Scholars Journal of Applied Medical Sciences (SJAMS) **ISSN 2320-6691 (Online)**
Sch. J. App. Med. Sci., 2017; 5(4D):1492-1494 **ISSN 2347-954X (Print)**

(An International Publisher for Academic and Scientific Resources)
www.saspublishers.com DOI: 10.36347/sjams.2017.v05i04.051

Original Research Article

Diagnostic utility of Adenosine Deaminase in Exudative pleural effusions

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Abstract: The objective is to determine the importance of adenosine deaminase (ADA) in exudative pleural effusions of different etiologies. It was an observational study conducted at a tertiary care teaching institute. Out of a total of 50 pleural fluid samples, 35 were found to be exudates and were include in the study. Pleural fluid ADA was done for all included patients. Pleural fluid ADA ≥40 U/l was taken as diagnostic cut off for TB effusion. Sensitivity, specificity positive and negative predictive value of pleural fluid ADA for diagnosing TB was calculated by using clinical calculator – 1, Richard Lowry 2001-2013. There were 35 patients with pleural effusion, out of which 35 (71.8%) were found to be exudative and were studied further. There were 17 (40.1%), 6 (29.5%) and 7(27%) cases of TB, malignancy and para pneumonic effusion respectively, whereas 5(3.3%) cases remained undiagnosed. Median ADA values for TB, malignancy and para pneumonic effusion were 49.8 U/l, 18 U/l and 25 U/l respectively. Conclusion: Pleural fluid ADA remains useful in diagnosing tuberculosis pleural effusion. The median ADA for TB effusion in present cohort was 49.8 IU/ml. Pleural fluid ADA of 40 U/L yielded 89.5% negative predictive value and 75% positive predictive value. Pleural fluid ADA is cost effective and good screening test for diagnosis of TB.
Keywords: Adenosine deaminase, pleural effusion, tuberculosis

INTRODUCTION

Tuberculosis (TB) is a major public health problem in many developing countries. Although the majority of patients with Tuberculosis have pulmonary TB, extra pulmonary TB affecting mainly the lymph nodes and pleura as the initial symptomatic presentation in about 25% of adults [1]. TB is one of the major leading causes of pleural effusions in some countries [2]. It should always considered possibility of tuberculous pleuritis in all patients with an undiagnosed pleural effusion. Tuberculous pleuritis is thought to represent primarily a hypersensitivity reaction to tuberculous protein and the bacillary burden in the pleural space is low.

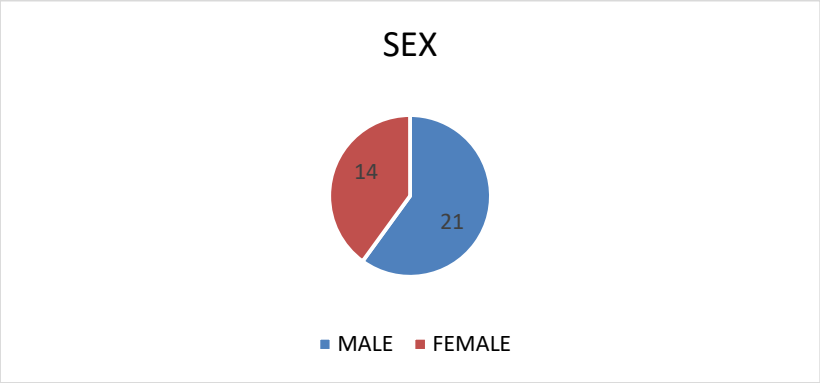
MATERIALS AND METHODS:

It is an observational study conducted in Apollo hospital, Secunderabad (Hyderabad).Total of 50 patients were selected for the study. All patients underwent thoracentesis. All the selected patients were undiagnosed cases of pleural effusion. Patient's pleural fluid was sent for ADA Analysis, gram stain, LDH, ZN stain, cytology. Patients satisfying the Lights Criteria were included in the study.

RESULTS AND DISCUSSION:

Patient's pleural fluid was sent for ADA Analysis. Among 50 patients, 35 patients were found to be exudative. Among 35 patients 21 (60 %) were males and 14 (40%) were females. Patients were all above 20 years of age in the study. Among the 35 patients, pleural fluid cytology was found to be positive in 6 (17.14%) patients. 7(20%) patients were having pleural effusion due to other cause i.e, Para pneumonic effusion. High positive yield is seen for tuberculosis i.e, 17 (48.5%) patients.

1. The ratio of pleural fluid protein to serum protein is greater than 0.5
2. The ratio of pleural fluid LDH and serum LDH is greater than 0.6
3. Pleural fluid LDH is greater than 0.6 or $^{2}/_{3}$ times the normal upper limit for serum.



Graph 1: Sex Distribution

Graph 2: Exudative Fluid

DISCUSSION:

A tuberculous pleural effusion that occurs in the absence of radiologically apparent TB may be the sequel to a primary infection 6–12 weeks previously or it may represent reactivation TB [3]. In industrialized and developing countries, it is thought that more pleural effusions are due to reactivation than follow a primary infection.[3] One epidemiologic study in San Francisco assessing the genotyping of mycobacterial organisms demonstrated that pleural TB patients were twice as likely to be clustered than pulmonary TB and three times more likely to be clustered than non-respiratory TB patients [4]. This observation suggested that the majority of patients of pleural effusion were post primary.

Table 1: Comparison of present study with previously published studies

STUDY	YEAR	SENSITIVE	SPECIFICITY
Reechai pichitkul *et al.*[5]	Thailand (2001)	80	80.5
Mo-lung Chen *et al.;* [6]	China (2004)	87.3	91.8
Bharat *et al.;* [7]	India (2010)	92	90
Sushmita *et al.;* [8]	India (2010)	97	93

CONCLUSION:

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 malignancy. Pleural fluid ADA holds an important diagnostic tool for differentiating between tubercular and non-tubercular pleural effusion.

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