

Musculoskeletal manifestations in diabetic patients at a tertiary center

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Abstract

Introduction: Diabetes mellitus (DM) is a major public health problem worldwide. India is popularly known as a “diabetes capital of the world”. Musculoskeletal (MSK) disorders are common in diabetic patients. **Objective :** Incidence of diabetes and life expectancy in these patients has increased resulting in increased prevalence of musculoskeletal problems in diabetic patients. These complications may be due to metabolic or microvascular causes. This study was carried out with aim to find the prevalence and types of musculoskeletal manifestations in patients having type 2 Diabetes mellitus. **Materials & Methods:** A total of 300 patients with diabetes mellitus were evaluated randomly in this cross sectional study from February 2015 to March 2016 with inclusion criteria of disease duration for minimum of 1 year. Those patients who were too ill, not willing to participate and with inflammatory arthritis were excluded. **Results:** A total of 300 subjects were assessed for various musculoskeletal manifestations. A total of 174 subjects amounting to about 58% had the manifestation. The various complications observed in the present study were DISH (14%), Frozen Shoulder (24%), Dupuytren’s Contracture (4%), Osteoarthritis (38%), Chieroarthropathy (21%) and Flexor Tenosynovitis (8%). **Conclusion:** From the above observation it is clear that about 58% suffer from musculoskeletal manifestations with most common seen in knee and shoulder joint.

Keywords: Chieroarthropathy, Diabetes mellitus, Frozen shoulder, Musculoskeletal complications, Osteoarthritis

Introduction

Diabetes mellitus is a metabolic condition characterized by persistent hyperglycemia with resultant morbidity and mortality related primarily to its associated microvascular and macrovascular complications [1]. Type 2 Diabetes mellitus is a highly prevalent disorder worldwide. India is popularly known as a “diabetes capital of the world”. Diabetes can affect the individuals by the disease per se as well as the complications like vascular complications of diabetes are well recognized, and account for principle mortality and morbidity from the condition that occur over the period of years. Important and common complications include neuropathy, nephropathy and retinopathy. Musculoskeletal (MSK) complications of diabetes mellitus (DM) are the most common endocrine arthropathies but not life threatening, are an important

cause of morbidity, pain and disability. Joints affected by diabetes include peripheral joints and the axial skeleton. A number of fibrosing conditions of the hands and shoulder are recognized, including carpal tunnel syndrome, adhesive capsulitis, tenosynovitis and limited joint mobility. Management of these conditions requires early recognition and close liaison between diabetes and rheumatology specialists.

In 2004, the National Health Interview Survey determined that 58% of diabetic patients would have functional disability [2]. 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% [3]. These manifestations are closely linked to age[4], prolonged disease duration [5] and vascular complications. Aim of this study was to evaluate the frequency of MSK manifestations in diabetic patients visiting a tertiary care centre of Southern India.

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Metabolic derangements, can lead to diffuse idiopathic skeletal hyperostosis (DISH) and osteopenia. DISH is not only associated with Type 2 diabetes mellitus but also seen in patients with obesity, hyperuricaemia and dyslipidaemia.

Syndromes due to microvascular disease like carpal tunnel syndrome, Dupuytren's contracture, flexor synovitis, adhesive capsulitis, limited joint mobility, other complications like sclerodactyly, calcific tendinitis of shoulder, peri arthritis of shoulder, reflex sympathetic dystrophy are associated with longer duration of diabetes, especially with poor glycemic control increases the risk of developing many of the above mentioned complications.

Materials and Methods

This study was carried out at K.R. hospital which is attached to the Mysore Medical College and Research Institute, Mysore, Karnataka, India. This institute is a referral government hospital in Southern Karnataka, India, where patients come from the districts of Mysore, Chamarajanagara, Mandya, Kodagu and Hassan. The present study was conducted from February 2015 to March 2016.

A total of 300 patients with Type 2 diabetes mellitus were selected randomly from inpatients and outpatients attending the departments of Medicine and Orthopaedics.

Inclusion criteria- All patients with Type 2 diabetes mellitus who attended hospital Outpatient and inpatients were considered for the study. Also those patients with the history of diabetes for minimum of 1 year were included.

Exclusion criteria- The patients who were too ill to be interviewed and examined, those unwilling to participate, patients with inflammatory arthritis, diabetic end stage renal disease were excluded. Also patients with renal osteodystrophy, rheumatoid arthritis patients associated with hand deformities and secondary

osteoarthritis, patients with collagen vascular disorder, patients with history of trauma-related musculoskeletal morbidities and patients with type 1 diabetes mellitus were excluded.

A detailed history and clinical examination was undertaken in each patient with emphasis on musculoskeletal examination after obtaining a written informed consent. Data was recorded in a proforma. Physical examination was focused on hand and shoulder abnormalities.

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. Glycosylated haemoglobin (HbA1c) estimation was done in selected cases. Anthropometric measurements taken were standing height in meters, weight in kg, hip and waist circumference in cms. Body Mass Index (BMI) was calculated using the formula weights in kilogram/height in metre [2].

Dupuytren's disease was diagnosed in patients with palpable thickening of the palmar fascia, with flexor deformity of the second, third, fourth, or fifth fingers.

Flexor tenosynovitis was diagnosed by feeling a nodule with locking phenomenon during extension or flexion of any fingers. Adhesive capsulitis of the shoulder was diagnosed when unilateral shoulder pain present for over 3 months and the range of external rotation and active and passive shoulder movements in all planes was less than 50% of normal.

Presence of more than two bridges between contiguous vertebrae was taken for the diagnosis of diffuse idiopathic skeletal hyperostosis (DISH). Past history of any surgery for any of these disorders was also considered.

