BIOPSY IN SUSPECTED MALIGNANT PLEURAL EFFUSIONS

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ABSTRACT **BACKGROUND:** Pleural space is a potential space between visceral and parietal pleurae of each lung with less than 5 ml of pleural fluid present in each hemithorax normally. In healthy individuals the pleural fluid contains less than 1000 WBC/mm³, glucose level similar to that of plasma, lactate dehydrogenase(LDH) less than 50% of plasma and protein content less than 1.5 gms/100 ml

METHODS: Patients of pleural effusions admitted in Govt. Chest and Communicable Diseases Hospital, Visakhapatnam were selected for the present study after taking history, thorough physical and systemic examination. They were subjected to relevant diagnostic work up.

RESULTS: Out of the total of 30 patients, 21 patients were proved to be positive for malignancy by pleural biopsy with a yield of 70%; cell block method helped in the diagnosis in 24 cases (80%) and smear cytology of pleural fluid established diagnosis in 12 cases (40%).

CONCLUSION: in the present study the cell block method showed higher diagnostic yield when compared to smear cytology and pleural biopsy

KEYWORDS : smear cytology, cell block, pleural biopsy, malignant pleural effusions

AIMS & OBJECTIVES

- To study the diagnostic efficacy of pleural fluid smear cytology, cell block and pleural biopsy in suspected malignant pleural effusions.
- Comparison of diagnostic efficacy of smear cytology Vs cell block Vs pleural biopsy in suspected malignant pleural effusions.
- To evolve modus operandi in the diagnostic algorithm of suspected malignant pleural effusions.

MATERIALS & METHODS: 30 cases of suspected malignant pleural effusions in Govt. Chest and Communicable Diseases Hospital, Visakhapatnam were included in the study. Criteria observed for selecting the patients were as follows:

- Recurrent massive pleural effusion
- Pleural effusions with ipsilateral mediastinum
- Pleural effusions with suspected mass lesions
- Pleural effusions with associated features like clubbing, rib destruction, hilar and mediastinal lymphadenopathy, extra thoracic (scalene group, cervical or axillary) lymphadenopathy.

All 30 patients were subjected to the following investigations:

- Bleeding time & clotting time: To exclude any bleeding diathesis as pleural biopsy is an invasive procedure.
- Sputum smear examination for acid fast bacilli to rule out pulmonary tuberculosis.
- Sputum for malignant cells.
- Chest X-rays – PA and bucky films for localization of underlying mass lesions or rib erosions.

All 30 patients were subjected to pleural biopsy with Abrams pleural biopsy needle and pleural aspiration in one sitting. Pleural biopsy was done initially followed by pleural aspiration, to get better yield in pleural fluid cytology.

RESULTS:

TABLE 1: Age and Sex distribution of the Study group (n=30, ratio=5:1)

Age (in years)	Males	%	Females	%
21-30	1	3.3	0	0
31-40	2	6.7	0	0
41-50	4	13.3	2	6.7
51-60	12	40.0	3	10.0
61-70	6	20.0	0	0
Total	25	83.3	5	16.7

- Malignant pleural effusions were seen mainly in males with a M:F sex ratio of 5:1
- In both sexes malignant pleural effusions were seen mainly in 51-60 years age group

TABLE 2: Incidence of malignancy in smokers Vs non-smokers

Age (in years)	Smokers	%	Non-smokers	%
21-30	1	3.3	0	0
31-40	2	6.7	0	0
41-50	5	16.7	1	3.3
51-60	12	40.0	2	6.7
61-70	7	23.3	0	0
Total	27	90.0	3	10.0

- Malignant pleural effusions were seen predominantly in smokers who consists 27 in number (90%).
- Majority of patients are in 6th decade followed by 7th decade indicating the chronicity of smoking closely related to lung malignancy.

Table 3: Comparison of malignant cell type in smokers vs non-smokers

Cell type	Smokers	%	Non-smokers	%
Squamous cell carcinoma	16	53.3	2	6.7
Adenocarcinoma	5	16.7	3	10.0
Undifferentiated carcinoma	2	6.7	1	3.3
Lymphoma	0	0	1	3.3
Total	23	76.7	7	23.3

- Squamous cell carcinoma followed by adenocarcinoma is the cell types found to be common in smokers in the present study group (70%).
- In non-smokers adenocarcinoma is relatively a common cell type.

