



## ASSOCIATION BETWEEN DIABETES MELLITUS AND RHEUMATOID FACTOR - IS IT BECAUSE OF INSULIN?

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### ABSTRACT:

**Introduction:** It has been hypothesized that chronic systemic inflammation predisposes to insulin resistance and type-II Diabetes mellitus in rheumatoid arthritis patients. A previous study has shown that diabetic patients who receive insulin therapy develop rheumatoid factor in the due course due to repeated exposure to foreign antigen and development of antigen-antibody complexes.

### Materials and methods:

100 subjects who were on both insulin and non insulin medications were chosen for the study. Around 5 ml of blood was withdrawn from them for estimation of rheumatoid factor and the laboratory estimation was done using nephelometry. RA factor value of less than 30 IU/ml was considered negative and above that was taken as positive.

### Results:

Of the 88 subjects studied only 13 had a Rheumatoid factor of above 30 IU/ml and were considered positive. Of the 13 subjects with increased RA factor, 12 were on insulin and one was not on insulin therapy. Test of significance was done using Chi square test and it was found to be significant (P less than 0.05).

### Conclusions:

Hence we conclude that diabetic patients who receive insulin therapy develop rheumatoid factor in the due course due to repeated exposure to foreign antigen and development of antigen-antibody complexes and therefore interpretation of elevated levels of Rheumatoid factor in the setting of Diabetes mellitus has to be done keeping this in mind.

**KEYWORDS:** Diabetes mellitus, Rheumatoid factor, Insulin, Antigen-Antibody complexes, Rheumatoid arthritis

**INTRODUCTION:**

Diabetes mellitus is a disorder in which glucose metabolism is deranged; insulin levels are reduced or insulin resistance is seen in them.<sup>1,2,5</sup> Association between diabetes mellitus and rheumatoid arthritis has been studied and it has been hypothesized that chronic systemic inflammation predisposes to insulin resistance and type-II Diabetes mellitus in rheumatoid arthritis patients.<sup>3</sup> A previous study has shown that diabetic patients who receive insulin therapy develop rheumatoid factor in the due course due to repeated exposure to foreign antigen and development of antigen-antibody complexes.<sup>4</sup> Positive rheumatoid factor does not necessarily mean that the person has Rheumatoid arthritis because Rheumatoid factor is a type of anti gamma globulin antibody found in association with a variety of diseases other than Rheumatoid arthritis. Production of RF can be stimulated by other gamma globulin antibodies.

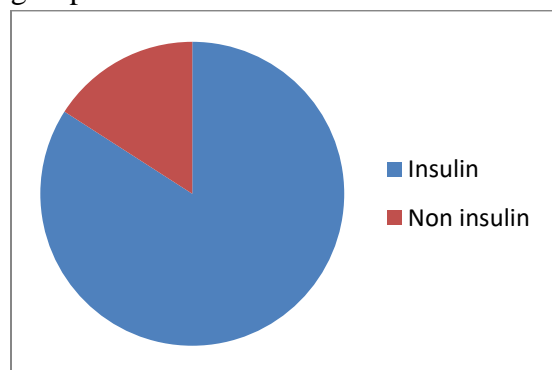
**METHODOLOGY:**

100 type-I and type-II diabetic subjects were included in our study after obtaining their informed written consent. It is a cross sectional study and the study was approved by the institutional ethical committee. A detailed diabetic, medical and drug history of the subjects was taken and subjects with known history of rheumatoid arthritis or any other chronic systemic inflammatory disease were excluded from the study. Subjects who were on both insulin and non insulin medications were chosen for the study. Around 5 ml of blood was withdrawn from them for estimation of rheumatoid factor and the laboratory estimation was done using nephelometry method in a standard laboratory. The results obtained were compared and analyzed. RA factor value of less than 30 IU/ml was considered negative and above that was taken as positive. Statistical analysis was done using Microsoft excel and SPSS version 20.

**RESULTS:**

Of the 100 diabetic subjects only 88 were included for the study since the others had known history of connective tissue disorder. The remaining 88 subjects were grouped into insulin and non insulin categories (Fig-1) and of these 88 subjects studied only 13 had a Rheumatoid factor of above 30 IU/ml and were considered positive. Of the 13 subjects with increased RA factor, 12 were on insulin and one was not on insulin therapy.

**Fig:1** – Distribution of subjects in insulin and non insulin group. N=88; Insulin = 74, Non insulin group = 14



**Table-1:**

Treatment for DM	Insulin	Non insulin
No of patients (n=88)	74	14
No of RA positive patients (13)	12	1

Test of significance was done using Chi square test and it was found to be significant (P less than 0.05).

**DISCUSSION:**

It is evident from the results that of the 13 patients with positive rheumatoid factor only one belonged to the non insulin category and the rest were from the insulin group. Significant difference was also obtained using the chi square test between insulin and non insulin groups. Since these patients did not have any history of connective tissue disorder in the past and did not have any signs or symptoms of connective tissue disorders the increased rheumatoid factor could possibly be because of cross reactions with insulin injections. But not all in the insulin group have an increased RA factor. This difference might be because of the type of insulin used by them and the duration of usage.

Hence we conclude that diabetic patients who receive insulin therapy develop rheumatoid factor in the due course due to repeated exposure to foreign antigen and development of antigen-antibody complexes and therefore interpretation of elevated levels of Rheumatoid factor in the setting of Diabetes mellitus has to be done keeping this in mind.

**REFERENCES:**

1. Xu H, Barnes GT, Yang Q, et al. Chronic inflammation in fat plays a crucial role in the development of obesity-related insulin resistance. *J Clin Invest* 2003;112:1821-30.
2. Festa A, D'Agostino R Jr, Howard G, Mykkanen L, Tracy RP, Haffner SM. Chronic subclinical inflammation as part of the insulin resistance syndrome: the Insulin Resistance Atherosclerosis Study (IRAS). *Circulation* 2000;102:42-7.
3. Rheumatoid arthritis and diabetes mellitus: evidence for an association? Michele Doran. *J Rheumatol* March 2007 34(3):460-462
4. Diabetes and rheumatoid factor. Irwin Oreskes and Harry Spiera. *Ann Rheum Dis.* 1973 Sep; 32(5): 431-432.
5. Chockalingam A, Natarajan P, Thanikachalam P, Pandiyan R. Insulin Resistance: The Inconvenient Truth. *Mo Med.* 2021 Mar-Apr;118(2):119-121. PMID: 33840852; PMCID: PMC8029630.