

Cytological Analysis of Pleural Effusion - A Five Year Retrospective Study

Sudha Iyengar¹, Jagannath Jatav²

ABSTRACT

Introduction: Cytological examination of pleural fluid is considered less invasive than biopsy, more simple, inexpensive, allows faster diagnosis and it facilitates in cancer screening in some cases. Cytological examination of pleural fluid is of great diagnostic value in both non neoplastic and neoplastic effusions. Aim of the study was to retrospectively analyse, all the pleural effusions, to get prevalence of benign and malignant pleural effusions and to evaluate the cytological value of pleural fluid in the diagnosis of benign and malignant lesions.

Materials and Methods: Total 240 cases collected from all the patients who underwent thoracentesis. Data were collected and analysed. From the received fresh sample, 10ml fluid was taken and fluid was centrifuged at 2500 rpm for 15 minutes and smears were prepared from the sediment and stained with MGG stain and H and E.

Results: In the study of 240 cases of pleural effusion the age of patient ranged between 17-87 years. The male to female sex ratio was 1:1.1. The maximum numbers of cases were in the age group of 41-50 years, constituting 54 cases (22.4%) of the total cases (Table 1). Most of the pleural effusion were associated with benign conditions (84.6%). The rest (15.4%) of the effusions showed malignant aetiology. Amongst the malignant effusions adenocarcinoma was the most common type of secondary (70.3%, 26 cases out of 37).

Conclusion: Cytological examination of pleural fluids is the most effective procedure to differentiate between benign and malignant effusion and also to know primary site of lesion in many cases.

Keywords: fluid, cytology, pleural Effusion, adenocarcinoma, immunocytochemistry.

INTRODUCTION

Effusions are often first clinical symptoms of malignant tumors or of their metastatic manifestations thereby making cytology of fluid the best or the only chance for making the diagnosis of an underlying malignancy and also to type them. Pleural effusion also reveals information about inflammatory conditions of serous membrane, parasitic infestations and infections. Sometimes there are diagnostic difficulties in effusion cytology indistinguishing reactive and malignant effusions in such cases the immunocytochemistry is performed for distinguishing reactive and malignant effusions.¹⁻³

MATERIALS AND METHODS

Total 240 cases collected from all the patients who underwent thoracentesis at Jayarogya Hospital group and their pleural fluid sent to cytology section, department of pathology, GR Medical College, Gwalior, M P, India during five year study period from Jan 2009 to Des 2014. Data were collected and analysed. The clinical findings and clinical

diagnosis of all cases of pleural effusions sent to the laboratory were noted. The pleural fluid received in the sterile plastic container with requisition forms were checked and case number issued. From the received fresh sample, 10ml fluid was taken and fluid was centrifuged at 2500 rpm for 15 minutes and smears were prepared from the sediment and stained with MGG stain and H and E.

RESULTS

In the study of 240 cases of pleural effusion the age of patient ranged between 17-87 years. Sex distribution in our set-up showed a female preponderance 127 cases (52.9%) than males, 113 cases (47.1%). The male to female sex ratio is 1:1.1. The maximum numbers of cases were in the age group of 41-50 years, constituting 54 cases (22.4%) of the total cases and followed by 31-40 and 61-70 years, each age group constituting 49 cases (20.4%). Least common incidence was found in age group 81-90 years, constituting only 4 cases (1.7%) and no case found in age group 0-10 years (Table No. 1).

Most of the pleural effusion was associated with benign conditions (84.6%). The rest (15.4%) of the effusions showed malignant aetiology. Amongst the malignant effusions adenocarcinoma was the most common type of secondary (70.3%, 26 cases out of 37). Other malignancy types were large cell anaplastic carcinoma, NHL, squamous cell carcinoma and malignant mesothelioma. Chronic non specific effusion (65%) was the commonest non neoplastic effusion and was followed by tubercular effusion (25%).

