

## Research Article

# Relationship of rheumatoid factor positivity to prevalence of joint manifestations in type 2 diabetes which are unrelated to rheumatoid arthritis

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## ABSTRACT

**Background:** The present study was designed to investigate the relationship of rheumatoid factor positivity to the prevalence of joint manifestations in type 2 diabetes which are not attributable to rheumatoid arthritis.

**Methods:** We evaluated 192 type 2 diabetes patients with rheumatological complications and age and sex matched non-diabetic controls for rheumatoid factor (RF) positivity. Diabetic patients with frozen shoulder, LJM syndrome, carpal tunnel syndrome, trigger finger, DISH and Dupuytren's contracture were evaluated for RF positivity.

**Results:** RF was positive in 47 patients (24.4%) when compared to controls (4.2%). RF positivity was associated with an increased prevalence of joint manifestations in diabetic group when compared to controls. RF positivity was not related to the duration of diabetes nor was it related to long term glycemic control.

**Conclusion:** RF positivity resulted in an increased prevalence of joint manifestations in diabetes, which were unrelated to rheumatoid arthritis.

**Keywords:** Diabetes mellitus, Rheumatoid factor, Joint manifestations

## INTRODUCTION

Although the precise aetiology of diabetes-associated musculoskeletal disorders remains uncertain, there is evidence that hyperglycemia may accelerate non-enzymatic glycosylation and abnormal collagen deposition in periarticular connective tissues, which alters the structural matrix and mechanical properties of these tissues leading to diffuse arthrofibrosis.<sup>2,3</sup>

While so much emphasis is given towards micro and macro vascular complications of diabetes, the long term complications often overlooked and underappreciated

include the musculoskeletal manifestations of diabetes like

Limited Joint Mobility Syndrome (diabetic cheiroarthropathy), Frozen shoulder, carpal tunnel syndrome and other rare complications.<sup>12</sup> When compared to the general population, patients with type 2 DM are 5 times more likely to have frozen shoulder, and they have an increased risk for bilateral carpal tunnel syndrome.<sup>13</sup>

Rheumatoid factor (RF) is an antibody against the Fc portion of IgG. The test was first described by Norwegian

Dr Erik Waaler in 1940 and redescrbed by Dr H. M. Rose and colleagues in 1948. It is still referred to as the Waaler-Rose test.

Rheumatoid factor (RF), are found in many persons with a wide variety of diseases other than rheumatoid arthritis.<sup>10,11</sup> Indeed, it appears that a majority of individuals exhibiting RF activity do not have rheumatoid arthritis .Presence of RF has been noted in the aged, and this observation has been associated with higher levels of chronic disease in such groups, notably parkinsonism and diabetes.<sup>14</sup>

## METHODS

The study was designed as a multicentric cross-sectional observational study involving 192 type 2 diabetic patients treated in medicine, diabetology and orthopedic departments of different hospitals of Trivandrum for period of 15 months from 2012 January to 2013 March. Age and sex matched normal healthy controls were selected for the study.

### Inclusion criteria

All type 2 diabetes patients with symptoms of joint involvement irrespective of the duration of diabetes and their diabetic control status were included.

### Exclusion criteria

1. Diagnosed cases of rheumatoid arthritis, SLE, other connective tissue disorders.
2. Patients with documented diabetic nephropathy.

### Data collection

The present study was designed to investigate the relationship of rheumatoid factor positivity to the prevalence of joint manifestations in type 2 diabetes which are not attributable to rheumatoid arthritis.

Age, sex, BMI and duration of diabetes were recorded. Routine investigations like complete blood count, urine analysis, fasting and post-prandial plasma glucose, serum uric acid, urea, creatinine, calcium and lipid profile were done. Long term glycaemic control was assessed by hemoglobin A<sub>1C</sub> levels. Only those patients with normal renal parameters, uric acid and calcium were considered for inclusion in the study. Skiagrams of the involved joints were done.

RF assay was done by the latex agglutination method. A value of more than 15 IU/ml was considered positive.

### Assessment of joint complications

A detailed physical examination of the patients was carried out. We examined and investigated for the presence of limited joint mobility syndrome, frozen

shoulder, Dupuytren’s contracture, trigger finger, Carpal tunnel syndrome, secondary osteoarthritis, diffuse idiopathic skeletal hyperostosis and neuropathic (Charcot’s) joints in type 2 diabetes mellitus.

Cheiroarthropathy was evaluated by the ‘prayer sign’, in which the patient was asked to touch the palmar surfaces of the interphalangeal joints together with the fingers fanned and the wrist maximally extended. If they were unable to do so, the test was considered to be positive.

