International Journal of Integrative Medical Sciences,
Int J Intg Med Sci 2016, Vol 3(6):300-02. ISSN 2394 - 4137
DOI: http://dx.doi.org/10.16965/ijims.2016.123

Original Research Article

A Prospective Study to comparatively assess the role of adenosine deaminase levels in contents of cold and pyogenic abscesses

Kapil Rampal *[1], Devendra K. Prajapati [1], Meghna Sharma [2].

[*1] Department of Surgery, Deendayal Upadhyay Hospital, New Delhi, India.
[2] CHC, Kasel, Tarn Taran, Punjab, India.

ABSTRACT

Tuberculosis with its varied clinical manifestations is a common health problem amongst the developing countries. In this study we prospectively studied the role of ADA levels in cold abscess content vis a vis pyogenic abscess and brought out its positive role as an economical, rapid and reliable tool in diagnosis of cold abscess.

KEY WORDS: Adenosine Deaminase, Cold Abscess, Psoas Abscess,Mycobacterium Tuberculosis, Pulmonary Tuberculosis, Extra Pulmonary Tuberculosis.

Address for correspondence: Dr. Kapil Rampal, F9/431,Street No 5,Gokal Avenue, P.O.Vijay Nagar, Amritsar-143001. India. **E-Mail:** balkarankapil@gmail.com

Online Access and Article Informtaion	
Quick Response code	International Journal of Integrative Medical Sciences www.imedsciences.com
DOI: 10.16965/ijims.2016.123	**Received:** 24-05-2016 **Accepted:** 14-06-2016 **Reviewed:** 24-05-2016 **Published:** 30-06-2016
Source of Funding: Self	**Conflicts of interest:** None

INTRODUCTION

Tuberculosis, since the times immemorial has been a common health problem and despite all the modern day advances in the fields of diagnosis and pharmacology, it continues to be a leading cause of mortality globally [1]. The socio-economical impact of the disease can be gauzed from the fact that it affects populations across the boundaries of age, gender and it can involve almost any organ of the human body. Tuberculosis is a bacterial disease categorized in pulmonary and extra pulmonary tuberculosis, the most common causative agent of which is Mycobacterium tuberculosis bacterium. Glandular tuberculosis is the most common form of extra pulmonary tuberculosis. Cold abscesses formation, another manifestation of extra-pulmonary tuberculosis that also include tubercular psoas abscess [Figure 1,2,3] are not at all rare especially in developing countries as ours. An early differentiation from pyogenic abscess is warranted as the management of the two clinical entities is entirely different. A wide range of tests available to diagnose tuberculosis include Montoux, acid fast staining, culture, chest x-ray and newer tests like the polymerase chain reaction. Till date the gold standard for diagnosis has been the demonstration of caseous granulomatous inflammatory reaction in the body tissues [2]. Fluid and serum ADA levels have been advocated recently and reported to have a high sensitivity and specificity for tuberculosis. ADA is an enzyme of purine metabolism that catalyses the conversion of adenosine to inosine and is richly concentrated in T-lymphocytes. Its estimation is relatively quick and economical. Levels of > 47 IU/L in pleural fluid, >40IU/L in pericardial fluid and > 36-40 IU/L in peritoneal fluid (Table 1) are useful cut offs [3,4,5]. Spuriously raised levels may be seen in rheumatoid pleurisy, lymphoma and mesotheliomas [6].

Aim: We aim to determine the ADA levels in contents of cold abscesses and compare them with the ADA levels in contents of pyogenic abscesses.

Fig. 1: Right cervical lymph node abscess.

Fig. 2: Left inguinal cold abscess secondary to left psoas abscess).

Fig. 3: Right psoas abscess.

Fig. 4: Right psoas abscess.

