THE PREVLANCE OF HAND ABNORMALITIES IN DIABETIC PATIENTS IN AL.NASSIYRIA CITY AND IT'S ASSOCIATION WITH DIABETIC VARIABLES

Dr. Basim Athaib Muter *

ABSTRACT

OBJECTIVES: To study the prevalence of hand abnormalities in diabetic patients and to evaluate the associations between the hand abnormalities and diabetic variables .

DESIGN: Cross-sectional study of 248 diabetic patients selected at random, setting , Out-patient clinic,diabetic centre ,AL- Nassriah city .

MEASURES: Presence and extent of carpal tunnel syndrome (CTS), Dupuytren's contracture (DC), flexor tenosynovitis (FTS), and limited joint mobility (LJM). Duration of diabetes, metabolic control .

RESULTS: Carpal tunnel syndrome, DC, FTS and LJM were each present in significant number. Hand abnormalities were observed in 39.5% and more than one abnormality was also found in a significant number.. The hand abnormalities were associated with the duration of diabetes but not with the metabolic control .

CONCLUSION: The prevalence of hand abnormalities in diabetic patients is high and increases with the duration of diabetes. ,but not the glycaemic control.

INTRODUCTION :

A variety of musculoskeletal conditions have been associated with diabetes mellitus (1) . These problems are important to recognize because they often respond to treatment, preventing pain and disability and improving quality of life (2) .

Musculoskeletal diseases associated with diabetes mellitus (1,2):

Hand

1- Carpal tunnel syndrome (CTS) .
2- Dupuytren's contracture (DC) .
3- Flexor tenosynovitis (FTS) .
4- Diabetic sclerodactyly (DS) .
5- Limited joint mobility (LJM) .

Shoulder

1- Adhesive capsulitis .
2- Calcific periarthritis .
3- Limited joint mobility .
4- Osteoarthritis .
5- Diffuse idiopathic skeletal hyperostosis.

Carpal tunnel syndrome :

Carpal tunnel syndrome (CTS) is a painful disorder caused by compression of the median nerve between the carpal ligament and other structures within the carpal tunnel (3). It has been reported in up to 20 percent of diabetic patients, but the incidence rises to 75 percent in those with limited joint mobility (1,3). Furthermore, diabetes has been reported in 6 to 17 percent of all cases of CTS (4,5) , and CTS may be more common in those with pre-diabetes (6). Two studies comparing two groups of diabetic and nondiabetic patients undergoing carpal tunnel release showed clinical (7) and neurophysiological

* Lecturer , department of medicine , college of medicine/ Thi Qar University .

(8) outcomes to be similar in both groups, although the diabetic patients were more likely to report the persistence of cold intolerance . Median nerve entrapment in diabetes is presumably due to the connective tissue changes which also lead to limited joint mobility (3) . Carpal tunnel syndrome is associated with the duration of diabetes but not with metabolic control or nephropathy (1) .

Dupuytren's contracture :

Dupuytren's contracture (DC) is characterized by fibrosis in and around the palmar fascia, with nodule formation and contracture of the palmar fascia leading to flexion contractures of the digits (5) . Many associations have been reported, including racial and genetic factors, chronic liver disease, and diabetes (9) . Depending upon the criteria used for diagnosis, Dupuytren's contractures have been reported in 16 to 42 percent of diabetic outpatients (1,10).

Flexor tenosynovitis :

Flexor Tenosynovitis (FTS) of the flexor tendon of the finger (trigger finger) in diabetes is characterized by palpable nodule formation and thickening localized to the flexor tendon or sheath, and locking phenomena. The ring, middle fingers, and thumb are most often affected and the condition is sometimes bilateral (11) . Flexor tenosynovitis has been reported in 5 percent of a series of 250 patients with type 1 diabetes aged 30 to 38 years (11) and in 20 percent of 100 patients with type 1 or type 2 diabetes aged 19 to 62 (1) .