DISCUSSION

Cytological analysis of pleural fluid is simple, quick and inexpensive method to determine the nature of effusion whether it is malignant or non-malignant. In present study 240 cases of pleural effusion were analysed, of all 240 cases, 113 cases (47.1%) were male while 127 cases (52.9%) were female. The male to female sex ratio is 1:1.1. There was female preponderance in our study (2014). The similar findings were reported by Dhital KR et al (2009).⁴ Contrary to our study, Bhavana et al (2014)⁵ found male preponderance, male female ratio was found 1.57:1 in their study.

¹Associate Professor, ²3rd Year Post Graduate Student, Department of Pathology, G. R. Medical College, Gwalior, Madhya Pradesh, India.

Corresponding author: Jagannath Jatav, 3rd Year Post Graduate Student, Department of Pathology, G. R. Medical College, Gwalior, Madhya Pradesh, India.

How to cite this article: Sudha Iyengar, Jagannath Jatav. Cytological analysis of pleural effusion - a five year retrospective study. International Journal of Contemporary Medical Research 2016;3 (3):631-633.

S.No.	Age group	Male	Female	Total	
				No.	%
1.	0-10	0	0	0	0
2.	11-20	04	07	11	4.6
3.	21-30	11	13	24	10
4.	31-40	22	27	49	20.4
5.	41-50	25	29	54	22.5
6.	51-60	18	19	37	15.4
7.	61-70	23	26	49	20.4
8.	71-80	08	04	12	5
9.	81-90	02	02	04	1.7
	Total	113	127	240	100

Table-1: Distribution of samples by age and sex

S. No.	Diagnosis	No. of cases	% of cases
1.	Chronic inflammatory effusion	156	65%
2.	Acute inflammatory effusion	17	7%
3.	Malignant effusion	37	15.4%
4.	Tubercular effusion	60	25%
5.	In conclusive	9	3.75%
	Total No. of cases	240	100%

Table-2: Cytological spectrum of neoplastic and non neoplastic conditions

S. No.		No. of cases	% of cases
1.	Non Malignant Effusions	203	84.6%
2.	Malignant Effusions	37	15.4%

Table-3: Malignant Effusions and non malignant Effusions

S. No.	Types of malignancy	No. of cases	% of cases
1.	Adenocarcinoma	26	70.3%
2.	Non Hodgkin Lymphoma	05	13.5%
3.	Large cell anaplastic carcinoma	02	5.4%

Table-4: Types of malignancy in cytologically malignant pleural effusions

The maximum numbers of cases were in the age group of 41-50 years, constituting 54 cases (22.4%) of the total cases and followed by 31-40 and 61-70 years, each age group constituting 49 cases (20.4%) whereas Bhavana et al (2014) found the maximum number of cases in 51-60 years of age group and least number of cases in 0-10 years of age group. Koss describes that a characteristic feature of mesothelial cells is the flattening of the opposite cell membranes with the formation of clear gaps or "windows", which are most likely because of microvilli separating the cells and are better visualized in air dried smears (Leopold G. Koss et al, 2006).³ Bedrossian insists that in benign mesothelial cells these microvilli are slender, bushy and distributed evenly around the cells whereas in adenocarcinoma, if present they are concentrated at the poles and are short and stubby (Pauri Murugan et al, 2008).⁶ In many situations, the diagnosis of MM, metastasis, or benign reactive mesothelial proliferation in effusion specimens is based on experienced cytopathologic. The other problems

areas following: sampling error, failed tap, few malignant cells shedding, hemorrhagic or inflammatory effusion and interpretative errors (Fassina, 2008).⁷ Two other common situations that associated with diagnostic pitfalls are pleural lavage samples and samples from patients having had radiotherapy (Zimmerman, 2005).⁸

In present study (2014), Most of the pleural effusion were associated with benign conditions (84.6%). The rest (15.4%) of the effusions showed malignant aetiology. Amongst the malignant effusions adenocarcinoma was the most common type of secondary (70.3%, 26 cases out of 37). Other malignancy types were large cell anaplastic carcinoma, NHL, squamous cell carcinoma and malignant mesothelioma. Chronic non specific effusion (65%) was the commonest non neoplastic effusion and was followed by tubercular effusion (25%).

