MUSCULOSKELETAL MANIFESTATIONS IN PATIENTS WITH DIABETES MELLITUS

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INTRODUCTION

Diabetes mellitus (DM) refers to a group of common metabolic disorders that share the phenotype of hyperglycaemia. Diabetes may affect the musculoskeletal system in a variety of ways. The metabolic changes in diabetes like glycosylation of proteins; microangiopathy resulting in damage to blood vessels and nerves; and collagen accumulation in skin and periarticular structures result in detrimental changes in the connective tissue[1].

Review of Literature

The metabolic perturbation characterized by diabetes results in overall changes in the connective tissue. These are commonly seen in long standing diabetics, both type 1 and type 2 DM[2]. The musculoskeletal manifestations of diabetes mellitus are the following[3]:

Syndromes of limited joint mobility

- Diabetic hand syndrome (diabetic cheiroarthropathy),
- Diabetic sclerodactyly
- Adhesive capsulitis (frozen shoulder, periarthritis),
- Trigger finger (flexor tenosynovitis)
- Dupuytren's contractures, Neuropathies
- Neuropathic arthritis (Charcot joints, diabetic osteoarthropathy),
- Carpal tunnel syndrome,
- Diabetic amyotrophy,
- Reflex sympathetic dystrophy, various other neuropathies

3) Diffuse idiopathic skeletal hyperostosis (DISH)
4) Diabetic muscle infarction

Diabetic Cheiroarthropathy- It is characterized by thick, tight, waxy skin reminiscent of systemic sclerosis with limited joint range of motion (inability to fully flex or extend the fingers) and possible sclerosis of tendon sheaths[4]. Metalloproteinases of the external matrix play an important role in ethiopatogenesis[5]. The classic presence of this condition is known as the “prayer sign,” which is seen as a patient’s inability to press the palms together completely without a gap remaining between opposed palms and fingers[6]

Diabetic Sclerodactyly- It is characterized by thickening and waxiness of the skin most marked on the dorsa of the fingers.

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ABSTRACT

This cross sectional study is done to determine the prevalence of musculoskeletal disorders in diabetic patients admitted in Department of Medicine, Thrissur Medical College. The study also tried to correlate the musculoskeletal manifestations with duration of diabetes and other system involvement. The median age group of 200 patients was 62 years and mean duration of disease was 9.23 years. Adhesive capsulitis was found in 19(9.5%) patients followed by carpal tunnel syndrome in 11 patients (5.5%). Limited joint mobility was found in 3 patients (1.5%) and diabetic seen in 2 patients (1%). Other manifestations were not present. Adhesive capsulitis, carpal tunnel syndrome and limited joint mobility had a positive association with longer duration of diabetes but the results are not statistically significant. Adhesive capsulitis was strongly associated with diabetic nephropathy, retinopathy and neuropathy, but not with coronary artery disease. There was statistically significant association of CTS with diabetic nephropathy and neuropathy. CTS was also strongly associated with retinopathy and not associated with coronary artery disease.
The skin changes resemble those in scleroderma. However, the Raynaud phenomena, ulceration, calcinosis, and tapering are absent, and autoantibodies are negative[7].

**Adhesive Capsulitis** - It refers to a stiffened glenohumeral joint, usually caused by a reversible contraction of the joint capsule[8]. It is characterised by progressive, painful restriction of shoulder movement, especially external rotation and abduction [9]

**Trigger Finger** – It is caused by fibrous tissue proliferation in the tendon sheath leading to limitation of the normal movement of the tendon. Physical examination reveals a palpable nodule, usually in the area overlying the metacarpophalangeal joint, and thickening along the affected flexor tendon sheath on the palmar aspects of the finger and hand.[10]

**Dupuytren’s Contractures** - It results from thickening, shortening, and fibrosis of the palmar fascia often associated with nodule formation along the fascia.[11]

**Diabetic Osteoarthropathy** - It is characterized by destructive lytic changes of bone as a result of diabetic peripheral neuropathy. 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.[12,13]

**Carpal Tunnel Syndrome** - It is a disorder characterised by paraesthesia over the median nerve cutaneous distribution of the thumb, index, middle, and lateral half of the ring fingers. The specific pathogenesis is thought to be median nerve entrapment caused by diabetes-induced connective tissue alterations, such as glycosylation of collagen in the periarticular tissue, decreased collagen degradation, and diabetic microangiopathy[14,15].

**Diabetic Amyotrophy** - It is characterised by muscle weakness and wasting, and by diffuse, proximal lower limb muscle pain, either unilateral or bilateral and asymmetrical loss of deep tendon jerks.

**Reflex Sympathetic Dystrophy** - It is characterised by localised or diffuse pain, which is usually associated with swelling, trophic changes, and vasomotor disturbances, with impaired mobility of the affected region.

**Diffuse Idiopathic Skeletal Hyperostosis (DISH)** - Diffuse idiopathic skeletal hyperostosis (DISH) also known as ankylosing hyperostosis or Forestier’s disease, is characterized by metaplastic calcification of spinal ligaments, along with osteophyte formation. Thoracolumbar spine is most commonly affected. Characteristically disk spaces, apophyseal joints, and sacroiliac joints are spared.