The prevalence of trigger finger is related to the duration of diabetes but not metabolic control(1) . Collagen abnormalities induced by diabetes mellitus are thought to be responsible (11 , 12) .

Diabetics are more likely than nondiabetics to have multiple digit involvement with stenosing flexor tenosynovitis (trigger finger), although it can also occur in non-diabetics; diabetic limited joint mobility has also been associated with multiple digit involvement (12) . Local glucocorticoid injection may be beneficial (13) but some patients require repeated surgery (11) .

Diabetic sclerodactyly :

Sclerodactyly is characterized by thickening and waxiness of the skin most marked on the dorsa of the fingers . It is associated with limited joint mobility, although it can occur without joint involvement,. The skin changes resemble those in scleroderma, but the Raynaud phenomena, ulceration, calcinosis and tapering are absent and autoantibodies are negative (pseudoscleroderma) (14,15) .

The frequency of skin changes correlates with the duration of diabetes, although skin changes have been described in children with diabetes of recent onset (15). Other than improving glycemic control, which is of theoretical benefit (13) , no treatment exists for this condition.

Reflex sympathetic dystrophy :

Reflex sympathetic dystrophy (also known as complex regional pain syndrome) is characterized by severe pain or burning sensation, most commonly in the hand or foot, with associated swelling, trophic skin changes, and signs or symptoms of vasomotor instability (16). When the hand is affected, there may be associated pain or limitation of the ipsilateral shoulder (shoulder-hand syndrome) (16) . Reflex sympathetic dystrophy may be bilateral, and bone films characteristically show patchy osteoporosis (16) . It is said to be more common in diabetes but there is very little recent literature on this association.

Limited joint mobility :

Limited joint mobility (LJM) is common in patients with diabetes mellitus. It is characterized by limitation of joint movement that is most marked in the small

joints of the hands (17,18) . Thickening and waxiness of the skin are also common, particularly on the dorsal surface of the fingers, but these skin changes may occur in the absence of limited joint mobility(19). The prevalence of limited joint mobility in diabetes mellitus has ranged from 8 to 58 percent (17,20,21). This variability depends largely upon the population studied and the way in which joint mobility is measured. Care must also be taken to avoid confusion with other diabetic hand problems such as Dupuytren's contracture, flexor tenosynovitis, trigger finger, and reflex sympathetic dystrophy, which may coexist (21) . Limited joint mobility also occurs in the absence of diabetes, with prevalence figures varying between 12 and 25 percent in nondiabetic subjects of three studies (20,22,23) .

Hemoglobin A1C :

The most widely used clinical test is measurement of glycated hemoglobin (also called A1C, hemoglobin A1C, glycohemoglobin, or HbA1C). Hemoglobin formed in new red blood cells enters the circulation with minimal glucose attached, however, red cells are freely permeable to glucose (24) . As a result, glucose becomes irreversibly attached to hemoglobin at a rate dependent upon the prevailing blood glucose concentration (24, 25) . Approximately one percent of erythrocytes are destroyed every day, while an equal number of new one are formed, thus, the average amount of A1C changes in a dynamic way and indicates the mean blood glucose concentration over the life span of the red cell(24,25) . Although the A1C reflects mean blood glucose over the entire 120 day life span of the red blood cell, it correlates best with mean blood glucose over the previous 8 to 12 weeks (25) . The National Glycohemoglobin Standardization Program (NGSP) has standardized more than 99 percent of the assays used in the United States to the DCCT standard (26) . A strict quality control program has improved precision and accuracy of assays in the US and many international assays (26 , 27) .

In addition, a new reference method has been established that will provide for even more reliable worldwide standardization of all A1C assays (27) .

