Original Research Article

A study of serum 5'- Adenosine deaminase and uric acid in rheumatoid arthritis patients

Archana Dhotre[1*], Avinash Gawande[2], Sandip Lambe[3], Manohar Muddeshwar[4], Bhushan Mahajan[5]

{[1,5]Associate Professor, [3]Assistant Professor, [4]Professor and HOD, Department of Biochemistry}
{[2]Associate Professor, Department of Preventive and Social Medicine} Government Medical College, Nagpur, Maharashtra, INDIA.
Email: drsandiplambe@gmail.com

Abstract

Rheumatoid arthritis is a chronic, systemic, inflammatory disease that chiefly affects the synovial membrane of multiple joints. The prevalence of this disease in general population is 1 to 2%. Adenosine deaminase enzyme is involved in purine metabolism. Several studies have reported the increase in level of 5'-ADA in RA patients. Uric acid is the end product of Purine catabolism. The present study was undertaken in department of Biochemistry of GMC, Nagpur over a period of one and half years with the aim to assess the changes in the level of serum 5'- Adenosine deaminase activity and uric acid in Rheumatoid arthritis patients.

Keywords: Rheumatoid arthritis (RA), 5'- Adenosine deaminase (ADA), Uric acid, Polymorphonuclear Lymphocytes (PMNL).

[*]**Address for Correspondence:**
Dr. Sandip Lambe, Associate Professor, Department of Biochemistry, Government Medical College, Nagpur, Maharashtra, INDIA.
Email: drsandiplambe@gmail.com
Received Date: 23/07/2015 Revised Date: 18/08/2015 Accepted Date: 23/09/2015

Access this article online

Quick Response Code:

Website: www.statperson.com

DOI: 08 October 2015

INTRODUCTION

Arthritis literally means "Inflammation of joints". Rheumatoid arthritis is a chronic, systemic, inflammatory disease that chiefly affects the synovial membrane of multiple joints. Rheumatoid arthritis generally occurs in symmetrical pattern.[1] The prevalence of the disease is 1-2% in general population.[2] Females with RA out number males by 3:1 margin.[2] It is an extremely disabling disease that carries a high mortality. Though aetiologies like genetic, environmental and autoimmune factors have been proposed in the development of this condition but it is still unknown. But autoimmune destruction of cartilage cells is widely accepted in the pathogenesis of RA. The inflammatory changes in rheumatoid arthritis lead to swelling and pain in affected joint which are the main presenting symptoms. Adenosine deaminase belongs to the group of enzymes which are associated with purine metabolism. It catalyzes the deamination of adenosine and deoxy-adenosine to inosine and deoxy-inosine.[3] It is present in most tissue as well as serum and it is one of the main components for maturation and function of lymphocytes and formation of macrophages from monocytes. Humans catabolise Purines to end product uric acid. Several studies have reported a rise in the level of serum ADA and uric acid in patients with rheumatoid arthritis.[4,5] Hence this study was undertaken to assess the changes in serum levels of ADA and uric acid in rheumatoid arthritis patients and to see if ADA, as a marker of activation of cellular immunity may help in better understanding some pathophysiological aspects of RA.

MATERIAL AND METHODS

The present study was carried out in the Department of Biochemistry, Govt Medical College, Nagpur over a period of One and half years.

Selection of Patients

Patients were selected from those attending the Ortho OPD and admitted in wards. 50 women patients of Rheumatoid arthritis were taken as cases and 50 healthy age matched women were taken as controls.

How to site this article: Archana Dhotre, Avinash Gawande, Sandip Lambe, Manohar Muddeshwar, Bhushan Mahajan. A study of serum 5'- Adenosine deaminase and uric acid in rheumatoid arthritis patients. *International Journal of Recent Trends in Science and Technology.* October 2015; 16(3): 518-520 http://www.statperson.com (accessed 12 October 2015).

Inclusion Criteria

1. Subjects willing to enter the study
2. Patients with a positive rheumatoid factor
3. Age between 30 to 60 years
4. No other systemic complications present

Sample Collection

5 ml venous blood was drawn from antecubital vein. Serum was separated by centrifugation. Hemolyzed samples were discarded.

Method of Estimation

Parameter	Method of estimation
Serum Adenosine Deaminase	Giuseppe Giusti and Bruno Galanti colorimetric method
Serum Uric acid	Uricase colorimetric method

RESULTS

Table 1: Table showing distribution of study subjects according to age

Age in years	Cases	Controls
30 to 40	23	24
41 to 50	19	18
51 to 60	8	8
Total	**50**	**50**

Table 2: Table showing values of 5'-Adenosine Deaminse in the study subjects according to age groups

Age in Years	Cases (n=50) Mean ± SD	Conrols (n=50) Mean ± SD	p Value
30 to 40	12.11±1.61	12.5±2.90	p>0.05
41 to 50	18.48±4.12	13.66±3.59	p<0.01
51 to 60	20.93±4.35	18.73±5.38	p>0.05
30 to 60	15.91±4.88	13.52±3.99	p<0.01

Table No 2 shows mean values of serum 5'-ADA level in cases and controls. There is a significant increase in ADA level in Rheumatoid arthritis cases compared to healthy controls. Upon segregation of levels in age groups, significant elevation in ADA was found in patients within age group of 41 to 50 years.

