

A STUDY OF RHEUMATOLOGICAL MANIFESTATIONS OF DIABETES MELLITUS IN A TERTIARY CARE CENTRE OF SOUTHERN INDIAHalesha B. R¹, Krishnamurthy V R²**HOW TO CITE THIS ARTICLE:**

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ABSTRACT: BACKGROUND: Diabetic mellitus (DM) is a major public health problem worldwide. Musculoskeletal (MSK) disorders are common in diabetic subjects. The pathophysiology of these disorders in diabetic patients is not obvious. **AIMS AND OBJECTIVES:** The present study was carried out to find the prevalence of musculoskeletal conditions in Indian patients with diabetes mellitus. **STUDY DESIGN:** Retrospective, descriptive and record based study. **MATERIALS AND METHODS:** Four hundred known diabetics and 400 non diabetic controls were evaluated during the period January 2012 to December 2103. The demographical, clinical and radiological data were recorded and analyzed. **RESULTS:** Out of 400 diabetics, 40 were Type 1 and 360 were Type 2. Shoulder adhesive capsulitis was seen in 18% diabetics compared to 3% in non-diabetics. Dupuytren's disease was observed in 17.5% diabetics compared to 2.5% of non-diabetics. Diffuse idiopathic skeletal hyperostosis (DISH) was seen in 16.25% of diabetics. Diabetic cheiroarthropathy and Carpal tunnel syndrome were observed in 13.5% and 11% of the diabetic patients respectively. Neuroarthropathy was seen in 3% diabetic compared to 0.75% in non-diabetic. **CONCLUSION:** musculoskeletal manifestations are under recognized in adult diabetic patients. Shoulder Adhesive capsulitis, diabetic chieroarthropathy, dupuytren's contracture and DISH are more prevalent in diabetics than non-diabetics. It is important to be aware of MSK complications of DM.

KEYWORDS: Diabetic cheiroarthropathy; Diabetes mellitus; Musculoskeletal; Rheumatological.

INTRODUCTION: Musculoskeletal (MSK) complications of diabetes mellitus (DM) are the most common endocrine arthropathies. Diabetes may affect the musculoskeletal system in a variety of ways. The metabolic perturbations in diabetes (including glycosylation of proteins; micro vascular abnormalities with damage to blood vessels and nerves; and collagen accumulation in skin and periarticular structures result in changes in the connective tissue.

Musculoskeletal complications are most commonly seen in patients with a longstanding history of type 1 diabetes, but they are also seen in patients with type 2 diabetes. Some of the complications have a known direct association with diabetes, whereas others have a suggested but unproven association. In contrast to various vascular complications of diabetes mellitus which are life threatening, rheumatological manifestations lead to considerable morbidity.

In 2004, the National Health Interview Survey determined that 58% of diabetic patients would have functional disability.⁽¹⁾ Recent data show that the prevalence of MSK manifestations in the hands and shoulders in patients with type 1 or type 2 diabetes is 30 %.⁽²⁾ These manifestations are closely linked to age,⁽³⁾ prolonged disease duration^(4,5) and vascular complications. Aim of this study was to evaluate the frequency of MSK manifestations in diabetic patients visiting a tertiary care Centre, Southern India. And to identify the association between some rheumatological disease and DM.

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MATERIALS AND METHODS: This record based, retrospective, descriptive study was carried out at the Sri Chamarajendra District Hospital which was attached to the Hassan Institute of Medical Sciences, Hassan, Karnataka, India. This institute is a referral government hospital in Southern Karnataka, India, where patients come from the districts of Hassan, Coorg, and Chikkamangaluru. The present study was conducted from January 2012 to December 2013.

The study group comprised of 800 patients, out of which 400 were diabetic. For comparison, 400 non-diabetics attending rheumatology clinic were included. All the patients underwent routine investigations like complete blood count, urine analysis, fasting and post-prandial plasma glucose, serum uric acid, urea, creatinine and lipid profile. X rays of the hand, shoulder, spine and other involved joints were done. A serum uric acid level up to 7.0 mg/dl in adult men and post-menopausal women was taken as normal.

Oral glucose tolerance test using standard protocol was performed in selected non-diabetic cases attending the Rheumatology clinic. Glycosylated haemoglobin (HbA1c) estimation was done in selected cases. Categorization of DM into type 1 and 2 was done mainly on clinical criteria and response to therapy. Anthropometric measurements taken were standing height in meters, weight in kg, hip and waist circumference in cms. Body Mass Index was calculated using the formula weights in kilogram/height in metre².

