

STUDY OF DIABETIC CHEIROARTHROPATHY IN TYPE 2 DIABETES MELLITUS PATIENTS

Ravin Devasir Sathyaseelan¹, Arun Kumaran Paneerselvam², Noor Mohamed Rasik Buhari Sareef³

¹Associate Professor, Department of General Medicine, Sri Lalithambigai Medical College and Hospital, Tamilnadu, India

²Assistant Professor, Department of General Medicine, Sri Lalithambigai Medical College and Hospital, Tamilnadu, India

³Senior Resident, Department of Community Medicine, Sri Lalithambigai Medical College and Hospital, Tamilnadu, India

Received : 27/08/2022
Received in revised form : 30/09/2022
Accepted : 10/10/2022

Keywords:

Diabetic Cheiroarthropathy,
Duration of Diabetes,
Retinopathy, Neuropathy,
Nephropathy

Corresponding Author:

Dr. Ravin Devasir Sathyaseelan,
Email: dr.ravindevasir@gmail.com
ORCID: 0000-0003-2381-2098

DOI: 10.47009/jamp.2022.4.5.118

Source of Support: Nil,
Conflict of Interest: None declared

Int J Acad Med Pharm
2022; 4 (5); 574-577



Abstract

Background: Diabetes mellitus is linked to numerous musculoskeletal symptoms of the disease and might have a negative impact on a patient's quality of life. One of these manifestations is diabetic cheiroarthropathy which is also termed limited joint mobility syndrome (LJMS) which affects the hands and fingers. **Materials and Methods:** In the present study, we have included 71 type 2 diabetes mellitus patients of both genders and aged between 40 to 60 years. We assessed the demographical and clinical characteristics of the study participants by using standard methods. **Result:** We have observed that diabetic cheiroarthropathy was detected in 18% of diabetic patients. Moreover, it is revealed that retinopathy was present in 26.8%, neuropathy was present in 15.5%, and nephropathy was present in 31% of all diabetic patients. The data demonstrated that most of the study participants had longstanding diabetes (36.6% and 39.4% of study participants had a duration of diabetes between 6-10 years and 11-15 years, respectively). **Conclusion:** The uncontrolled and long-standing diabetes, and the presence of diabetic complications are associated with and are predictive of diabetic cheiroarthropathy. Therefore, medical professionals caring for diabetes patients should be able to identify this disease and understand its connection to other diabetic complications. Physiotherapy and occupational therapy are crucial in the management of hand mobility and prevention of further loss of movement.

INTRODUCTION

Diabetes mellitus (DM) is a chronic metabolic disorder and a major public health problem worldwide. DM is associated with numerous musculoskeletal manifestations which might have a negative impact on a patient's quality of life and they are mostly under-recognized and poorly treated. One of these manifestations is diabetic cheiroarthropathy also termed limited joint mobility syndrome and mainly it is caused due to the accumulation of advanced glycosylated end products on collagen and other connective tissues. It alters the patient's musculoskeletal system by affecting the patient's joints, soft tissues, and bones. Diabetic patients with longstanding and uncontrolled diabetes are more likely to have cheiroarthropathy. The prevalence of cheiroarthropathy ranges from 8 to 50% in type 1 diabetic patients and is also reported in type 2 DM. [1,2,3,4]

A long-standing DM may lead to the development of other complications such as diabetic cheiroarthropathy. Clinical signs include the development of painless stiffness in the hands and fingers, fixed flexion contractures in the small hand and foot joints, impairment of fine motor function, and decreased grip strength in the hands are used to make the diagnosis of cheiroarthropathy in diabetes patients. As the disease worsens, additional joints may also get affected. An accurate diagnosis of diabetic cheiroarthropathy is essential because it has been recognized that the condition is linked to both macrovascular (cardiovascular disease) and microvascular (retinopathy, nephropathy, and neuropathy) complications of diabetes. Due to the absence of curative treatments, maintaining or improving glycemic control is advised as a way to delay the onset of cheiroarthropathy. Daily joint stretches will help prevent or decrease the progression of joint stiffness and maintain the overall quality of life. [2,4,5]

There is a scarcity of studies from India on the prevalence and consequence of cheiroarthropathy on microvascular complications in type 2 DM patients. To address this gap, we evaluated the proportion of cheiroarthropathy in type 2 DM patients and also studied the significance of cheiroarthropathy as a potential measure of diabetic microvascular complications. Thus, in the present study, we have assessed cheiroarthropathy in diabetic patients across a range of age groups and diabetes durations.

MATERIALS AND METHODS

This study was carried out at.... We have included 71 type 2 DM patients both male and female, and aged between 41 to 60 years old. Patients with cancer, serious illnesses, or end-stage disorders of target organs were not included. The institutional ethics committee approved the study protocol and all patients gave written informed consent before their inclusion in the study.

Before a physical examination, the data regarding age, gender, addiction (smoking and/or alcohol), duration of diabetes, diabetic medication (oral hypoglycemic agents (OHA) and/or insulin), compliance with treatment (regular or irregular), and presence of chronic diabetic complications (retinopathy, nephropathy, and neuropathy) were collected. In physical examinations, weight and height were measured and body mass index (BMI) was calculated as weight (kilograms) divided by the square of height (square meter).

