

**IJCRR**

Vol 06 issue 01

Section: Healthcare

Category: Research

Received on: 03/04/13

Revised on: 10/05/13

Accepted on: 15/06/13

## DIAGNOSTIC SIGNIFICANCE OF ADA (ADENOSINE DEAMINASE) IN TUBERCULOUS PLEURAL EFFUSION

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### ABSTRACT

**Introduction:** Adenosine deaminase (ADA) is a useful biochemical parameter for tuberculous pleural effusion. Studies have confirmed diagnostic role of Adenosine deaminase for early diagnosis of pleural tuberculosis in high prevalence countries like India.

**Objective:** To assess the diagnostic level of ADA in tubercular pleural effusion and to determine its Sensitivity, Specificity, Positive and Negative predictive value.

**Material and Methods:** The Retrospective study was carried out on 51 patients suffering from pleural effusion in B.J.M.C. Ahmedabad during May to Aug-2012. Detailed clinical history, physical examination and routine investigation of all patients including ADA estimation by Galanti And Giusti method was done.

**Results :** ADA level in tuberculous pleural effusion ranged from 25-160 U/L with a mean level of 72 U/L and at >60 U/L the Sensitivity-69.2%, Specificity-92%, Positive Predictive Value-90% and Negative Predictive Value -74%. So this was best cut off point for ADA level to confirm diagnosis.

**Conclusion:** ADA was found positive with a mean value of 72 U/L in tuberculous pleural effusion with 69.2% sensitivity and 92% specificity at cut off value of 60 U/L.

**Keywords:** Adenosine deaminase, Tuberculosis, Pleural effusion.

### INTRODUCTION

Tuberculosis is one of the commonest infectious diseases which causes morbidity and mortality in countries like India<sup>(1)</sup>. Tuberculosis usually affects lungs but extra pulmonary tuberculosis is also common, of which tuberculous pleural effusion is one. Diagnosis of pulmonary tuberculosis is confirmed by sputum examination of AFB (Acid Fast Bacilli), while the diagnosis of tuberculous pleural effusion requires investigation of pleural fluid biochemistry, cytology and pleural biopsy. Pleural biopsy is usually the main diagnostic support but it is invasive & difficult procedure. So many biologic parameters have been introduced. One such parameter is ADA (Adenosine deaminase) which is excellent parameter for the diagnosis of tuberculous pleural effusion.

### OBJECTIVE

For Assessment of diagnostic level of ADA in tubercular pleural effusion and to determine its Sensitivity, Specificity, Positive Predictive value and Negative predictive value.

### MATERIALS AND METHODS

This Retrospective study was carried out on 51 patients in B.J.M.C, Ahmedabad during May-Aug 2012 of both sexes admitted as cases of exudative lymphocytic pleural effusion. Detailed clinical history, Physical examination and investigation e.g. AFB, cytology, Biochemical Examination X-ray chest, pleural biopsy for exclusion of cases of tuberculosis enteric fever, leprosy, Viral Hepatitis

& malignancy. ADA Estimation in pleural fluid was done by GALANTI and GIUSTI method.

## RESULT

During the study period, 51 patients with exudative lymphocytic pleural effusion were investigated, out of which tuberculous pleural effusion was diagnosed in 26 patients. Other causes of exudative lymphocytic pleural effusion were malignancy (44.7%), chronic nonspecific inflammation (10%) and systemic lupus erythematosus (0.7%).

ADA level in tuberculous pleural effusion ranged from 25-160 U/L with mean level of 72 U/L. At 60 U/L cut off point, sensitivity and specificity of the test for patient with tuberculous pleural effusion was 69.2% and 92% respectively while Positive Predictive Value and Negative Predictive Value was 90% and 74% respectively.

## DISCUSSION

In our study we investigated 51 cases of exudative lymphocytic pleural effusion, out of which 32 were males and 19 were females ( Figure I ). Our findings seem to confirm the ADA activity is a useful parameter in Tuberculous pleural effusion. The mean level of ADA in tuberculous pleural effusion were higher than in any other disease <sup>(2)</sup>. Many studies have reported the utility of ADA in diagnosis of tuberculous pleural effusion with a wide Range of cut off value (40-85U/L).

