



A STUDY OF DIAGNOSTIC VALUE OF PLEURAL FLUID ADENOSINE DEAMINASE LEVEL IN CASES OF PLEURAL EFFUSION

General Medicine

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ABSTRACT

STUDY OBJECTIVE: To study the diagnostic value of ADA level in various etiology of pleural effusion. To find out sensitivity, specificity, positive predictive value & negative predictive value of ADA in diagnosis of pleural effusion.

DESIGN: A hospital based observational study.

PATIENTS: 50 consecutive patients of pleural effusion, who were above the age of 18 years, were studied.

RESULTS: Pleural fluid adenosine deaminase was more than 36 IU/L (36 to 229.7 IU/L) in tubercular pleural effusion (34 patients). In case of malignancy no. of patients was 08 and pleural fluid adenosine deaminase was more than 18.5 IU/L (18.5 to 68 IU/L). While in one case of hypoproteinemia pleural fluid adenosine deaminase was 13.2 IU/L. If 36 IU/L is taken as cut of limit the sensitivity and specificity of ADA for tuberculosis is 97.06 % and 75 %. More than 100 IU/L was exclusively seen in tubercular pleural effusion.

CONCLUSION: ADA > 100 IU/L was observed in TB only.

KEYWORDS

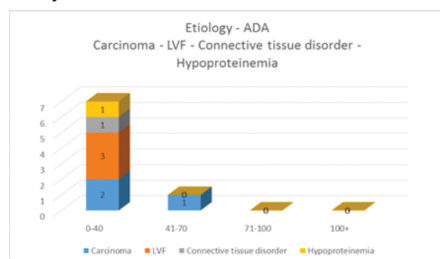
ADA-Adenosine Deaminase AFB-Acid Fast Bacilli USG-Ultrasonography CBC-Complete Blood Count LVF-Left Ventricular Failure TB-Tuberculosis

INTRODUCTION

Pleural effusion is collection of fluid abnormally present in the pleural space, usually resulting from excess fluid production and/or decreased lymphatic absorption. It has two types according to pathophysiology. Exudative and Transudative. ADA enzyme catalyzes conversion of adenosine to inosine. ADA has two iso-enzymes, ADA1 & ADA2. The increase in ADA activity with tuberculous pleuritis is mainly due to ADA2, which is because most of the cells in pleural fluid are lymphocytes. ADA level can also be elevated in diseases like empyema & rheumatoid pleuritis in addition to tuberculosis. ADA is helpful for establishing the etiology of tubercular pleural effusion & rule out other diagnosis in which lymphocytes predominance seen as in case of malignancy and collagen vascular diseases.

METHODS AND MATERIAL

The present study was conducted in the Medicine Department of SHETH L.G. Hospital during January 2019 to June 2019. During this period 50 Patients of pleural effusion above the age of 18 years attending department of Medicine are taken. Patients in whom history of typhoid fever, acute viral hepatitis and active cirrhosis were present, were excluded. Detailed history was taken and thorough clinical examination was done in each and every patients. Patients were admitted & all routine investigations like CBC, all serological examination, chest X-ray were done. USG chest, sputum for AFB & sputum culture sensitivity were done according to requirement. Thoracentesis done & fluid was sent for protein, glucose, cell count, malignant cells, Gram's stain, pleural fluid examination for AFB, pleural fluid culture for mycobacterium tuberculosis. ADA was measured in pleural fluid by colorimetric method. Data collected and statistical analysis done.