The diagnosis of diabetic cheiroarthropathy was done clinically after eliciting the “prayer” and “tabletop” signs. The patient asks to press their palms together and extends their fingers to approximate the palmar surfaces of the proximal and distal interphalangeal joints. The positive prayer test is the failure of the patients to completely press their hands together without a gap between their palms and fingers. The “tabletop test” is conducted by asking the patient to place their hands palms-down on a tabletop with their fingers spread. A normal individual should be able to place palms flat on a horizontal surface; but, a diabetic cheiroarthropathy patient will not be able completely to place palms flat on a horizontal surface which confirms a positive tabletop sign. Further, we have performed a statistical analysis. All the variables were qualitative

and described as frequencies and proportions (percentages).

RESULTS

Demographic characteristics of study participants:

Table 1 is showing demographic characteristics of the study participants. We have subdivided study participants according to different age groups. Data indicated that most of the participants were from 51-60 age groups (47.9%), whereas the least number of participants were <40 years old. Out of 71 participants, 59.2% of patients were males and 40.8% were females. Further, the data for BMI indicated that 43.7% of participants were overweight, 31.0% of participants had normal weight, and 25.4% of participants were obese. The addictive habits of participants were assessed as the presence or absence of smoking or alcohol intake which showed that 45.2% of participants were smokers while 57.1% of participants had a habit of alcohol intake [Table 1].

Clinical Characteristics of Study Participants

The clinical characteristics of the study participants are shown in [Table 2]. The duration of diabetes in study participants ranged from 5 to 16 years. The data demonstrated that 8.5% of study participants had a duration of diabetes <5 years whereas 15.5% of study participants had a duration of diabetes >16 years. The 36.6% and 39.4% of study participants had a duration of diabetes between 6-10 and 11-15 years, respectively. Further, 78.9% of diabetic patients received OHA, 15.5% of patients were on insulin, and 5.6% received OHA and insulin both as a part of treatment. Among study participants, the percentage of compliance with diabetes treatment was 57.7%, while the percentage of non-compliance was 40.8%. Moreover, we have assessed the three different types of diabetes complications and the data indicated that among all diabetic patients, retinopathy was present in 26.8%, neuropathy was present in 15.5%, and nephropathy was present in 31% of diabetic patients [Table 2].

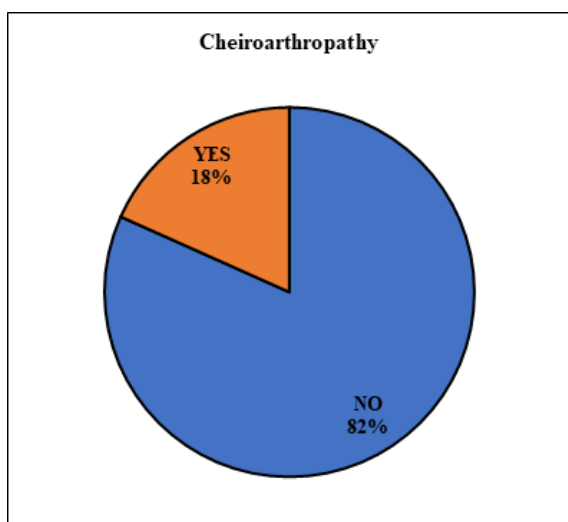
Additionally, we assessed diabetic cheiroarthropathy among all the study participants and we observed that 18% of participants were diagnosed with diabetic cheiroarthropathy [Figure 1].

Table 1: Demographic characteristics of study participants

Patient characteristics	Frequency	Percent
Age groups	<40	7.0%
	41-50	31.0%
	51-60	47.9%
	>61	14.1%
Gender	Female	40.8%
	Male	59.2%
BMI	Normal weight	31.0%
	Overweight	43.7%
	Obese	25.4%
Addiction	Smoking	45.2%
	Alcohol	57.1%

Table 2: Clinical characteristics of study participants

Patient characteristics		Frequency	Percent
Duration of DM	<5 years	6	8.5%
	6-10 years	26	36.6%
	11-15 years	28	39.4%
	>16 years	11	15.5%
Treatment OHA / insulin	Insulin	11	15.5%
	OHA	56	78.9%
	OHA/ Insulin	4	5.6%
Compliance of treatment	Regular	41	57.7%
	Irregular	29	40.8%
Complications	Retinopathy	19	26.8%
	Neuropathy	11	15.5%
	Nephropathy	22	31.0%

**Figure 1: Percentage of diabetic patients with and without cheiroarthropathy**

DISCUSSION

The present study found that cheiroarthropathy was present in 18% of type 2 DM patients. The presence of cheiroarthropathy is a common complication of DM, accounting for 8-50% of patients.^[3,4] Moreover, we also reported that most of the study population had longstanding diabetes and most of them had developed microvascular complications. In cheiroarthropathy patients, retinopathy was the most commonly occurring microvascular complication, followed by nephropathy and neuropathy. Cheiroarthropathy is associated with a three to four-fold risk for retinopathy, neuropathy, and nephropathy.^[6,7,8] In our study, we have reported the highest prevalence of nephropathy followed by retinopathy and neuropathy.

