OPEN ACCESS
Saudi Journal of Pathology and Microbiology
Abbreviated Key Title: Saudi J Pathol Microbiol
ISSN 2518-3362 (Print) |ISSN 2518-3370 (Online)
Scholars Middle East Publishers, Dubai, United Arab Emirates
Journal homepage: https://saudijournals.com

Original Research Article

Analysis of Pleural Fluid Adenosine Deaminase in Diagnosis of Tubercular Pleural Effusion in A Tertiary Care Hospital, Bhavnagar

Dr. K. J. Desai[1], Dr. Harsh Singel[2*], Dr. Jatin Sarvaiya[3], Dr. Saklainhaider Malek[4], Dr. Ravindra Jadeja[5]

[1]Head of Department, Microbiology Department, Government Medical College, Bhavnagar, Gujarat-364001, India
[2,4]Assistant Professor, Microbiology Department, Government Medical College, Bhavnagar, Gujarat-364001, India
[3]Tutor, Microbiology Department, Government Medical College, Bhavnagar, Gujarat-364001, India
[5]Associate Professor, Microbiology Department, Government Medical College, Bhavnagar, Gujarat-364001, India

DOI: 10.36348/sjpm.2021.v06i05.005 | **Received:** 08.04.2021 | **Accepted:** 15.05.2021 | **Published:** 22.05.2021

***Corresponding author:** Dr. Harsh Singel

Abstract

Introduction: Pleural effusion, that is commonly encountered clinical problem by the Pulmonologists and physicians.The gold standard for diagnosis of tuberculous pleuritis is detection of Mycobacterium tuberculosis bacilli in pleural fluid, either by microscopy/ molecular methods (CB-NAAT) and culture, or the histological demonstration of the caseating granulomas in biopsy specimen. Aims & objectives are to assess Significance of ADA level in the diagnosis of pleural effusion**.** ***Materials and method:*** The study was done in microbiology laboratory at Sir-T Hospital, Bhavnagar, Gujarat from January, 2020 to December, 2020 to Analysis of pleural fluid adenosine deaminase in diagnosis of tubercular pleural effusion. Adenosine Deaminase levels are evaluated by Adenosine Deaminase Assay Kit (DIAZYME). ***Observation & results:*** In our study, Total 48 pleural fluid samples were tested for ADA. Out of total 48 samples 34 were males and 14 were females in our study. However out of 48 samples, n20 samples positive for CB-NAAT. Out of the total 48 pleural fluid samples, 20 pleural fluid samples were positive (value >60 U/L) for ADA in our study. ***Conclusion:*** From this study, its concluded that Pleural Fluid Adenosine deaminase is important biomarker in diagnosing the Tubercular pleural effusion and can be useful aid in the day to day clinical practice.

Keywords: TB- Tuberculosis, ADA-adenosine deaminase, U/L-Unit per litre.

INTRODUCTION

Pleural effusion is commonly encountered clinical problem by the Pulmonologists and physicians. It's important to establish the accurate etiological diagnosis for treatment in the patient as about 15 to 20% of cases remain undiagnosed [1].

TB is common cause of pleural effusion worldwide (30-60%). That's estimated between 2 to 3 billion people are infected with Mycobacterium Tuberculosis worldwide, of which 5-15% will develop tuberculosis during their lifetime [2]. It's important to consider the possibility of tuberculosis [TB] in the all patients with undiagnosed pleural effusion [3].

The gold standard for diagnosis of tuberculous pleuritis is detection of Mycobacterium tuberculosis bacilli in pleural fluid, either by microscopy/ molecular methods (CB-NAAT) and culture, or the histological demonstration of the caseating granulomas in biopsy specimen. The diagnosis in pleural tuberculosis has greatly improved by use of biochemical markers, these are rapid and more sensitive. The first reported in 1978, Measurement of pleural fluid ADA has the consistently demonstrated high accuracy for the diagnosing pleural TB [4, 5].

ADA comprises the two isoenzymes, ADA1 and ADA2. ADA1 is ubiquitous enzyme that is produced by many different cell types, and ADA2 is secreted by monocytes & macrophages and the predominant isoenzyme (85%) in the TB pleural effusion [6]. When extrapulmonary TB is suspected, Smear microscopy & TB culture are performed when available, but often insensitive because of the low bacillary load. Variety of commercial nucleic acid amplification tests have role in diagnosis of extrapulmonary TB. When available, they should be used along with clinical findings & conventional tests used to confirm, rather than "rule out", the diagnosis of extrapulmonary TB. Elevated levels of adenosine

deaminase (ADA) in pleural fluid is reasonably specific and sensitive for TB.

AIMS & OBJECTIVES

Aims & objectives are to assess Significance of ADA level in the diagnosis of pleural effusion**.**

MATERIALS AND METHOD

The study was done in microbiology laboratory at Sir-T Hospital, Bhavnagar, Gujarat from January, 2020 to December, 2020 to Analysis of pleural fluid adenosine deaminase in diagnosis of tubercular pleural effusion. Adenosine Deaminase levels are evaluated by Adenosine Deaminase Assay Kit (DIAZYME).