RESULTS

Out of 50 patients, 36 were male & 14 were female. Majority of patients were between 21 to 60 years of age. 2 patients with exudative

pleural effusion have ADA level less than 40.6 patients with transudative pleural effusion have ADA level is more than 40. One patient of Mesothelioma had pleural fluid ADA level 68. 3 patients of LVF had pleural fluid ADA level less than 40 and 1 patient of hypoproteinemia had pleural fluid ADA level 13.2 IU/L. If 40 IU/L is taken as cut off value for exudative pleural effusion then,

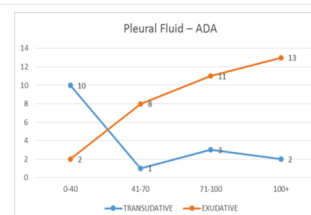
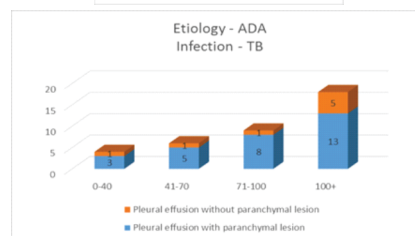
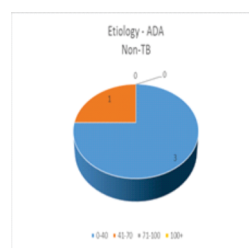
SENSITIVITY 97.06%

SPECIFICITY 75.00%

POSITIVE PREDICTIVE VALUE 89.19%

NEGATIVE PREDICTIVE VALUE 92.31%

Mean value of ADA in 37 diagnosed case of tubercular pleural effusion is 72.4. Mean value of ADA in 13 patients of non-tubercular pleural effusion is 23.6. $p > 0.05$ in cases where ADA value is > 40 (Exudative effusion)



Etiology	ADA				Grand Total
	0-40	41-70	71-100	100+	
Infection					
TB	4	6	9	18	37
Pleural effusion with parenchymal lesion	3	5	8	13	29
Pleural effusion without parenchymal lesion	1	1	1	5	8
Pyogenic	4	1	0	0	5
Carcinoma	2	1	0	0	3
LVF	3	0	0	0	3
Connective tissue disorder	1	0	0	0	1
Hypoalbuminemia	1	0	0	0	1
Grand Total	15	8	9	18	50

DISCUSSION

Present study confirms that the ADA level in tubercular pleural effusion is increased and in non tubercular pleural effusion ADA level did not exceed to 100 IU/L. Tuberculosis is a common cause of pleural effusion, especially in countries like India. More over incidence of tuberculosis is increasing world wide. Although tubercular pleural effusion can resolve spontaneously but up to 65% untreated tubercular pleural effusion can develop active tuberculosis. So rapid and accurate diagnosis and prompt treatment is necessary for tubercular pleural effusion. Whenever a patient of pleural effusion presents we usually investigate on line of gross, microscopic and biochemical parameters (excluding ADA level). Although lymphocytic predominant fluid is usually seen in tubercular pleural effusion but all lymphocytic predominant fluid can't be tubercular, it could be malignant. So there is a need to differentiate among various causes of pleural effusion. Definitive diagnosis of tubercular is often difficult as in more than 50% of patients, pleura is the only site of infection. Tuberculin test is non specific and finding can be negative. Because bacterial load is less so pleural fluid culture for mycobacterium tuberculosis is also low (<20) 10. Pleural fluid ADA estimation is quick and relatively inexpensive.

In present study ADA level in tuberculosis cases was more than 38 IU/L. ADA level in malignancy was up to 68 IU/L. ADA level more than 100 IU/L observed only in cases of tubercular pleural effusion so from the study we concluded that if ADA level of more than 100 IU/L is taken as cut off point it is exclusively seen in cases of tubercular pleural effusion. So we can say that estimation of ADA level in pleural fluid is extremely helpful in establishing the etiology of tubercular pleural effusion and to rule out other diagnosis especially of other diseases in which lymphocyte predominance of pleural effusion is seen such as malignancy and collagen vascular diseases (i.e. rheumatoid arthritis and systemic erythematosis).

The results of this study corresponds well with the study 'ADA levels in Tubercular Pleural Effusion' done by S.K. Verma, A.L. Dubey, P.A. Singh, S.L. Tewerson and published in journal 'Lung India'.

CONCLUSION

High negative predictive value of ADA suggests that ADA has more value in diagnosing patients with exudative pleural effusion. We found that when more than 100 IU/l was taken as cut of limit of ADA level, it was seen in tuberculosis only.

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