

## Original research article

## An observational assessment of the most common rheumatological manifestations in patients with type 2 diabetes

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### Abstract

**Aim:** The aim of the present study to evaluate the rheumatological manifestations amongst Patients with Type 2 Diabetes.

**Methods:** This was a prospective study conducted in the Department of Biochemistry, PMCH, Bihar, India, Total 120 patients of already diagnosed type 2 diabetes mellitus were included in this study. The selected patients were subjected to further evaluation using Baseline diabetic questionnaire: Name, age, sex, occupation especially manual labor, height, weight, BMI (We considered overweight subjects with a BMI between 25 and 29.9 and obesity with BMI >30 kg/m<sup>2</sup>), duration and onset of type 2 diabetes, smoking habits, any history of systemic diseases, medications: oral hypoglycemic or insulin injection, blood sugar level: fasting, post prandial and glycosylated hemoglobin. Musculoskeletal system was systematically examined.

**Results:** Most of the patients were between 60-70 years of age and were 41.67% of the total patients. In our study out of 120 diabetic patients 35 had rheumatological manifestations. The most common manifestation was Osteoarthritis which was found to be present in 15.83% cases. Second most common complication was Adhesive capsulitis which was found to be present in 12.5% cases. The prevalence of Carpal tunnel syndrome was found to be 7.5% in diabetic individuals in present study. Flexor tenosynovitis was found to have a prevalence of 6.67%. Diabetic cheiroarthropathy was found in 5% of patients. Diabetic amyotrophy and Dupuytren's contracture were found to have a prevalence of 1.67% each in patients suffering from T2DM. Out of 120 patients 35 had rheumatological manifestations out of which 15 were males and 20 were females. 40 males and 45 females were without rheumatological manifestations.

**Conclusion:** The diabetic patients need to be regularly screened for rheumatological complications or any bone disorders. This could be helpful in preventing chronic disability in patients and improving their quality of life. Good glycemic control is a key to prevent rheumatological manifestations in patients with T2DM.

**Keywords:** diabetes, arthritis, rheumatological manifestations

### Introduction

Diabetes mellitus (DM) is a major public health problem worldwide. It was estimated that in 2017 there are 451 million (age: 18–99 years) people with DM. These figures were expected to increase to 693 million by 2045.<sup>1</sup> A variety of musculoskeletal (MS) disorders have been associated with DM and can cause significant disability.<sup>2,3</sup> These conditions include shoulder capsulitis (SC), limited joint mobility (LJM), trigger finger (TF), Dupuytren's contracture (DC), Charcot's foot (CF), carpal tunnel syndrome (CTS), osteoarthritis (OA), and other rare complications.<sup>4</sup> The pathophysiology leading to these disorders in patients with DM is not well understood. DM is a chronic metabolic disorder characterized by chronic hyperglycemia. High glucose levels may affect cell function and alter extracellular matrix components of the

connective tissue producing damage.<sup>3,5</sup> In contrast to vascular complications of DM, which has been studied extensively, MS disorders have been hitherto neglected. This study was carried out to investigate the prevalence of MS disorders in Moroccan diabetic patients, their associated factors, and their relationship to other diabetic complications, including micro- and macrovascular complications.

Rheumatoid arthritis (RA) is a systemic autoimmune disease characterized by chronic, symmetry, and destructive poly-articular synovitis. Although its pathogenesis remains unclear, it has shown that inflammation induced by abnormal immune response plays a crucial role in the development of RA. Recent studies show that RA patients with diabetes mellitus (DM) prevalence rate was about 15% to 19%, which was significantly higher than the prevalence rate of 4% to 8% of global middle-aged population DM.<sup>6,7</sup> In a study, which consists of 48,718 cases of RA patients and 40,346 cases of non rheumatic subjects, the incidence of RA patients with DM was 0.86% higher than the 0.58% in the control group which were observed, and DM risk was 1.5-fold in RA patients when compared with control group.<sup>8</sup> Consistently, a study described that abnormal glucose metabolism in RA patients was up to 46% after 2 years when compared with the time point of recruitment.<sup>9</sup>

### **Material and methods**

This was a prospective study conducted in the Department of Biochemistry, PMCH, Bihar, India, after taking the approval of the protocol review committee and institutional ethics committee. The technique, risks, benefits, results and associated complications of the procedure were discussed with all patients.