The presence of more than two bridges between contiguous vertebrae was taken for the diagnosis of diffuse idiopathic skeletal hyperostosis (DISH). Diabetic end stage renal disease was excluded to exclude patients with renal osteodystrophy. Rheumatoid arthritis patients were excluded because they may be associated with hand deformities and secondary OA. Prevalence rates were calculated in percent of total cases in each group as well as percent of subgroup. Where ever applicable, prevalence amongst two groups were subjected to statistical analysis using 't' test and 'z' test. The 'p' value of <0.05 was considered significant.

RESULTS:

	Diabetic(n-400)	Non -Diabetic(n-400)
Type 1/Type 2	40/360	---
Male/Female	225/175	236/164
Age range	13-78	20-75
in years	49.3±6.7 years	45 ±7.9 years

Table 1: Demographic factors of study subjects

MSK manifestations	Diabetic (n-400)	Non-diabetic (n -400)	P value
Shoulder adhesive capsulitis	72 (18%)	12 (3%)	<0.005
Dupuytren's disease	70 (17.5%)	10 (2.5%)	<0.02
Diffuse idiopathic skeletal hyperostosis	65 (16.25%)	7 (1.75%)	<0.05
Diabetic cheiroarthropathy	54 (13.5%)	2 (0.5%)	<0.05
Carpal tunnel syndrome	44 (11%)	6 (1.5%)	<0.05
Diabetic amyotrophy	27 (6.75%)	---	>0.05
Flexor tenosinovitis	26 (6.5%)	2 (0.5%)	>0.05

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Crystal arthropathy	12 (3%)	9 (2.25%)	>0.05
Charcot joint	12 (3%)	3 (0.75%)	>0.05
Diabetic sclerodactyly	9 (2.25%)	---	>0.05
Plantar fasciitis	8(2%)	7(1.75%)	>0.05
De Quervain's tenosynovitis	7 (1.75%)	3 (0.75%)	>0.05
Diabetic osteolysis	7 (1.75%)	2 (0.5%)	>0.05
Reflex sympathetic dystrophy	6 (1.5%)	3 (0.75%)	>0.05
Muscle infarction	3 (0.75%)	2 (0.5%)	>0.05

Table 2 : Prevalence of musculoskeletal disorders among studied diabetic patients

RESULTS: A total of 400 diabetic patients and 400 non diabetic controls were examined during the study period. The mean age of the patients was 49.3±6.7 years. The mean duration of diabetes was 10.21±4.5 years. Type 1 diabetes was diagnosed in 40 patients (10%); 360 patients (90%) had type 2 diabetes. Only 65 patients (16.25%) had controlled diabetes, with mean HbA1c level of 8.1±2.1 mmol/L. 132(33%) patients were overweight and obese. 104(26%) persons were obese and overweight in control group.

Table 1 shows age, sex and disease distribution of patients in the Diabetic and Rheumatology clinic. Table 2 shows the types of rheumatological diseases among the diabetics and also comparative figure in non-diabetic controls.

Shoulder adhesive capsulitis was the most common musculoskeletal manifestation seen in 72(18%) patients in diabetic group ,when compared to 12(3%) patients in non-diabetic control group and which is statistically significant ($p<0.005$). Dupuytren's contracture was seen in 70(17.5%) patients in diabetic group when compared to 10(2.5%) patients in non-diabetic control group and which is statistically significant. Diffuse idiopathic skeletal hyperostosis, Diabetic cheiroarthropathy and Carpal tunnel syndrome were observed in 65 (16.25%), 54 (13.5%) and 44 (11%) diabetic patients respectively.

DISCUSSION: This study shows that the prevalence of rheumatological diseases like Frozen shoulder, Diabetic choreoathetosis,, Dupuytren's contracture and DISH are more common in the diabetic population as compared to non-diabetics. The association of diabetes mellitus and frozen shoulder is well documented. Bridgmen reported an incidence of 11% among diabetics. We found an incidence of 18% in diabetics compared to 3% in non-diabetics which is in concordance with other studies.⁽⁶⁾ The most disabling of the common musculoskeletal problems is adhesive capsulitis, which is also known as frozen shoulder, shoulder periartthritis, or obliterative bursitis.

It is characterized by progressive, painful restriction of shoulder movement, especially external rotation and abduction.⁽⁷⁾ Adhesive capsulitis appears at a younger age in patients with diabetes and is usually less painful,⁽⁸⁾ although it responds less well to treatment and lasts longer. The estimated prevalence is 11–30% in diabetic patients and 2–10% in non-diabetics.⁽⁹⁾ Adhesive capsulitis is associated with the duration of diabetes and age. Limited joint mobility is also known as diabetic cheiroarthopathy (after the Greek word "cheiros" for hand.⁽⁹⁾ The limitation of joint movement probably results from dermal and sub-cutaneous sclerosis resulting from increased non-enzymatic glycosylation of collagen, which increases intermolecular cross-linking.