PATIENTS & METHODS :

A cross-section study of 248 diabetic patients were collected from diabetic centre in AL-Nassriah city during the period from 5/12/2010 to 5/6/2011 . Their ages range between 45-70 year , 138 patients of them were male while 110 were female. Blood sample were obtained from the patients for measurement of HbA1c . All patients send for nerve conduction study and examination by rheumatologist for hand abnormality detection

HbA1c is measurd by mixing the whole blood with a lysing reagent containing a detergent and borates ions . Elimination of the labile Schiff's base is thus achieved during the hemolysis. The hemolysate is then mixed for 5 minutes with a weakly binding cation exchange resin . During this time , HbA0 binds to the resin . A special resin separator is used to remove the resin from the supernatant fluid which contains the HbA1 . The glycohemoglobin percentage of total hemoglobin is determined by measuring the absorbance of the glycohemoglobin and of the total hemoglobin fraction at 415 nm or Hg 405 nm in comparison with a standard glycohemoglobin preparation carried through the test procedure (28 , 29) .

Calculation of the HbA1 Content :

Factor F Determination by use of (STD):

The glycohemoglobin percentage (%HbA1 STD) is stated on the label under % .
F = (**A** total Hb STD × % HbA1 STD) / **A** HbA1 STD

Glycohemoglobin Content of the Sample:
% HbA1 sample = F × (**A** HbA1 sample / **A** total Hb sample) .

Clinical Interpretation :

Patients	%HbA1c
Well controlled metabolism or stabilized diabetics	4.5-7
Diabetics , insufficiently controlled or with metabolic imbalance	≥ 8.5

Questionare was done for each patient to exclude other causes of hand abnormalities like chronic liver disease , epilepsy and heavy hand workers .Statistical analysis was done using Fisher exact test by SPSS . All result are significant if the P value is < 0.05 .

RESULTS :

The basic clinical characteristics of the study were present in table 1 which showed :

1: 98 patients from 248 diabetic patients with hand
abnormalities (39.5 %) shown as :

- 16 patients with DC .
- 20 patients with CTS .
- 20 patients with LJM .
- 12 patients with FTS .
- 30 patients with combined hand abnormalities .

2: Age group classified as less than 50 , 50-60 , more than 60
year .

3: 45 patients of those with hand abnormalities were female
while 53 patients were male .

There was significant difference (P value < 0.005) between hand abnormalities and advanced age .

In Table 2 showed the distribution of those hand abnormalities to the duration of diabetes mellitus which explained the highly significant difference (P value <0.005) with more advanced duration (> 10 years) .

While in Table 3 showed the distribution of hand abnormalities according to the glycemic control by HbA1c which found there was no relation between the occurance of hand abnormalities and the glycemic control of the diabetes mellitus (which show no significant difference between these two variables P<0.43)

DISCUSSION :

Hand abnormalities are common in diabetic patients, reflecting pathologic changes in the microvasculature, connective tissue, and peripheral nerves (23 ,24) . One study, for example, evaluated 100 diabetic patients selected randomly in an outpatient clinic; hand abnormalities were observed in 50 patients and more than one abnormality was found in 26 (24) . Furthermore, 25 of the 50 patients with hand syndromes were disabled to such an extent that surgery was recommended. Carpal tunnel syndrome, Dupuytren's contracture, flexor tenosynovitis, and limited joint mobility were each present in approximately 20 percent (24)

In a study of 200 patients with Type 1 and 2 diabetes and 100 controls, the prevalence of hand or shoulder disorders was higher in the diabetic patients than in controls and correlated with the duration but not the type of diabetes (25) .

In this study we revealed the the prevelance of hand abnormalities in diabetic patients who consult the diabetic centre as out patients which showed 39.5% of hand abnormalities from 248 diabetic patients ,which nearly compatible with the percent of above studies.also this showed the significant relationship between these hand abnormalities and the duration of diabetes but not the metabolic control .

CONCLUSION :

There were a high prevelance of hand abnormalities in diabetic patients in AL.Nassiyria city with significant relationship with duration of diabetes,but not an important correlation with metabolic control .