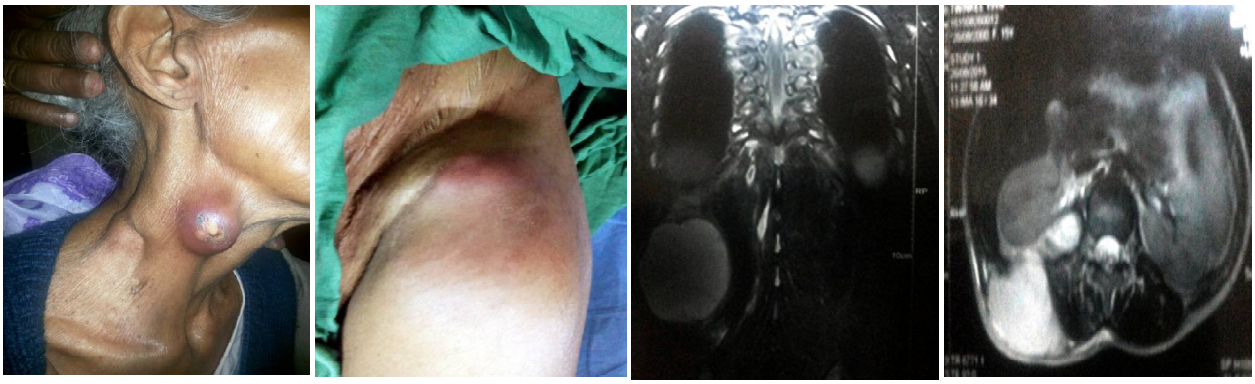

Table 1: ADA levels (IU/L) in various body fluids.

Body fluids	ADA levels (IU/L)
Serum	15-30
Pleural	< 47
Pericardial	< 40
Peritoneal	< 40
CSF	< 10

MATERIALS AND METHODS

The study as per design is prospective non randomised and observational in nature. Study spanned from January 2015 to January 2016. 42 microbiologically (both AFB stain positive and tubercle bacilli culture positive) confirmed cases of cold abscess and 50 cases of pyogenic abscess over any part of the body were studied.

Inclusion criteria: Microbilogically confirmed consenting adult cases of cold abscess and pyogenic abscess were included. A positive cut off value of 47 IU/L was used for cold abscess, as it is the highest cut off value suggested by some studies for pleural effusion and since no standard cut off values exist for a cold abscess.

Exclusion criteria: minors, non consenting adults, those suffering from diseases that alter ADA levels as enteric fever, diabetes, viral hepatitis, HIV, nephritic syndrome etc and those taking drugs that alter ADA levels as ribavirin, alpha interferon etc were excluded.

Pus samples in both groups were obtained by radiologically guided or direct aspiration and surgical drainage.

OBSERVATIONS AND RESULTS

In cold abscess group raised ADA levels are observed in 39 patients out of the total 42(92.85%). An interesting co-observation is that in 94.87% cases levels more than 200 IU/L were obtained. Mean ADA levels of 229.90 IU/L have been observed. In the pyogenic abscess group raised ADA levels are observed only in 02 patients (04.0%) and the raised levels in both these patients were below 70 IU/L. The mean value of ADA observed in this group is 25.46 IU/L. Thus ADA level measurement in a cold abscess has a sensitivity of 92.85% with 96% specificity. A positive predictive value of 95.12% and a negative predictive value of 94.11% is deduced [Table 2].

Table 2: Cold Vs pyogenic Abscess ADA values variations.

Group	ADA Raised	ADA Normal	Total
COLD ABSCESS	39 (92.85%)	03 (07.15%)	42
PYOGENIC ABSCESS	02 (04.0%)	48 (96.0%)	50

DISCUSSION

In this study we have endeavoured to bring out a role for ADA estimation in the diagnosis of cold abscesses. ADA, an enzyme of purine salvage pathway catalyses conversion of adenosine to inosine and is ten times more concentrated in lymphocytes(specifically T-lymphocytes) than erythrocytes [7]. This enzyme activity is accelerated in response to mitogenic and immunogenic inducers . Also being an enzyme its effect can be blocked by specific inhibitors [8,9]. The ADA activity lags in disorders of cell mediated immunity as in AIDS. ADA measurements form a part of tools to diagnose tuberculosis in tubercular pleural, pericardial and peritoneal effusions and a sensitivity and specificity rates of 95-97% and 85-90%, respectively have been reported in literature [10-14]. In our study we have deduced a sensitivity and specificity of 92.85% and 96%

respectively. The positive and negative predictive values as inferred from our study are 95.12% and 94.11% respectively. The peak ADA levels observed in cold abscess also are much higher compared to pyogenic abscesses with a mean value of 229.90IU/L.

Sonone Kanchan et al had comparatively highlighted the role of ADA measurements in pulmonary tuberculosis patients with and without pleural effusion [15].

Mukesh Kumar Aggarwal et al had concluded in their study that higher serum ADA levels are seen in culture positive patients of tuberculosis than healthy control group [16].

A study by Y.C.Gary Lee et al also highlighted high ADA levels in pleural fluids of tubercular lymphocytic fluid [17]. Not much data exists in literature for ADA levels in the contents of cold abscess but the outcome of our study is in coherence with related conclusions drawn from available literature.