Table 3: Table showing values of serum Uric acid in the study subjects according to age groups

Age in Years	Cases (n=50) Mean ± SD	Conrols (n=50) Mean ± SD	p Value
30 to 40	3.75±0.34	3.47±0.35	p<0.01
41 to 50	5.86±0.51	4.83±0.44	p<0.01
51 to 60	5.95±0.33	5.92±0.33	p>0.05
30 to 60	5.22±0.98	4.51±0.90	p<0.01

Table No 3 shows mean values of serum uric acid in cases and controls. A statistically significant increase in serum uric acid level is observed in RA cases compared to controls. Furthermore a significant increase in uric acid level was found within the age groups of 30 to 40 and 42 to 50 years.

DISCUSSION

Rheumatoid arthritis is best perceived as a chronic, systemic inflammatory disease. It is characterized by inflammation of synovial tissue with joint pain, swelling and stiffness. The disease usually strikes between ages of 30 to 40 years and the incidence of clinical illness is greatest among those aged 40 to 60 years.[2] In some cases, rheumatoid arthritis can be difficult to diagnose in its early stages. From various studies it is found that there is a significant increase in serum 5'-ADA and uric acid levels in rheumatoid arthritis patients. It is suggested that increase in ADA in serum and synovial fluid of patients with RA can be attributed to a higher activation and turnover of Polymorphonuclear lymphocytes (PMNL) in inflamed joints.[5] Thus serum ADA may provide an additional tool for diagnosis and monitoring the patients with rheumatoid arthritis.[6] Increased turnover of PMNLs and increased breakdown of purines lead to rise in serum uric acid level. In the present study, there was statistically significant increase in the levels of both serum 5'-ADA and uric acid in rheumatoid arthritis patients compared with healthy controls. The findings of our study correlated well with the studies conducted by T Patterson *et al*[5], I Ocana *et al*[7], H Yuksel *et al*[8], S Egawa *et al*[9], Smolenska Z *et al*[10] and Marcos JC *et al*[11]. In none of the above studies, ADA levels were considered according to the age group of study subjects. In our study, when the serum levels of ADA and uric acid were taken according to age of study population, it was observed that there was significant increase in the level of both these parameters in the age group of 41 to 50 years. Thus our study put forth by grouping the patients decade wise of life revealed a better diagnostic probability in case of rheumatoid arthritis patients.

CONCLUSION

Significant increase in serum 5'-ADA in age group 41 to 50 years rheumatoid arthritis patients indicates that this may be evaluated as a diagnostic marker of the beginning of inflammatory changes in the joints and activation of cellular immunity in the detection of pathophysiological changes occurring in rheumatoid arthritis earlier. But for that a larger study with more study population size will be required to be conducted in Indian scenario.

REFERENCES

1. Edward D Harris Jr. Textbook of Rheumatology. 3rd edition: 638-935.
2. Focus on--Rheumatoid Arthritis. Medical science bulletin. Dec 1994: 1-6.
3. Oscar Bodonsky and Morton K Schwartz. Advances in Clinical Chemistry. 11:1968.

4. Leonore Hollander Koehler and Edward J Benz. Serum Adenosine Deaminase: Methodology and clinical applications. Clinical Chemistry. 1962: Vol 8(2).
5. T Patterson, M Klockars, TH Webber et al. Adenosine deaminase activity in joint effusions. Scand J Rheumatology. 1988; 17: 365-69.
6. T Patterson, M Klockars and T H Webber. Pleural fluid Adenosine deaminase in Rheumatoid arthritis and Systemic Lupus Erythematosus. Chest. Aug 1984; 86(2): 274.
7. I Ocana, E Ribera, JM Martinez-Vazcuez, Ruiz, E Bezarano, C Pigrau et al. Adenosine deaminase activity in Rheumatoid pleural effusion. Annals of the Rheumatic Disease. 1988; 47: 394-7.
8. H Yuksel and TF Akoglu. Serum and synovial fluid adenosine deaminase activity in patients with rheumatoid arthiritis, osteoarthritis and reactive arthritis. Annals of the Rheumatic Disease. 1988; 47: 492-5.
9. SI Egawa, Yasuhiro Watanabe. Correlations between matrix metalloproteinase-9 and Adenosine deaminase isoenzyme in synovial fluid from patients with Rheumatoid arthritis. The Journal of Rheumatology. 2001; 28(3):485-9.
10. Smolenska Z, Kaznovaska Z, Zarowny D, Simmonda HA, Smolenski RT. Effect of Methotrexate on blood purine and pyrimidine levels in patients with rheumatoid arthritis. Rheumatology (Oxford). Oct 1999; 38(10): 997-1002.
11. Marcos JC, Maccagno A, Gutfraind E, Garsd A, Messina DO, Maldonado cocco J et al. Efficacy tolerability and safety of cyclosporine for microemulsion in the treatment of active rheumatoid arthritis. Medicine (B Aries). 2000; 60 (4): 435-40.

Source of Support: None Declared
Conflict of Interest: None Declared