TABLES

Table 1 : Distribution of hand abnormalities according to the demographic character of tudied population . (by Fisher exact test with P value <0.005)

Age	DC	CTS	LJM	FTS	Combined abnormality	Total
< 50	2	2	3	1	5	
50-60	8	8	7	3	16	
>60	6	10	12	8	11	
Male	9	11	9	6	18	53
Female	7	9	11	6	12	45
Total	16	20	20	12	30	98

Table 2 : Distribution of hand abnormalities according to the duration of diabetes mellitus (by Fisher exact test P value < 0.005)

Duration of diabetes	DC	CTS	LJM	FTS	Cobined lesion
< 5 years	0	2	3	1	5
5-10 years	0	7	6	5	11
> 10 years	16	11	11	6	14
Total	16	20	20	12	30

Table 3 : Distribution of hand abnormalities according to the glycemic control by HbA1c show no significant difference between them (P < 0.43)

Metabolic control HbA1c	DC	CTS	LJM	FTS	Combined lesion
Well control HbA1c < 7	8	7	5	3	10
Fair control HbA1c 7 – 8.5	4	5	13	3	8
Poor control HbA1c > 8.5	4	8	2	6	12

REFERENCES :

1. Chaudhuri KR, Davidson AR, Morris IM. Limited joint mobility and carpal tunnel syndrome in insulin-dependent diabetes. Br J Rheumatol 1989; 28:191.
2. Phalen GS. Reflections on 21 years' experience with the carpal-tunnel syndrome. JAMA 1970; 212:1365.
3. Blodgett RC Jr, Lipscomb PR, Hill RW. Incidence of hematologic disease in patients with carpal tunnel syndrome. JAMA 1962; 182:814.
4. Gulliford MC, Latinovic R, Charlton J, Hughes RA. Increased incidence of carpal tunnel syndrome up to 10 years before diagnosis of diabetes. Diabetes Care 2006; 29:1929.
5. Thomsen NO, Cederlund R, Rosén I, et al. Clinical outcomes of surgical release among diabetic patients with carpal tunnel syndrome: prospective follow-up with matched controls. J Hand Surg Am 2009; 34:1177.
6. Thomsen NO, Rosén I, Dahlin LB. Neurophysiologic recovery after carpal tunnel release in diabetic patients. Clin Neurophysiol 2010; 121:1569.
7. Sibbitt, WL. Fibrosing syndromes: diabetic stiff hand syndrome, Dupuytren's contracture and plantar fasciitis. In: Arthritis and Allied Conditions, 11th ed, McCarty, DJ (Ed), Lea & Febiger, Philadelphia 1989.
8. Noble J, Heathcote JG, Cohen H. Diabetes mellitus in the aetiology of Dupuytren's disease. J Bone Joint Surg Br 1984; 66:322.
9. Yosipovitch G, Yosipovitch Z, Karp M, Mukamel M. Trigger finger in young patients with insulin dependent diabetes. J Rheumatol 1990; 17:951.
10. Kameyama M, Meguro S, Funae O, et al. The presence of limited joint mobility is significantly associated with multiple digit involvement by stenosing flexor tenosynovitis in diabetics. J Rheumatol 2009; 36:1686.
11. Kapoor A, Sibbitt WL Jr. Contractures in diabetes mellitus: the syndrome of limited joint mobility. Semin Arthritis Rheum 1989; 18:168.
12. Jelinek JE. The skin in diabetes. Diabet Med 1993; 10:201.
13. Seibold JR. Digital sclerosis in children with insulin-dependent diabetes mellitus. Arthritis Rheum 1982; 25:1357.
14. Kozin, F. Painful shoulder and the reflex sympathetic dystrophy syndrome. In: Arthritis and Allied Conditions, 11th ed, McCarty, DJ (Ed), Lea & Febiger, Philadelphia 1989.
15. Jelinek JE. The skin in diabetes. Diabet Med 1993; 10:201.
16. Kapoor A, Sibbitt WL Jr. Contractures in diabetes mellitus: the syndrome of limited joint mobility. Semin Arthritis Rheum 1989; 18:168.
17. Seibold JR. Digital sclerosis in children with insulin-dependent diabetes mellitus. Arthritis Rheum 1982; 25:1357.
18. Arkkila PE, Kantola IM, Viikari JS. Limited joint mobility in type 1 diabetic patients: correlation to other diabetic complications. J Intern Med 1994; 236:215.
19. Ramchurn N, Mashamba C, Leitch E, et al. Upper limb musculoskeletal abnormalities and poor metabolic control in diabetes. Eur J Intern Med 2009; 20:718.
20. Clarke CF, Piesowicz AT, Spathis GS. Limited joint mobility in children and adolescents with insulin dependent diabetes mellitus. Ann Rheum Dis 1990; 49:236.