Results

Total of 300 cases were analysed and out of them patients with musculoskeletal manifestations were 174(58%). DISH was present in 24(14%) patients. Frozen shoulder was present in 42(24%) patients, Dupuytren's contracture was present in 10(4%) patients and Osteoarthritis was found in 66(38%) patients.

In case of diabetic chiroarthopathy it was present in 36(21%) patients, Flexor Tenosynovitis was present in 14(8%) patients. Table 1 depicts the representation of the various musculoskeletal disorders.

Table 1: Prevalence of musculoskeletal disorders among studied diabetic patients.

Msk manifestation	Number	Percentage (%)
Osteoarthritis	66	38
Frozen shoulder	42	24
Diabetic cheiroarthropathy	36	21
DISH	24	14
Flexor tenosynovitis	14	8
Dupuytren's disease	7	4

Discussion

Diabetes mellitus is associated with several musculoskeletal manifestations which have been generally ignored and poorly treated as compared to other complications such as neuropathy, retinopathy and nephropathy. The incidence and life expectancy of diabetic patients have both increased; resulting in increased prevalence and clinical importance of musculoskeletal manifestations in diabetics.

Prevalence of osteoarthritis is one of the commonest long term complications of diabetes mellitus. Out of 300 diabetic patients, 66(38%) were suffering from osteoarthritis. Our results are consistent with Sarkar et al [6] where 287(31%) patients were found associated with the same manifestation out of 860 subjects. Mathew et al [7] reported prevalence of osteoarthritis of knee 20.64%, osteoarthritis of spine 7%, ankle 1% and hand 4% in their study. Prevalence of osteoarthritis in diabetes mellitus is more mainly because of overweight but mechanical overload being not able to explain this increase in prevalence, role of systemic mediator called adipokines and defined as cytokines produced by fat adipose tissue has been proposed [8].

Prevalence of frozen shoulder is one of the second commonest long term complications of diabetes mellitus. In our study 42 patients (24%) out of 300 were having this complication. A prevalence (25%) was found in the study conducted by Ramchurn et al [9], which is compatible with our results. Sarkar et al [6] also reported prevalence of 17.9% in their study. Neurologic factors may contribute to the generation of pain. Inadequate blood supply to soft tissue identical to that found in Dupuytren's contracture is also observed in adhesive capsulitis.

Out of 300 diabetics, DISH was present in 24 patients i.e. 14%. Sarkar et al [6] in their study found that prevalence of DISH was 28%. All patients were of type

2 and the age > 45 years. This study showed higher results that may be because of less number of patients in their study and age was > 45 years. Mathew et al [7] supported our results by their study as they found prevalence of DISH 14.52% in their study. Marked hyperinsulinaemia has been demonstrated in patients with DISH [9].

Prevalence of Dupuytren's contracture in present study was 4% (10 patients) out of 300 diabetic patients. Sarkar et al [6] found much high prevalence (46%) while Mathew et al [7] found low rate of prevalence i.e. 2.26%. This wide variation may be due to difference between type 1 and type 2 number of cases in their studies. Sarkar et al [6] included 50% type 1 and type 2 cases and prevalence among type 2 was 15.9% while Mathew et al [7] carried out the study with type 2 diabetes mellitus cases only. This variation also may be due to difference in various risk factors like Age, HbA1C and BMI.

Localised ischaemia from diabetes, trauma, or other aetiologies are thought to produce xanthine oxidase free radicals that may in turn damage the perivascular connective tissue and bring on a reparative response by surrounding fibroblasts or triggering myofibroblasts. Fibroblast growth factor (FGF), platelet-derived growth factor (PDGF), and transforming growth factor-beta (TGF- β) may signal an over production of myofibroblasts, leading to the formation of nodules and contractures.

In our study prevalence of Chieroarthropathy was 21%. Our results are comparable with Ravindran-Rajendran et al [10]. They found 28.5% prevalence of limited joint mobility. Ray et al [11] also found prevalence of limited joint mobility to be 29%. This glycosylation results in abnormally cross-linked collagens, which are unusually resistant to mechanical and enzymatic degradation [12].

Out of 300 diabetic patients flexor tenosynovitis was found in 14(8%) patients. Our results are compatible with Ray et al [11] which showed prevalence of Trigger Finger to be 7%. On the contrary Ramchurn et al [13] found 29% prevalence of flexor tenosynovitis which is much higher than our study. Their higher results may be because of encompassing the complications in established cases of diabetes mellitus since long duration while in our study duration of diabetes covered wide range.

The other manifestation like carpal tunnel syndrome, Charcot joints were not seen during examination of subjects. Pathogenesis of adhesive capsulitis, Dupuytren's contracture and flexor tenosynovitis not understood, glucose induced collagen modifications might be an important component of this syndrome. Adhesive capsulitis of shoulder is thought to be due to fibrosis and inflammation. Diabetes can induce fibrosis by altering proliferative characteristics of several cell types and increased expression of cytokines [14].

Thus, our study shows higher prevalence of various musculoskeletal manifestations among diabetics in southern India. Most common among them were osteoarthritis, frozen shoulder and chieroarthropathy.

Conclusion

From the above observation it is clear that about 58% of the type 2 diabetics suffer from musculoskeletal manifestations. The most common manifestations are seen in knee and shoulder joint. From this study it could be concluded that thorough examination of musculoskeletal system should be made as a part of physical examination in diabetics, as these manifestations may go unrecognized or simply be overlooked in daily clinical practice. So life style modification and exercises to various joints should be part of diabetic management.

However, many of these musculoskeletal 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 musculoskeletal conditions. Pharmacotherapy, diet, and a regular sensible physiotherapy programme should be the cornerstone of diabetes management.

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