CONCLUSION

Higher ADA levels have been observed in the contents of cold abscess than pyogenic abscess with a favourable sensitivity, specificity and predictive value profile. To best of our knowledge only a single case study is available in literature highlighting ADA's role in cold abscesses. This is thus first comparative study that brings out and recommends the use of relatively economical, rapid, easily available diagnostic tool for a disease condition fairly common in our part of the world.

REFERENCES

[1]. Mathur PC, Tiwari KK, Trikha S and Tiwari D: Diagnostic utility of Adenosine deaminase (ADA) activity in Tubercular serositis. Indian journal of Tuberculosis 2006;53:92-95.

[2]. Baumann, MH, Nolan, R, Petrini, M, et al. Pleural tuberculosis in the United States: incidence and drug resistance. Chest 2007;131:1125.

[3]. Valdés L, Alvarez D, San José E, et al. Value of adenosine deaminase in the diagnosis of tuberculous pleural effusions in young patients in a region of high prevalence of tuberculosis. Thorax 1995;50:600-603.

[4]. Valdés L, San José E, Alvarez D, Valle JM. Adenosine deaminase (ADA) isoenzyme analysis in pleural effusions: diagnostic role, and relevance to the origin of increased ADA in tuberculous pleurisy.Eur Respir J 1996;9:747-51.

[5]. Riquelme A, Calvo M, Salech F, et al. Value of adenosine deaminase (ADA) in ascitic fluid for the diagnosis of tuberculous peritonitis: a metaanalysis. J Clin Gastroenterol 2006;40:705-10.

[6]. Ibrahim Koc, Ersin Arslan, Feridun Isik, Öner Dikensoy. Tuberculous pleurisy: High adenosine deaminase level in cold abscess content. IJCRI – International Journal of Case Reports and Images, 2011;2(3).

[7]. Ramgopal S, Reem GH. Activities of purine nucleotide metabolizing enzymes in human thymocytes and peripheral blood T.lymphocytes: In vitro effect of thymic hormones. Thymus 1982;4:163-72.

[8]. Hovi T, Smyth JF, Allisen AC, Williams SC. Role of ADA in lymphocyte proliferation Clinical Exp Immunology 1976;1276:395-403.

[9]. Carson DA, Seegmiller JE. Effect of adenosine deaminase inhibition upon human lymphocyte blastogenesis. J Clin Invest 1976;57:274-82.

[10]. Valdés, L, Alvarez, D, San José, E, et al. Tuberculous pleurisy. A study of 254 patients. Arch Intern Med 1998;158:2017

[11]. Ocaña, I, Martinez-Vazquez, JM, Segura, RM, et al.Adenosine deaminase in pleural fluids: Test for diagnosis of tuberculous pleural effusion. Chest 1983;84:51.

[12]. Orriols, R, Coloma, R, Ferrer, J, et al. Adenosine deaminase in tuberculous pleural effusion. Chest 1994;106:1633.

[13]. Bañales, JL, Pineda, PR, Fitzgerald, JM, et al. Adenosine deaminase in the diagnosis of tuberculous pleural effusions. A report of 218 patients and review of the literature. Chest 1991;99:355.

[14]. Villegas, MV, Labrada, LA, Saravia, NG. Evaluation of polymerase chain reaction, adenosine deaminase, and interferon-gamma in pleural fluid for the differential diagnosis of pleural tuberculosis. Chest 2000;118:1355.

[15]. Dr. Sonone Kanchan K.et al. Study Of Adenosine Deaminase Levels In Patients Of Pulmonary Tuberculosis With And Without pleural effusion. OSR Journal of Dental and Medical Sciences (IOSR-JDMS) feb 2014;2279-0853.

[16]. Agarwal MK, Nath J, Mukerji PK and Srivastava VML. A.study of serum adenosine deaminase activity in sputum negative patients of pulmonary tuberculosis. Ind. L Tub, 1991;38:139.

[17]. Lee YCG, Rogers JT, Rodriguez RM, Miller KD and Light RW. Adenosine Deaminase Levels in Nontuberculous Lymphocytic Pleural Effusions. Chest 2001;120:356-361.

How to cite this article: Kapil Rampal, Devendra K. Prajapati, Meghna Sharma. A Prospective Study to comparatively assess the role of adenosine deaminase levels in contents of cold and pyogenic abscesses. Int J Intg Med Sci 2016;3(6):300-302.
DOI: 10.16965/ijims.2016.123