In our study ADA Level of 60 U/L was most suitable cut off value yielding sensitivity 69.2%, Specificity 92%, Positive predictive value 90% and Negative predictive value 74%.

( Table I & II).

ADA, a product of T lymphocytes, is a very good parameter for diagnosis of tuberculous pleural effusion. Almost all research workers are using different cut off levels for measuring sensitivity and specificity of ADA level in pleural fluid.

Burgess L.J.<sup>(2)</sup> showed ADA activity in tuberculous effusion was higher than in any other diagnostic group. At a level of 50U/L the

sensitivity and specificity for the identification of tuberculosis was 90% and 89% respectively.

P.C.Mathur <sup>(3)</sup> studied ADA activity in 50 patients with pleural effusion and found sensitivity and specificity of 100% at a level of 40 U/L cut off value.

Shibagaki T *et al.*<sup>(4)</sup> concluded that tuberculous pleural effusion had a much higher ADA activity than cancer effusion.

The method of ADA estimation is easy, simple, rapid and non expensive test which requires only a simple colorimeter and takes only two hours.

## CONCLUSION

Estimation of ADA level is a simple, cheaper, inexpensive, highly sensitive & specific test employed routinely to differentiate between tubercular and non tubercular etiology in patients of pleural effusion in developing countries like India.

## ACKNOWLEDGEMENT

We would like to express our gratitude to Department of Pathology, B.J. Medical College, Ahmedabad. We also acknowledge the great help received from the scholars whose articles cited and included in references of this manuscript. We are also grateful to authors / editors / publishers of all those articles, journals and books from where the literature for this article has been reviewed and discussed. We are grateful to IJCRR editorial board members and IJCRR team of reviewers who have helped to bring quality to this manuscript.

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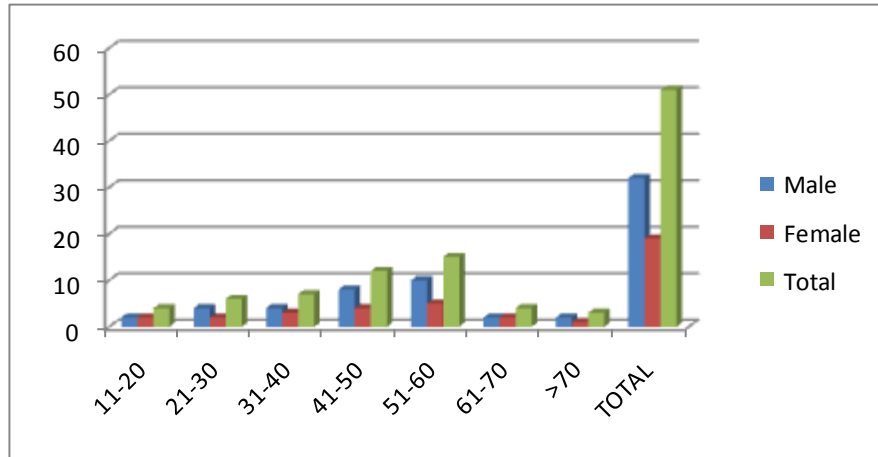


Figure I: Age and Sex Wise Distribution In Patients Of Pleural Effusion

Table-I: No. of Patients with pleural effusion

ADA test	Tuberculous	Nontuberculous
Positive	18 ( a )	2 ( b )
Negative	8 ( c )	23 ( d )

Table –II: Sensitivity, Specificity, Positive Predictive Value & Negative Predictive Value of ADA for tuberculous pleural effusion.

Sr No.	ADA level	Sensitivity	Specificity	Positive Predictive Value	Negative Predictive Value
1	>40 U/L	92 %	56 %	68 %	87.5 %
2	>60 U/L	69.2 %	92 %	90 %	74 %