**Diabetic Muscle Infarction** - Diabetic muscle infarction is characterized by spontaneous infarction that tends to affect patients with a long history of poorly controlled DM. Affected patients complain of acute onset of pain and swelling over days to weeks in affected muscle groups (usually the thigh or calf), along with varying degrees of tenderness[16].

**Aims and Objectives**

- To determine the prevalence of musculoskeletal disorders in diabetic patients admitted in Department of Medicine, Thrissur Medical College.
- To assess the correlation of manifestations with duration of disease and other system involvement.

**MATERIALS AND METHODS**

A sample of 200 consecutive diabetic patients with amininum5 years history of diabetes admitted in medical wards of Thrissur Medical College was studied. Calculated sample size from previous prevalence studies amounts to was 196.[17]

**Study Setting**

The present study was done for a period of one year, from February 2014 to January 2015.

**Inclusion Criteria**

Patients more than 18 years of age with a history of Diabetes mellitus for at least 5 years, diagnosed according to the World Health Organization (WHO) criteria

- a fasting plasma glucose level of greater than or equal to 126 mg/dL (7.0 mmol/l),
- a random venous plasma glucose concentration > 11.1 mmol/(200 mg/dL),
- 2 hour plasma glucose greater than or equal to 11.1mmol/l (200mg/dl) during an oral glucose tolerance test
- orHb A1C > 6.5%

**Exclusion Criteria**

Patients diagnosed with rheumatoid arthritis, osteoarthritis and other inflammatory arthritis.

Patients aged less than 18 years

** METHODOLOGY**

After taking detailed clinical history and performing general examination, patients were examined in detail for clinical evidence of musculoskeletal disorders. Patients were examined in a systematic manner starting from hands, followed by shoulders, spine and lower limb in the order. Previous history of co morbidities and symptoms suggestive of complications associated with diabetes was noted. Diabetic nephropathy was confirmed by renal function tests and ultrasonographic imaging of kidneys. Retinopathy was confirmed by fundoscopy examination.

**Statistical analysis**

Data entered in a presetproforma was analysed using EPI INFO version 7.1.2 by CDC (Centers for Disease Control and Prevention) .Quantitative variables was reported as means +/- SD and the qualitative variables as percentage.

Type of study: Observational cross-sectional study

**RESULTS**

The median age group of 200 patients was 62 years and mean duration of disease was 9.23 years. Adhesive capsulitis was found in 19(9.5%) patients followed by carpal tunnel syndrome in 11 patients (5.5%). Limited joint mobility was found in 3 patients (1.5%) and diabetic sclerodactyly was seen in 2 patients(1%). Other manifestations were not present. Hypertension was present in 34.5% patients , followed by coronary artery disease which was present in 15% of patients.

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Diabetic nephropathy was prevalent in 14.5%. diabetic neuropathy was present in 8.5% and diabetic retinopathy was present in 8% of patients.

Adhesive capsulitis was seen in 20.6% of patients with diabetic nephropathy with an odds ratio of 3.17 (95% CI 1.966–9.166) with a p value of 0.06. 17.65% patients with diabetic neuropathy had adhesive capsulitis with an odds ratio of 2.23 (95% CI 0.58–8.61) with a p value of 0.44. 12.5% patients with diabetic retinopathy had adhesive capsulitis with an odds ratio of 1.40 (95% CI 0.29–6.70) and a p value of 0.98. 10.53% of patients with coronary artery disease had adhesive capsulitis with an odds ratio of 0.64 (95% CI 0.14–2.93) and p value of 0.83.

Carpal tunnel syndrome (CTS) was seen in 17.24% of patients with diabetic nephropathy with an odds ratio of 5.72 (95% CI 1.62–20.23) with a p value of 0.01. CTS also had a positive correlation with diabetic neuropathy with an odds ratio of 7.73 (95% CI 2.00–29.88) and a statistically significant p value of 0.004. 12.5% patients with diabetic retinopathy had CTS with an odds ratio of 2.77 (95% CI 0.54–14.12) with a p value of 0.47. Only 3.3% of patients with coronary artery disease had CTS with an odds ratio of 0.55 (95% CI 0.06–4.47) and a p value of 0.89. Limited joint mobility had a positive correlation with diabetic neuropathy (odds ratio of 12.59 with 95% CI 1.10–143.69) and neuropathy (odds ratio of 5.65, 95% CI of 0.48–65.83) and the p values respectively being 0.05 and 0.23.

CONCLUSIONS

- Adhesive capsulitis, carpal tunnel syndrome and limited joint mobility had a positive association with longer duration of diabetes but the results are not statistically significant.
- Adhesive capsulitis was strongly associated with diabetic nephropathy, neuropathy and neupathy, but not with coronary artery disease, although results are not statistically significant.
- There was statistically significant association of CTS with diabetic nephropathy and neuropathy. CTS was also strongly associated with retinopathy and not associated with coronary artery disease. But the result is not statistically significant.

References