Table 4: Diagnostic yield of different investigation methods in malignant pleural effusions

Investigation method	Number	%
Pleural biopsy	20	66.6
Smear cytology	10	33.3
Cell block	22	73.3
Combined	28	93.3

- Combined investigation method (pleural biopsy, smear cytology and cell block) yield was 93.3%
- Among individual investigation methods, cell block proved to have positive diagnostic yield of 73.3% followed by pleural biopsy (66.6%).

Table 5: Correlation of pleural fluid smear cytology vs cell block vs pleural biopsy in present study

Investigative method	Squamous cell carcinoma	Adenocarcinoma	Undifferentiated carcinoma	Negative
Pleural biopsy	14	5	1	10
Pleural fluid smear cytology	6	3	1	20
Pleural fluid cell block	15	6	1	8

- Diagnostic utility of cell block method is slightly higher compared to pleural biopsy and much higher compared to smear cytology.

DISCUSSION:

Out of 30 patients of the present study, 20 were proved positive by pleural biopsy with a diagnostic yield of 66.6%. The result was similar to that of Hanson and Trevor study (69%)³. Results of smear cytology showed wide variation from 30% to 70% by various authors. The higher yield obtained by some authors could be explained by the use of techniques of cell spread, use of membrane filters and other advanced techniques such as cytogenetic analysis and flow cytometry apart from early processing of the pleural aspirate.

Out of 30 cases of the present study, cell block aided in the diagnosis of malignancy in 22 patients (73.3%). The yield for pleural biopsy and pleural fluid smear cytology was 66.6% and 33.3% respectively. Pleural biopsy was shown to be more reliable than smear cytology. The reason may be due to delay in transport of smear cytology sample to the lab and the other reason could be because of sending one sample of smear cytology when compared to 3 to 4 bits off pleural tissue specimens.

Smear cytology confirmed the diagnosis in 10 (33.3%) cases, whereas cell block contributed to 22 (73.3%) cases. The method used for cell block, where the sample is centrifuged and the sediment is used for the preparation of cell block, could be the reason for higher diagnostic yield from cell block technique.

Sensitivity of cell block compared to pleural biopsy is not significant and it requires a large study sample for better evaluation of cell block vs pleural biopsy.

In the present study, squamous cell carcinoma was the predominant histological type in smokers and in non-smokers the incidence of squamous and adenocarcinomas are almost equal.

Out of the 30 cases, in 2 cases the cell type could not be proved by any of the three investigation modalities. However, the diagnosis was established by other means like lymphnode biopsy and FNAC of lymphnode.

CONCLUSION:

The results of our study suggest that pleural fluid cell block is superior to smear cytology in confirming the diagnosis of suspected malignant pleural effusions. We observed that the diagnostic accuracy of pleural fluid cell block is slightly superior to pleural biopsy. To conclude, pleural fluid cell block is our preferred method of investigation in malignant pleural effusions as it is cost effective and less invasive.

REFERENCES:

1. Benjamine, P.K., 1962. Needle biopsy of parietal pleura. *API Journal*
2. Benjamine, P.K., 1962 and Weiss, 1962. Needle biopsy of parietal pleura in patients with effusion. *British Medical Journal*, P:298-302
3. Hanson and Trevor, 1962. Pleural biopsy in the diagnosis of thoracic diseases. *BMJ*, P:300.
4. Dekker A. Buppa PA- cytology of serous effusions: An investigation into the usefulness of cell blocks versus smears. *American Journal of Clinical Pathology* 1978; 70:855-60
5. Light RW, 5th edition- *Pleural diseases*. Lippincott Williams & Wilkins. 2007, 486
6. Maher, G.G., and Berner, H.W: Massive pleural effusion: Malignant and non-malignant causes in 46 patients. *American Review of Respiratory diseases*. 105: 458, 1972.