Original Article

ASSESSMENT OF MUSCULOSKELETAL MANIFESTATIONS IN DIABETIC PATIENTS VISITING DIABETIC CLINIC OF SERVICES HOSPITAL, LAHORE

Muhammad Naeem, Iffat Naheed, Malik Shahid Shaukat, Najam ud Din, Navid Munir and Adnan Shahzad

Objective: To determine the frequency of musculoskeletal manifestations in diabetic patients and to examine the possible predictors for its development.

Material & Methods: We performed a cross sectional study from 1 April 2013 to 31 June 2013 to evaluate the musculoskeletal manifestations in diabetic patients at Diabetic Management Center of Services Hospital Lahore, Pakistan. Base line variables were examined to determine the association of musculoskeletal manifestations. Analysis was carried out using Statistical package for Social Sciences (SPSS version 20).

Results: 100 patients were included; 34% had musculoskeletal manifestations. Of these 34 patients 29 (85%) were type 2 DM. The most common manifestations were adhesive capsulitis (n=13), carpal tunnel syndrome (n=12) and muscle atrophy (n=9). A significant association was found between gender (p=0.041), overweight (p=0.021) and neuropathy.

Conclusion: Musculoskeletal manifestations are recognized in diabetic patients. Physicians should consider examining the particular regions in the joints of shoulders and hands during their routine visits.

Keywords: Diabetes mellitus, adhesive capsulitis, carpal tunnel syndrome, neuropathy.

Introduction

Diabetes mellitus (DM) is a multi-system disease characterized by persistent hyperglycemia that has both acute and chronic biochemical and anatomical sequel. Currently, DM affects 240 million people world wide and this number is projected to increase to 380 million by 2025, and 80% of burden will be at the low and middle income countries. In Pakistan there are 6.9 million diabetics, and it stands 7th worldwide and expected to be at 4th by 2025.

In type 1 diabetes, a lack of insulin results in poor carbohydrate, fat, and protein metabolism. Insulin is functionally absent, typically due to immune-mediated destruction of the beta cells of the pancreas, though other etiologies of beta cell destruction have also been implicated, including drugs, chemicals, viruses, mitochondrial gene defects, pancreatectomy and ionizing radiation. Type 1 DM (DM1) occurs most commonly in juveniles. It can occur in adults, especially in their late 30s and early 40s. Unlike people with Type 2 DM (DM2), those with Type 1 DM are usually not obese and they may initially present to the clinician in physiologic crises with diabetic ketoacidosis (DKA). Symptoms typically do not become apparent until 80-85% of the beta cells have been lost. Although diabetic concordance among first degree relatives is relatively low (6-10%), there does appear to be a

genetic disposition toward diabetes mellitus type II, mainly determined by genes in the major histo-compatibility complex (i.e. human leukocyte antigen [HLA] region located on the short arm of chromosome 6). Type 2 DM represents approximately 90% of all cases of diabetes. It usually occurs in older overweight individuals and does not often present initially with DKA. It is thought that while the primary defect may be insulin resistance, many of these patients also have poor insulin production, particularly for their level of glycemia. There is a suggested genetic predisposition as well, and the prevalence varies widely by ethnicity, from a high of 18% among native Americans and Alaska natives to a low of approximately 7% among non-Hispanic Caucasians.[3] Many patients with DM2 will ultimately require insulin treatment for good glycemic control. Presumably, the defects of type 2 diabetes mellitus occur in patients who live a diabetogenic lifestyle. Excessive caloric intake, inadequate caloric expenditure, and obesity are suspected to be superimposed upon a susceptible genotype. There are four basic categories within the American Diabetes Association's classification system for DM. These are "Type I DM," "Type II DM," "Gestational Diabetes Mellitus"(GDM) and "other specific types."

This study is focused on the assessment of musculo-skeletal manifestations in diabetic patients visiting

visiting Diabetic clinic (DMC) of Services Hospital Lahore.

Objective:

To assess musculoskeletal manifestations in diabetic patients visiting Diabetic Management Center (DMC) of Services Hospital Lahore (SHL).

Material & Methods

Study Design: Cross-sectional

Setting: Study was conducted at Services Hospital Lahore, a tertiary care center located in the center of city at Jail Road Lahore.

Duration of study: 2 months

Study Population: Patients attending DMC of SHL

Inclusion Criteria: Patients having duration of DM 2 years and more

Exclusion Criteria: Patients with comorbid conditions including congenital disorders, traumatic disorders, chronic liver disease, hypothyroidism, alcoholism

Sampling Technique: Non probability purposive sampling

Study Sample: Estimated monthly population =10000 patients visiting DMC of SHL. Expected frequency of worldwide prevalence musculoskeletal manifestations =32.1% Worst acceptable level = 23% at confidence level of 95% the sample size was 100.

Data Collection:

Interview: Data was collected regarding demographic profile i.e. name age sex and duration of illness.

Examination: Following examination techniques were used

1) Adhesive Capsulitis: Unilateral or bilateral pain in deltoid area with no history of trauma and restriction in active, passive movements in capsular pattern (external rotation > abduction > internal rotation)

2) Tendonitis: Taken positive with inflammation of two tendons of rotator cuff / Biceps.

3) Trigger Finger: Identified by presence of palpating nodule or thickened flexor tendon with locking phenomenon.

4) Dupuytren's Contracture: Identified as thickening of palmer fascia with flexor deformity of second and fifth finger

5) Carpel Tunnel Syndrome: considered positive with Tinsel's/ Phalanx's sign and reduced sensation of 1-3 fingers.

6) Limited Joint Mobility: Characterized by thick, tight waxy fingers (positive prayer's sign or Table test)

7) Charcoat Joint: Swelling and deformity at weight bearing joints

8) Diabetic Infarction: Painful mass with swelling and induration of skin.