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It was first described by Jung et al⁽¹⁰⁾ in adult diabetics and Grgic et al⁽¹¹⁾ in paediatric diabetics. Most studies suggest a prevalence of about 8-50 %.^(12,13) In our study, we observed an overall prevalence of 13.5%, out of which 66% were Type 1. This condition is most commonly seen in type 1 diabetics, with a prevalence of 8–50%, compared with 0–26% in controls. Limited joint mobility is more prevalent in patients with diabetic neuropathy than in those without. Limited joint mobility and Dupuytren's contracture are commonly found in the same patient. Treatment consists of optimizing glycaemic control and an individualized hand therapy programme if a patient's symptoms warrant it.

Dupuytren's contracture is the palmar or digital thickening, tethering, or contracture of the hands. In patients with diabetes, the ring and middle finger are more commonly affected, compared with the fifth finger in patients without diabetes. In our study 17.5% of diabetic subjects had Dupuytren's contracture. The prevalence of Dupuytren's contracture in diabetic patients ranges from 20 to 63%,⁽⁹⁾ compared with 13% in the general population. Among patients with Dupuytren's contracture, 13–39% has diabetes.⁽¹⁴⁾ The contractures are generally milder in diabetics than in patients with Dupuytren's contracture who do not have diabetes, and the prevalence increases with advancing age.

CTS is common in patients with diabetes, with an estimated prevalence of 11–16%, compared with an incidence of about 125 per 100 000 population over a five year period.⁽¹⁵⁾ About 5–8% of patients with CTS have diabetes. CTS are more common in women than in men. Associations between carpal tunnel syndrome and age and the duration of diabetes have been suggested. Diffuse idiopathic skeletal hyperostosis (DISH) is characterized by metaplastic calcification of spinal ligaments (diagnosed on lateral spine radiographs) along with osteophyte formation.

Estimated prevalence is 13–49% in diabetic patients and 1.6–13% in non-diabetics.⁽⁹⁾ Among patients with diffuse idiopathic skeletal hyperostosis, 12–80% have diabetes or impaired glucose tolerance. In the study by Holt, it was 25% amongst 428 diabetic patients. In our study, hyperostosis of spine was noted in 16.25% diabetic patients compared to 1.75 % of non-diabetics which is similar to study conducted by Sarkar R N et al.⁽¹⁶⁾

Charcot's joints are typically seen in patients over the age of 50 who have had diabetes for many years and have existing neuropathic complications. The joints most commonly affected are weight-bearing joints such as the foot, ankles, and knees; joints such as the hand and wrist are rarely affected. Charcot joint involving foot and knees was seen in 3% diabetic patients compared to 0.75% in the non-diabetic group which is comparable to other studies.^(6,9,16)

Diabetic amyotrophy is a disabling illness that is distinct from other forms of diabetic neuropathy. It is characterized by muscle weakness and wasting, and by diffuse, proximal lower limb muscle pain, and asymmetrical loss of tendon jerks. It typically occurs in older men with type 2 diabetes, and is often associated with weight loss, sometimes as much as 40% of pre-morbid body mass. In our study 6.75% of the diabetic patients presented with diabetic amyotrophy, which is comparable to other studies.⁽¹⁷⁾

CONCLUSIONS: The complications of diabetes mellitus are numerous and include involvement of the musculoskeletal system. These manifestations may go unrecognized or simply be overlooked in daily clinical practice. However, many of these rheumatological complications are treatable (to varying degrees), with resultant improvements in quality of life and more independence in activities of daily

living. When the control of diabetes is poor, higher levels of diabetic complications result. Poor glycaemic control can lead to worsening of certain rheumatic conditions. Pharmacotherapy, diet, and a regular, sensible physiotherapy programme should be the cornerstone of diabetes management.

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AUTHORS:

1. Halesha B. R.
2. Krishnamurthy V. R.

PARTICULARS OF CONTRIBUTORS:

1. Assistant Professor, Department of General Medicine, Hassan Institute of Medical Sciences, Hassan.
2. Assistant Professor, Department of General Surgery, Hassan Institute of Medical Sciences, Hassan.

NAME ADDRESS EMAIL ID OF THE CORRESPONDING AUTHOR:

Dr. Halesha B. R,
Assistant Professor,
Department of General Medicine,
Hassan Institute of Medical Sciences,
Hassan-573201, Karnataka.
Email: haleshrashmi@gmail.com

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