In the study of (Sherwani et al,2005)⁹ Out of 207 cases, 160 (77.30%) were non malignant in nature and 47(22.70%) were found to be malignant in nature. In the present study, (84.6%) were non malignant in nature and (15.4%) cases were found to be malignant in nature. Our findings broadly correlate with the study conducted by (Sherwani et al, 2005). In present study (2014), (25%) of cases were of tubercular effusion. In the study done by (Gayatri M et al, 2014)¹⁰ cases of tubercular effusion were (35%). In our study adenocarcinoma was found to be the most common lesion amongst the malignant effusion constituting (70.3%) cases of total malignant effusion. In the study done by (Somnath B et al, 2014)¹¹, (54%) of total malignant effusion cases reported as adenocarcinoma.

CONCLUSION

Cytological examination of serous fluids is the most effective procedure to differentiate between benign and malignant effusion and also to know primary site of lesion.

REFERENCES

1. Light RW. The undiagnosed pleural effusion. Clin Chest Med 2006;27:309-19.
2. Bodele A.K, Parate N, Wadadekar A, Bobhate SK, Munshi MM. Diagnostic utility of cell block preparation in reporting of fluid cytology. Journal of Cytology 2003; 20:133-135.
3. Koss LG, Melamed MR. Effusions in the presence of cancer. In: Koss LG, editor. Koss' Diagnostic Cytology and its Histopathologic Bases. Vol II, 5th ed. Philadelphia Pennsylvania, USA: Lippincott Williams and Wilkins; 2006. p. 950.
4. Dhital KR, Acharya R, Bhandari R, Kharel P, Giri KP, Tamrakar R. Clinical profile of patients with pleural effusion admitted to KMCTH. Kathmandu University Medical Journal. 2009;7: 438-444.
5. Bhavana Grandhi, Vissa Shanthi, Mohan Rao N, Chidananda Reddy V, Venkata Murali Mohan K. The diagnostic utility of cell block as an adjunct to cytological smears. Int J Med Res Health Sci. 2014;3:278-284.
6. Pauri Murugan, Neelaiah Siddiraju, Syed Habeebullah, Debdata Basu. Significance of intercellular spaces (windows) in effusion fluid cytology: A study of 46 sam-

- ples. *Diagnostic Cytopathology*. 2008;36:628-32.
7. Fassina A, Fedeli U, Corradin M, Da Fre M, Fabbris L. Accuracy and reproducibility of pleural effusion cytology. *Legal Medicine*. 2008;10:20–25.
 8. Zimmerman R. Effusion cytology: Keeping researchers and journals in business for the past 20 years—and it is not over yet. *Current Diagnostic Pathology*. 2005;11: 194–202.
 9. Sherwani R, Akhtar K, Naqvi AH, Akhtar S, Abrani A, Bergava R. Diagnostic and prognostic significance of cytology in effusions. *Journal of cytology*. 2005;22:73-77.
 10. Gayathri MN, Kunal Puri, Satish MK, Ravikumar T, Bharathi M. Diagnostic utility of cell block method in pleural fluid cytology. *J of Evidence Based Med and Hlthcare*. 2014;1:1240-45.
 11. Somnath Bhattacharya, Tapan D Bairagya, Anirban Das, Abhijit Mandal, Sibes K Das. Closed Pleural Biopsy is Still Useful in the Evaluation of Malignant Pleural Effusion. *Journal of laboratory physicians*. 2012;4:35-38.

Source of Support: Nil; **Conflict of Interest:** None

Submitted: 07-01-2016; **Published online:** 28-01-2016