Diabetic cheiroarthropathy is a chronic complication associated with DM. The complications of diabetes such as nephropathy, neuropathy, retinopathy, and cardiovascular disease received more attention, and diabetic cheiroarthropathy remains underdiagnosed, despite its association with neuropathy. Cheiroarthropathy, a non-vascular complication, was first reported in type 1 DM patients and later in type 2 DM patients.^[2,9] Saini et al. reported a strong association between the presence of cheiroarthropathy and neuropathy in Indian type 2 DM patients. Thus, cheiroarthropathy could serve as

a possible indicator of the presence of neuropathy in type 2 DM patients.^[9]

The underlying cause of cheiroarthropathy in diabetic patients is supposed to be multifaceted. Diabetic microangiopathy, decreased collagen breakdown, increased glycosylation of collagen in the skin and periarticular tissue, and perhaps even diabetic neuropathy are supposed to be some of the contributing factors.^[4] The maintenance of good glycemic control can improve symptoms and signs of cheiroarthropathy in diabetic patients, even though the complete reversal of diabetic cheiroarthropathy is possible as reported earlier. Along with good glycemic control, non-steroidal anti-inflammatory drugs and physiotherapy will help to improve cheiroarthropathy.^[10,11] Early diagnosis and treatment have the potential to significantly reduce a patient's symptoms or reverse the clinical depiction altogether. The clinician may be able to correlate the diagnosis to microvascular complications and intervene accordingly.

The study had some limitations, including the small number of participants, the diagnosis being based primarily on clinical examination, and the absence of radio imaging of the hand joints, which would have strengthened our findings.

CONCLUSION

Cheiroarthropathy is an underreported complication of diabetes that should be evaluated during the yearly checkup of diabetes patients, along with micro- and macrovascular complications. Practically speaking, maintaining good glycemic control and daily exercise are the only primary pillars of prevention. Newly developed targeted therapies are required to delay the development of cheiroarthropathy, decline the development of disabilities, and maintain quality of life in patients with diabetes. Early diagnosis of this condition will allow effective treatment and help to reduce morbidity and disability.

REFERENCES

- Goyal A, Tiwari V, Gupta Y. Diabetic Hand: A Neglected Complication of Diabetes Mellitus. *Cureus*. 2018;10(6):e2772. doi: 10.7759/cureus.2772.

2. Abate M, Schiavone C, Salini V, Andia I. Management of limited joint mobility in diabetic patients. *Diabetes Metab Syndr Obes.* 2013;6:197-207. doi: 10.2147/DMSO.S33943.
3. Cherqaoui R, McKenzie S, Nunlee-Bland G. Diabetic cheiroarthropathy: a case report and review of the literature. *Case Rep Endocrinol.* 2013;2013:257028. doi: 10.1155/2013/257028.
4. Pandey A, Usman K, Reddy H, Gutch M, Jain N, Qidwai S. Prevalence of hand disorders in type 2 diabetes mellitus and its correlation with microvascular complications. *Ann Med Health Sci Res.* 2013;3(3):349-54. doi: 10.4103/2141-9248.117942.
5. Gerrits EG, Landman GW, Nijenhuis-Rosien L, Bilo HJ. Limited joint mobility syndrome in diabetes mellitus: A minireview. *World J Diabetes.* 2015;6(9):1108-12. doi: 10.4239/wjd.v6.i9.1108.
6. Garg SK, Chase HP, Marshall G, Jackson WE, Holmes D, Hoops S, et al. Limited joint mobility in subjects with insulin dependent diabetes mellitus: relationship with eye and kidney complications. *Arch Dis Child.* 1992;67(1):96-9. doi: 10.1136/adc.67.1.96.
7. Starkman HS, Gleason RE, Rand LI, Miller DE, Soeldner JS. Limited joint mobility (LJM) of the hand in patients with diabetes mellitus: relation to chronic complications. *Ann Rheum Dis.* 1986;45(2):130-5. doi: 10.1136/ard.45.2.130.
8. Rosenbloom AL, Silverstein JH, Lezotte DC, Riley WJ, Maclaren NK. Limited joint mobility in diabetes mellitus of childhood: natural history and relationship to growth impairment. *J Pediatr.* 1982;101(5):874-8. doi: 10.1016/s0022-3476(82)80351-x.
9. Nair A, Jayakumari C, Jabbar PK, Jayakumar RV, Raizada N, Gopi A, et al. Prevalence and Associations of Hypothyroidism in Indian Patients with Type 2 Diabetes Mellitus. *J Thyroid Res.* 2018;2018:5386129. doi: 10.1155/2018/5386129.
10. Wyatt LH, Ferrance RJ. The musculoskeletal effects of diabetes mellitus. *J Can Chiropr Assoc.* 2006;50(1):43-50.
11. Hider SL, Roy DK, Augustine T, Parrott N, Bruce IN. Resolution of diabetic cheiroarthropathy after pancreatic transplantation. *Diabetes Care.* 2004;27(9):2279-80. doi: 10.2337/diacare.27.9.2279-a.