21. Eadington DW, Patrick AW, Frier BM. Association between connective tissue changes and smoking habit in type 2 diabetes and in non-diabetic humans. Diabetes Res Clin Pract 1991; 11:121.
22. Gamstedt A, Holm-Glad J, Ohlson CG, Sundström M. Hand abnormalities are strongly associated with the duration of diabetes mellitus. J Intern Med 1993; 234:189.
23. Cagliero E, Apruzzese W, Perlmutter GS, Nathan DM. Musculoskeletal disorders of the hand and shoulder in patients with diabetes mellitus. Am J Med 2002; 112:487.
24. Nathan DM, Singer DE, Hurxthal K, Goodson JD. The clinical information value of the glycosylated hemoglobin assay. N Engl J Med 1984; 310:341.
25. Goldstein DE. Is glycosylated hemoglobin clinically useful? N Engl J Med 1984; 310:384.
26. Steffes MW, Sacks DB. Measurement of circulating glucose concentrations: the time is now for consistency among methods and types of samples. Clin Chem 2005; 51:1569.
27. Hanas R, John G, International HBA1c Consensus Committee. 2010 consensus statement on the worldwide standardization of the hemoglobin A1C measurement. Diabetes Care 2010; 33:1903.
28. Gorka G., Labor-Medizin,1, 30-31 (1985) .
29. James T.M. et al., Clin. Biochem. 14, 25-27 (1981) .

مدى انتشار تشوهات اليد لدى مرضى داء السكري في مدينة الناصرية ومدى ارتباطها مع متغيرات داء السكري

د. باسم عذيب مطر*

داء السكري هو احد اكثر الامراض شيوعا ، وتشوهات اليد هي احدى المضاعفات الناجمة عنة . ان هدف الدراسة هو معرفة مدى انتشار تشوهات اليد الناجمة عن داء السكري في مدينة الناصرية ومدى ارتباط حدوثها مع متغيرات نسبية لداء السكري كالفترة الزمنية الاجمالية لداء السكري وكذلك مع معدل السيطرة الايضية لداء السكري .

لقد تم دراسة ٢٤٨ مريضا بداء السكري وهم مرضى مراجعين لمركز السكري في مدينة الناصرية وقد تم اخذهم بصورة عشوائية واجريت لهم فحص الهيموكلوبين اي ون سي وكذلك فحص تخطيط الاعصاب وتم عرضهم على اختصاصي امراض المفاصل وكذلك تم استبعاد الاسباب الاخرى لتشوهات اليد كامراض الكبد المزمنة والصرع والعمال اليدويين .

وبعد التصنيف السريري وجد ان نسبة تشوهات اليد عند مرضى داء السكري هي ٣٩,٥ % من مجموع المرضى الذين شملتهم الدراسة وكان التصنيف السريري لتشوهات اليد كالاتي : (متلازمة النفق الرسغي ، تليف صفاق راحة اليد ، التهاب جراب الوتر الانقباضي و تحدد مدى حركة اليد) .

كما اظهرت الدراسة مدى الارتباط الوثيق بين مدى حدوث تشوهات اليد الناجمة عن داء السكري وطول الفترة الزمنية لداء السكري ، كما اظهرت الدراسة عدم ارتباط حدوث تشوهات اليد الناتجة عن داء السكري مع السيطرة الايضية الجيدة لداء السكري .

* مدرس، قسم القسم الباطني - كلية الطب - جامعة ذي قار