Data Analysis: For the purpose of tabulation, calculation and data management SPSS was used.

Table-1: Frequency distribution of diabetics regarding: gender, age, duration of DM, type of DM, occupation, & control of DM.

Gender of Patients	No.	%
Male	68	68
Female	32	32
Total	100	100
Age of Patients (Years)		
40-55	42	42
56-70	40	40
71-85	18	18
Total	100	100
Duration of DM (Years)		
1-5	36	36
6-10	40	40
11-15	16	16
11-15	08	08
Total	100	100
Type of DM		
Type-I	17	17
Type-II	83	83
Total	100	100
Occupation		
With physical activity	82	82
Without physical activity	18	18
Total	100	100
Control of DM		
HbA1c < 7g %	10	10
HbA1c > 7g%	90	90
Total	100	100

Weight		
Normal	20	20
Overweight	48	48
Obese (BMI)	32	32
Total	100	100
Peripheral Neuropathy		
Present	68	68
Absent	32	32
Total	100	100
Musculoskeletal Manifestations		
Adhesive capsulitis	13	13
Carpal tunnel syndrome	12	12
Muscle atrophy	09	09
Total	100	100

Ethical Consideration:
1) Approval was taken from ethical research committee of SHL.
2) Informed consent from subjects was taken.

Results
Can be depicted from the tables indicating variables and their frequencies.

Discussion
The study was conducted to assess the musculoskeletal manifestations and different indicators of these manifestations in patients of diabetes mellitus visiting Diabetes Management Center of Services Hospital Lahore. The sample of study was of 100 subjects who had diabetes for more than 2 years. In our study 68% subjects were male and 32% were females with mean age of 54.7 ± 7.28; 98% were in range of 40-70 years and 83% subjects were type I diabetics while 17% were type II diabetics. Overall prevalence of musculoskeletal manifestations was 34%. Control of diabetes was assessed by HbA1c values measured few days before the search. HbA1c level of 7% or less was taken as controlled diabetes and values more than 7% were considered as uncontrolled diabetes. It was found that mean of HbA1c was 8.42 ± 1.19 and 90% subjects had uncontrolled diabetes; only 10% had adequate control of diabetes. It was observed that 68% subjects had peripheral neuropathy. SPSS analysis showed significant association of musculoskeletal manifestations with gender (p=0.041), obesity and control of diabetes (p=0.021). It was found that all the subjects who had the manifestations were having peripheral neuropathy but many subjects who were neuropathic did not show any manifestation. The role of duration of diabetes was not very conclusive in our study. The most common manifestations were adhesive capsulitis 13%, carpal tunnel syndrome 12%, and muscle atrophy 9%.

Suzan Attar research showed that the most common manifestations were adhesive capsulitis and carpal tunnel syndrome which is consistent with our findings but we found significant prevalence of muscle atrophy which might be due to routine physical activities & unsatisfactory nutrition. Most of the variables like type of diabetes, duration, control of diabetes were same.

According to Enrico Cagliero et al, female gender and duration of diabetes were the most important predictors of musculoskeletal manifestations. Control of diabetes, obesity, and neuropathy were not found to be predictive. But as it is found that mostly upper limbs are involved in these deformities this research also concluded the same results.

Conclusion
In our study it is concluded that prevalence of musculoskeletal manifestations in diabetic patients is 34%. There is a significant association of musculoskeletal manifestations with gender (p=0.041), type of diabetes, overweight and obese patients (p=0.021), control of diabetes and neuropathy. A significant association is not seen with age and duration of diabetes. Comparing the results with previous studies it is found that many of the results are same despite of the difference of geographic distribution.

Department of Forensic Medicine
Institute of Public Health, Lahore
www.esculapio.pk

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What ear was tested?
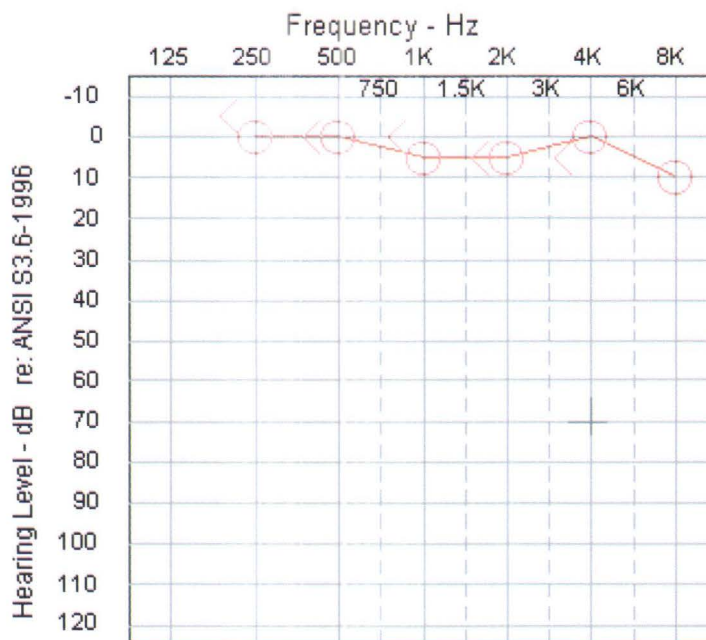
This shows the results of testing a right ear. All hearing thresholds are within normal limits. Note that the air conduction thresholds are connected with a solid line. Bone conduction thresholds are not connected. At 250 and 1000 Hz, there is a 5 dB air-bone gap, but that is not significant. The bone-air gap at 4000 Hz is also not meaningful.

Large or consistent bone-air gaps probably mean the bone oscillator is not positioned correctly.