### **Methodology**

Total 120 patients of already diagnosed type 2 diabetes mellitus were included in this study. Detailed clinical examination and biochemical profile was obtained as per present proforma, after informed consent in their vernacular language. The criteria for diagnosis of diabetes mellitus were according to the criteria laid down by the American Diabetes Association, 2014. Patients with history of injury or fractures in the joint region, Patients with history of end stage renal disease and Patients with history of chronic liver disease were excluded from the study. Complete clinical examination was done and all the routine investigations as in proforma were undertaken. The selected patients were subjected to further evaluation using Baseline diabetic questionnaire: Name, age, sex, occupation especially manual labor, height, weight, BMI (We considered overweight subjects with a BMI between 25 and 29.9 and obesity with BMI >30 kg/m<sup>2</sup>),<sup>3</sup> duration and onset of type 2 diabetes, smoking habits, any history of systemic diseases, medications: oral hypoglycemic or insulin injection, blood sugar level: fasting, post prandial and glycosylated hemoglobin. Musculoskeletal system was systematically examined. First, the hands were examined, followed by the shoulders, then spine, and finally the lower limbs.

### **Statistical analysis**

All the data thus obtained was arranged in a tabulated form and analyzed using SPSS software. Student t test was used for statistical analysis. Probability value of less than was considered as significant.

### **Results**

Table 1 shows the distribution of cases according to age. The age ranges from below 50 years to above 70 years. Most of the patients were between 60-70 years of age and were 41.67% of the total patients.

Table 2 shows distribution of various rheumatological manifestations in patients with T2DM. In our study out of 120 diabetic patients 35 had rheumatological manifestations. The most common manifestation was Osteoarthritis (Osteoarthritis knee in our study) which was found to be present in 15.83% cases. Second most common complication was Adhesive capsulitis which was found to be present in 12.5% cases. The prevalence of Carpal tunnel syndrome was found to be 7.5% in diabetic individuals in present study. Flexor tenosynovitis was found to have a prevalence of 6.67%. Diabetic cheiroarthropathy was found in 5% of patients. Diabetic amyotrophy and Dupuytren's contracture were found to have a prevalence of 1.67% each in patients suffering from T2DM. Diabetic osteoarthropathy, Reflex sympathetic dystrophy and Diffuse Idiopathic skeletal hyperostosis were not found in any of the patients suffering from T2DM enrolled in the study.

Table 3 shows the distribution of cases according to gender. Out of 120 patients 35 had rheumatological manifestations out of which 15 were males and 20 were females. 40 males and 45 females were without rheumatological manifestations. In our study association of rheumatological manifestations in T2DM Patients with gender is non significant.

**Table 1: Distribution of patients according to age**

Age Groups (in years)	No. of Patients	%age
Below 50	16	13.33
50-60	40	33.33
60-70	50	41.67
Above 70	14	11.67
Total	120	100

**Table 2: Distribution of various rheumatological manifestations in T2DM**

Rheumatological Manifestations	No. of Patients	%
Overall prevalence	31	25.83
Osteoarthritis	19	15.83
Adhesive capsulitis	15	12.5
Carpal tunnel syndrome	9	7.5
Flexor tenosynovitis	8	6.67
Diabetic cheiroarthropathy	6	5
Diabetic amyotrophy	2	1.67
Dupuytren's Contracture	2	1.67
Diabetic osteoarthropathy	0	0.0
Reflex sympathetic dystrophy	0	0.0
Diffuse idiopathic skeletal hyperostosis	0	0.0
N.B. Many patients had more than one rheumatological manifestations		

**Table 3: Distribution of patients according to gender**

Gender	With Rheumatological manifestations	Without Rheumatological manifestations	P value
Male	15	40	>0.05
Female	20	45	
Total	35	85	

