

Association of Diabetic Cheiroarthropathy with Duration of DM and HbA1c**Harpreet Singh¹, Inderpal Singh², Jasleen Kaur³, Sunil Suman⁴**¹Associate Professor, Department of Medicine, GMC, Amritsar²Assistant Professor, Department of Medicine, GMC, Amritsar³Associate Professor, Department of Social and Preventive Medicine, GMC, Amritsar⁴Senior Resident, Department of Medicine, GMC, Amritsar

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Conflict of interest: Nil

Abstract:

Background: Diabetic mellitus can lead to a myriad of complications (both microvascular and macrovascular). The wide spectrum of rheumatic affections related to DM are Diabetic Hand Syndrome (Diabetic Cheiroarthropathy), Adhesive Capsulitis, Trigger Finger, Dupuytren's Contracture, Diffuse Idiopathic Skeletal Hyperostosis (DISH), Diabetic muscle infarction etc. Diabetic cheiroarthropathy is characterized by limited movement of the joints of the hands along with thickening of the skin on the palmar and dorsal surfaces.

Studies have found association between Diabetic Cheiroarthropathy, Duration of diabetes and Glycation end products of Diabetes. The present study was conducted to study the prevalence of Diabetic Cheiroarthropathy in patients of DM and its association with duration of DM and Glycation end products.

Materials and Methods: This was conducted on 200 patients in the department of Medicine, Government Medical College, Amritsar. The study protocol was approved by the institutional ethics committee. The patients were enrolled in the study after obtaining written informed consent. All the patients were interviewed and examined for peripheral neuropathy, retinopathy by ophthalmoscopy, presence of albuminuria and Diabetic Cheiroarthropathy by Prayer Sign and Table Top Sign. The results were then analyzed.

Results: Out of 200 patients, 104 patients had cheiroarthropathy. Majority of the patients with cheiroarthropathy (33) were in the age group 61-70 years. The mean age of patients with and without cheiroarthropathy were 61.3±13.6 years and 45.8±9.8 years, respectively (p value= 0.000). The mean diabetes' duration in absence of cheiroarthropathy was 4.3±2.5 years, while in presence of cheiroarthropathy it was 12.6±5.7 years (p value= 0.000). With increasing duration of diabetes, incidence of Cheiroarthropathy also increased and this showed statistical significance (p value=0.000). Cheiroarthropathy showed positive association with HbA1c as with increasing HbA1c levels, there was increased incidence of Cheiroarthropathy (p value=0.000).

Conclusion: Advancing age plays in the determination of the severity of diabetic cheiroarthropathy along with the duration of Diabetes Mellitus. Apart from the already established association of Cheiroarthropathy with microvascular complications, there is also association of Cheiroarthropathy with the status of HbA1c levels of the patient.

Keywords: Diabetes mellitus, Microvascular complications, Cheiroarthropathy, Glycation End Products, HbA1c.

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Introduction

Diabetic mellitus conveys a gamble for a bunch of difficulties which can be microvascular and macrovascular in origin. [1] Diabetic cheiroarthropathy is a term gotten from the Greek word "cheiros" signifying "of the hand". It is portrayed by firm hands with unmistakably thick, tight, and waxy skin, particularly on the dorsal parts of the hands. It is important for long haul difficulty of diabetes and many recommend it is related with microvascular complications. [2] Diabetic cheiroarthropathy, or "stiff-hand syndrome" is described by restriction of mobility of

the little joints of the hands. The predominance goes from 8% to 50% among patients with DM, contrasted with just 4% to 20% among people without DM. [3,4] Diabetic cheiroarthropathy is principally a clinical conclusion and the imaging discoveries are nonspecific. [5] There are two clinical signs which are fundamental for the finding: Prayer sign (the patient can't surmise the palmar surface of the fingers while lifting the hands as if in prayer) and the Table top sign (when the patient is asked to lay the palms level on the table top he can't contact the palmar surface of the

fingers to the table). The current review was led to concentrate on the prevalence of diabetic cheiroarthropathy in patients of diabetes mellitus and its correlation with duration and Glycation end products.

Materials and Methods

This study was directed on 200 diabetic patients conceded in the Medicine Wards, Guru Nanak Dev Hospital, Government Medical College, Amritsar (Punjab). The review was approved by the institutional ethics panel and the patients were signed up for the study subsequent to getting composed informed consent.