Assay Principle

The Diazyme ADA Assay is based on the enzymatic deamination of adenosine to inosine which is converted to hypoxanthine by purine nucleoside phosphorylase. Hypoxanthine is then converted to uric acid and hydrogen peroxide by xanthine oxidase. Hydrogen peroxide is further reacted with N-Ethyl-N-(2-hydroxy-3-sulfopropyl)-3-methylaniline and 4-aminoantipyrine (4-AA) in the presence of peroxidise to generate quinine dye which is monitored in a kinetic manner [7].

One unit of ADA is defined as the amount of ADA that generates one micromole from adenosine per min at 37^0C. Adenosine Deaminase Assay Kit has 2 reagents that are R1 and R2. Assay procedure-Application sheet for use of Adenosine Deaminase Assay on automated clinical analyzer.add R1-360 microL & sample-10 microL and incubate it for 3 min at 37^0C, then add R2 -180 microL and incubate is for 5 min and run in the analyzer, it will take another 3min.Final result are printed in U/L.Literature citation show that for pleural fluid values were found to be in range Normal < 30 U/L, Suspect 30-40 U/L, Strong Suspect 40-60 U/L, Positive >60 U/L.

OBSERVATION & RESULTS

In our study, Total 48 pleural fluid samples were tested for ADA. Out of total 48 samples 34 were males and 14 were females in our study. However out of 48 samples, 20 samples positive for CB-NAAT.

Out of the total 48 pleural fluid samples, 20 pleural fluid samples were positive (value >60 U/L) for ADA in our study. The Age of these all patient was above 40 year.

Table-1: Gender distribution of patients.

Total Samples Taken – 48	
males	34
females	14

Table-2: Study variables in pleural fluid ADA.

Total samples taken	48
positive	20

DISCUSSION

This study was conducted for Analysis of pleural fluid adenosine deaminase in diagnosis of tubercular pleural effusion in the region.

However, In India, ADA is found to be particularly useful in diagnosis of Pleural TB. Another study conducted by Chan et al, on patients along with tuberculous pleural effusion revealed the age of 44 years [8]. Higher prevalence of tuberculosis in the low age group is may be due to living/working conditions & poor socioeconomic conditions. Men are more predisposed to tuberculosis and malignancy [9].

In our Study out of 48 pleural fluid samples, 20 were positive for pleural fluid ADA compare to another study by A. Trajman et al, who evaluated 132 patients in which 95 were Tubercular [10].

CONCLUSION

From this study, it is concluded that Pleural Fluid Adenosine deaminase is important biomarker in diagnosing the Tubercular pleural effusion and can be useful aid in the day to day clinical practice.

REFERENCES

1. Guleria R, Agarwal SR, Sinha S, Pande JN, Misra A. (2003). Role of pleural fluid cholesterol in differentiating transudative from exudative pleural effusion. Natio Med J Ind, 16(2):64-9.
2. World Health Organization. (2015). Global tuberculosis report. Available at: https://www.health-e.org.za/wp content/uploads/2015/10/Global-TB-Report-2015FINAL-2.pdf.
3. Light RW. 2010). Update on tuberculous pleural effusion. Respirol, 15(3):451-8.
4. Piras M, Gakis C, Budroni M, Andreoni G. (1978). Adenosine deaminase activity in pleural effusions: an aid to differential diagnosis. Br Med J, 2(6154):1751.
5. Porcel JM, Esquerda A, Bielsa S. (2010). Diagnostic performance of adenosine deaminase activity in pleural fluid: a single-center experience with over 2100 consecutive patients. Eu J Int Medi, 21(5):419-23.
6. Bielsa S, Palma R, Pardina M, Esquerda A, Light RW, Porcel JM. (2013Comparison of polymorphonuclearand lymphocyte-rich tuberculous pleural effusions. Int J Tuber Lung Dis, 17(1):85-9.
7. DIAZYME, Adenosine Deaminase Assay kit, kit manual 70056 Rev.M,Diazyme Laboratories 12889 Gregg Court poway, CA 92064,USA.

8. Chan CH, Arnold M, Chan CY, Mak TW, Hoheisel GB. (1991).Clinical and pathological features of tuberculous pleural effusion and its long-term consequences. Resp. 58(3-4):171-5.
9. Antonangelo L, Vargas FS, Seiscento M, Bombarda S, Teixera L, Sales RK. (2007). Clinical and laboratory parameters in the differential diagnosis of pleural effusion secondary to tuberculosis or cancer. Clinics, 62(5):585-90.
10. Trajman A, Kleiz EF, Bastos ML, Neto EB, Silva EM, da Silva Lourenço MC, et al. (2014). Accuracy of polimerase chain reaction for the diagnosis of pleural tuberculosis. Res Med, 108(6):918-23.