## Discussion

A Study by Del Rosso (2006) found that rheumatological complications of Diabetes Mellitus may be classified in: non articular, articular and bone conditions. Among non particular conditions, diabetic cheiroarthropathy, frequent in type I diabetes, the most important disorder related to limited joint mobility, results in stiff skin and joint contractures. Adhesive capsulitis of the shoulder, flexor tenosynovitis, and Dupuytren's and Peyronie's diseases are also linked to limited joint mobility. Diffuse skeletal hyperostosis, due to calcification at entheses, is frequent and early, particularly in type 2 diabetes. Neuropathies cause some non articular conditions, mainly neuropathic arthritis, a destructive bone and joint condition more common in type I diabetes. Algodystrophy, shoulder-hand and entrapment syndromes are also frequent. Mononeuropathy causes diabetic amyotrophy, characterised by painless muscle weakness. Among muscle conditions, diabetic muscle infarction is a rare, sometimes severe, condition. Among articular conditions, osteoarthritis is frequent and early in diabetes, in which also chondrocalcinosis and gout occur. Rheumatoid arthritis (RA) and diabetes I have a common genetic background and the presence of diabetes gives to RA an unfavourable prognosis. Among bone conditions, osteopenia and osteoporosis may occur early in type 1 diabetes. Contrarily, in type 2 diabetes, bone mineral density is similar or, sometimes, higher than in non diabetic subjects, probably due to hyperinsulinemia.<sup>10</sup> In present study of 120 patients 35 were found to have rheumatological manifestations. The most common manifestation was Osteoarthritis (Knee in our study). In earlier studies as one done by Sarkar et al<sup>11</sup> and another by Douloumpakas et al<sup>12</sup> osteoarthritis was found in 31% and 31.2% respectively. In a study done by Mathew et al<sup>13</sup> and Abourazzak et al<sup>14</sup> prevalence of osteoarthritis was 20.64% and 49% respectively. Mohan et al<sup>15</sup> conducted a study and found osteoarthritis in 18% of subjects studied. This agrees with present study. Adhesive capsulitis was second most common complication in our study and found in 12.5% subjects. This is comparable to studies done by Cagliero et al<sup>16</sup> and other studies shown in the table. Flexor tenosynovitis and CTS were found to be fairly common among diabetics as shown in present study and similar findings were noted in earlier studies done by Cagliero et al<sup>16</sup>, Douloumpakas et al<sup>12</sup> and Abourazzak et al.<sup>14</sup> The mean values of age of patients with T2DM in the various studies conducted by, Abourazzak et al<sup>14</sup>, Mohan et al<sup>15</sup>, Kumar et al, were 61±10, 57.72±10, 57.59±10.44 years respectively. The mean age of patients in our study was 60.36±8.45 years. This agrees with the previous studies. In our study gender difference in prevalence of rheumatological manifestations was non significant. This is in agreement with Attar et al.<sup>17</sup> Study conducted by Cagliero et al<sup>16</sup> found females to have increased prevalence. This difference may be due to racial factors. Sarkar et al (2003) did a study to find out the prevalence of different rheumatological problem in Indian diabetic population. Eight hundred and sixty known diabetics and 800 rheumatic patients were evaluated during the period 1991 to 2000.: Adhesive capsulitis was seen in 17.9% diabetics. Shoulder hand syndrome was observed in 1.8% diabetics. Diabetic hand syndrome was seen in 13.1% of diabetics. Osteoarthritis of knee, was observed in 31% of diabetics. Dupuytren's contracture was noted in 46.7% of diabetics. Hyperostosis of spine was seen in 28.7% of diabetics. Neuroarthropathy was seen in 3.2%. They concluded that Adhesive capsulitis, diabetic cheiroarthropathy, dupuytren's contracture and DISH are more prevalent in diabetics.<sup>11</sup> Douloumpakas et al (2007) conducted a pilot study including 208 sequentially selected patients

with type 2 Diabetes Mellitus who regularly followed up at Hippokratian University Hospital. They concluded that musculoskeletal disorders are common finding among patients with type 2 diabetes mellitus.<sup>12</sup>

### Conclusion

Rheumatological manifestations are common amongst subjects with Type 2 diabetes mellitus. The overall prevalence of rheumatological manifestations was 29.17%. The most common musculoskeletal complication was osteoarthritis which was found to be present in 15.83% cases. Second common complication was adhesive capsulitis which was found to be present in 12.5% cases. The diabetic patients need to be regularly screened for rheumatological complications or any bone disorders. This could be helpful in preventing chronic disability in patients and improving their quality of life. Good glycemic control is a key to prevent rheumatological manifestations in patients with T2DM.

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**Received: 02-10-2020 // Revised: 27-10-2020 // Accepted: 12-11-2020**