The diagnosis of periartthritis (Frozen shoulder) was made on the following criteria: Patients with pain in the shoulder for at least 1 month, an inability to lie on the affected shoulder, and restricted active and passive shoulder joint movements in at least three planes.<sup>15,16</sup>

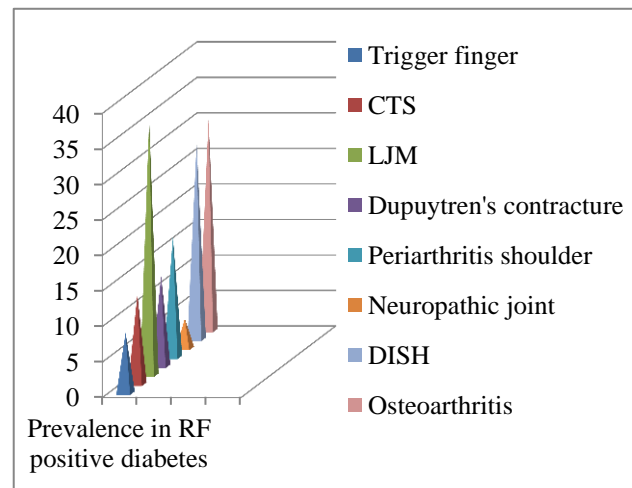
Diagnosis of Dupuytren’s contracture was based on one or more of the following features on examination: a palmar or digital nodule; tethering of palmar or digital skin; a pretendinous band; and a digital flexion contracture.

Trigger finger was diagnosed by palpating a nodule or thickened flexor tendon with locking phenomenon during extension or flexion of any finger.<sup>17</sup>

Diffuse idiopathic skeletal hyperostosis - In most cases affected persons have normal mobility of the spine and may be asymptomatic, with the diagnosis of the condition an incidental radiographic finding.

## RESULTS

RF was positive in 47 patients (24.4%) when compared to controls (4.2%) (Figure 1).



**Figure 1: Prevalence in RF positive diabetes.**

Of this 47 patients with RF positivity, frozen shoulder was present in 8 patients (17%) compared to 6% of controls. This was statistically significant (p<0.001).

Limited Joint Mobility (LJM) syndrome was seen in 17 diabetic patients (36.1%) when compared to 6% controls, which was statistically significant. ( $p < 0.01$ ).

Dupuytren's contracture was seen in 6 (12.7%) diabetics compared to only 4% of non-diabetics, which was statistically significant ( $p < 0.001$ ).

Osteoarthritis of knee, hip and spine were observed in 14 (29.7%) diabetics compared to 26% non-diabetic patients. This was not statistically significant ( $p < 0.08$ ).

DISH was seen in 13 (27.6 %) diabetics compared to only 2.6% non-diabetics, which was statistically significant ( $p < 0.001$ ). All diabetics with DISH were above the age of 50 years.

Neuroarthropathy of knees and foot was seen in 2 (4.2%) diabetics when compared to 0.5% non-diabetic patients which was statistically significant ( $p < 0.01$ ).

Carpal tunnel syndrome was seen in 6 (12.7%) patients compared to only 3% controls which was statistically significant ( $p < 0.01$ ).

Trigger finger was present in 4 (8.5%) diabetic patients when compared to 1.2% controls which was significant ( $p < 0.05$ ).

RF positivity was not related to the duration of diabetes nor was it related to long term glycemic control.

## DISCUSSION

The present study was designed to investigate the relationship of Rheumatoid Factor positivity to the prevalence of joint manifestations in type 2 diabetes which are not attributable to rheumatoid arthritis

Diabetic patients with frozen shoulder, LJM syndrome, carpal tunnel syndrome, trigger finger, DISH and Dupuytren's contracture were evaluated for RF positivity.

RF positivity in diabetes had a positive correlation to the development of joint manifestations in diabetes. This was statistically significant.

RF positivity did not show a positive correlation with any specific joint complication in diabetes.

RF positivity was not related to the duration of diabetes nor was it related to long term glycemic control.

The association of diabetes and periartthritis is well documented.<sup>4</sup> Bridgmen reported an incidence of 11% among diabetics.<sup>3</sup>

Syndrome of limited joint mobility variously known as diabetic cheiroarthropathy, stiff hand syndrome or

diabetic hand syndrome was first described by Jung et al. in adult diabetics and Grgic et al. in type 1 diabetes.<sup>5</sup> Rosenbloom et al.<sup>7</sup> who gave LJM syndrome this name recognized its association with type 1 diabetes. LJM is a condition of stiffness principally in the hands that occasionally extends to the proximal upper extremities and spine.<sup>17</sup>

Dupuytren's disease consists of palmar and digital nodules and cords, palmar skin tethering, and digital contractures.<sup>1</sup> Studies have noted that in the setting of diabetes mellitus, involvement is predominantly of the ring and middle digits, as opposed to non-diabetics, which more commonly involves the small and ring digits.<sup>8</sup>

Oreskes and Spiera, 1966 has shown that the anti-gamma globulin antibodies, otherwise known as rheumatoid factor (RF), are found in many persons with a wide variety of diseases other than rheumatoid arthritis.<sup>1</sup> Indeed, it appears that a majority of individuals exhibiting RF activity do not have rheumatoid arthritis. Presence of RF has been noted in the aged and this observation has been associated with higher levels of chronic disease in such groups, notably parkinsonism and diabetes (Litwin and Singer, 1965).

Though there are many studies showing evidence of rheumatoid factor positivity in type 1 diabetes, an exhaustive review of literature did not reveal any relevant study showing the impact of RF positivity in type 2 diabetes.

## CONCLUSION

RF positivity in diabetes had a positive correlation to the development of joint manifestations in diabetes.

RF positivity did not show a positive correlation with any specific joint complication in diabetes.

However more studies are needed in this direction to detect the exact pathogenesis of the impact of RF positivity on the musculoskeletal complications in diabetes.

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