Inclusion criteria-

- Patients who are known instances of diabetes mellitus.
- Patients who have joint inclusion.
- Patients who settled for voluntary participation.

Exclusion criteria-

- Patients with injury to hands.
- Patients with liver cirrhosis.
- Patients with rheumatoid joint inflammation.

Every one of the patients were evaluated and analyzed for Cheiroarthropathy (surveyed clinically) by the presence of positive Table Top Sign (when the patient is asked to lay the palms level on the tabletop he can't contact the palmar surface of the fingers to the table) and Prayer Sign (the patient can't surmise the palmar surface of the fingers while lifting the hands as if in prayer). The results of observation of individual patients were tabulated and examined utilizing suitable statistical programming.

Results

Baseline data of patients: There was a slight male preponderance (51% male vs 49% female patients). Most of the patients (89%, 178) had type 2 diabetes mellitus and remaining 11% (22) had type 1 diabetes mellitus. Out of 200 patients, 104 (52%) patients had Cheiroarthropathy. Of the 104 patients,

11 were Type 1 DM, and 93 were Type 2 DM. Of the 104 patients, 74 were only on OHA, 12 were only on Insulin, 11 were on OHA and Insulin together, and 7 were on neither OHA nor Insulin. Of the 96 patients without Cheiroarthropathy, 11 were Type 1 DM, and 85 were Type 2 DM. In these non Cheiroarthropathy patients, 83 were only on OHA, 10 were only on Insulin, 1 patient was on OHA and Insulin together, and 2 were neither on OHA nor Insulin. (Table 2).

Association of Diabetic Cheiroarthropathy with duration of Diabetes:

Of the 200 patients, 81 patients had diabetes duration of ≤ 5 years, and the data showed that only 8 of those had developed Cheiroarthropathy. 66 patients had duration of diabetes from 6-10 years, 45 of those developed Cheiroarthropathy. 23 patients had duration of diabetes in the range of 11-15 years, of which 21 had Cheiroarthropathy. 20 patients had diabetes from 16-20 years, and all 20 of them had Cheiroarthropathy.

Similarly 10 patients had duration of diabetes from 21-25 years, and all 10 patients had Cheiroarthropathy. This showed a positive association of progression to Cheiroarthropathy, with increasing duration of Diabetes in the patients and was statistically significant (p value=0.000) (Table 1).

Association of Diabetic Cheiroarthropathy with HbA1c:

Of the 200 patients, 85 patients had HbA1c in the range of 6.5-7.5, of which only 16 had Cheiroarthropathy. 57 patients had HbA1c from 7.5-8.5, of which 40 patients had developed Cheiroarthropathy. 22 patients had HbA1c of 8.5-9.5, and 20 patients had Cheiroarthropathy. 24 patients had HbA1c of 9.5-10.5, and 19 patients had Cheiroarthropathy. 7 patients had a HbA1c range of 10.5-11.5 and 6 of them had developed Cheiroarthropathy, Total of 5 patients had HbA1c >11.5 , of which 3 had developed Cheiroarthropathy. This shows a positive trend of increased incidence of Cheiroarthropathy with increasing HbA1c levels and was found to be statistically significant (p value=0.000) (Table 1).

Table 1:

Parameters	Variables	Cheiroarthropathy		Total
		Absent	Present	
Duration of Diabetes (years)	≤ 5 years	73	8	81
	6-10 years	21	45	66
	11-15 years	2	21	23
	16-20 years	0	20	20
	21-25 years	0	10	10
HbA1c (%)	6.5 - 7.5	69	16	85
	7.5 - 8.5	17	40	57
	8.5 - 9.5	2	20	22
	9.5 - 10.5	5	19	24
	10.5 - 11.5	1	6	7

	>11.5	2	3	5
Age (years)	≤30	8	4	12
	31-40	23	8	31
	41-50	39	9	48
	51-60	21	29	50
	61-70	5	33	38
	>70	0	21	21

Table 2:

Parameter	Cheiroarthropathy		Total
	Absent	Present	
Only OHA	83	74	157
Only Insulin	10	12	22
OHA + Insulin	1	11	12
No OHA + No Insulin	2	7	9

Discussion:

Age group and Cheiroarthropathy: In age group ≤ 30 years, out of the 12 patients only 4 had cheiroarthropathy. In age group 31-40 years, 8 (out of 31 patients) had cheiroarthropathy; in 41-50 years age group, 9 (out of 48 patients) had cheiroarthropathy; in 51-60 years group, 29 (out of 50 patients) had cheiroarthropathy; in 61-70 years age group, 33 (out of 38 patients) had cheiroarthropathy and among > 70 years age group, all the 21 patients had cheiroarthropathy. In the absence of cheiroarthropathy mean age is 45.8 years, and in the presence of cheiroarthropathy mean age is 61.3 years. This showed that with increasing age, the prevalence of diabetic cheiroarthropathy also increased, and it showed positive correlation with p value= 0.000 (statistically significant). Paul A et al (2023) found that the prevalence of cheiroarthropathy increases with increasing age. [6] Parappil SM et al (2019) found that prevalence of cheiroarthropathy in diabetics increases with increasing age (p value= 0.001). [7]

Duration of Diabetes with Cheiroarthropathy:

The mean DM duration in patients without cheiroarthropathy was 4.3 years, and in patients with cheiroarthropathy was 12.6 years. This implies that with increasing duration of diabetes mellitus the incidence of cheiroarthropathy also increases. These findings were statistically significant with p value= 0.000. Al-Sergany MA et al (2003) concluded that LJM was significantly associated with longer duration of DM with p value< 0.05. [8] Antony J et al (2019) also found cheiroarthropathy to be statistically significantly associated with DM duration (p value= 0.016). [9] Of the total of 81 patients with duration of diabetes ≤5 years, only 8 patients had Cheiroarthropathy. 66 patients had duration of diabetes from 6-10 years, 45 of those developed Cheiroarthropathy. 23 patients had duration of diabetes in the range of 11-15 years, of which 21 had Cheiroarthropathy. 20

patients had diabetes from 16-20 years, and all 20 of them had Cheiroarthropathy. Similarly 10 patients had duration of diabetes from 21-25 years, and all 10 patients had Cheiroarthropathy. This showed with increasing duration of diabetes, Cheiroarthropathy also increased and was statistically significant (p value=0.000). Paul A et al (2023) [6] found that prevalence of Cheiroarthropathy increases with increasing duration of Diabetes (P value= 0.002).

HbA1c and Cheiroarthropathy:

The mean of HbA1c in patients without cheiroarthropathy was 7.5 %, and in patients with cheiroarthropathy was 8.6 %. This suggests positive association between poor glycemic control and presence of diabetic cheiroarthropathy with significance of p value= 0.000. Antony J et al (2019) concluded relation between HbA1c and Cheiroarthropathy, 8 patients that had cheiroarthropathy in their study had corresponding HbA1c of 8.1 to 10 %, and this observation was statistically significant (p value= 0.04). [9] Parappil SM et al (2019) observed positive association between poor glycemic control and cheiroarthropathy, with HbA1c of 9.84 % in patients with cheiroarthropathy and 9.19 % in patients without cheiroarthropathy. This association also being statistically significant (p value= 0.009). [7] Of the 200 patients, 85 patients had HbA1c in the range of 6.5-7.5, of which only 16 had Cheiroarthropathy. 57 patients had HbA1c from 7.5-8.5, of which 40 patients had developed Cheiroarthropathy. 22 patients had HbA1c of 8.5-9.5, and 20 patients had Cheiroarthropathy. 24 patients had HbA1c of 9.5-10.5, and 19 patients had Cheiroarthropathy. 7 patients had a HbA1c range of 10.5-11.5 and 6 of them had developed Cheiroarthropathy, Total of 5 patients had HbA1c >11.5, of which 3 had developed Cheiroarthropathy. This showed that with increasing Glycation end products, incidence of

Cheiroarthropathy also increased and was statistically significant (p value=0.000).

Conclusion:

The present study found that advancing age plays a role in the severity of diabetic cheiroarthropathy. Increased concentration of Glycation End Products (HbA1c) was associated with increased incidence of Cheiroarthropathy, and more is duration of diabetes, more is incidence of Cheiroarthropathy.

Presence or absence of Cheiroarthropathy can be considered as an indirect marker for the status of glycemic control of the patient in the past and to some extent can predict the degree of progression of Microvascular complications of diabetes.

Ethical approval:

The study was approved by the Institutional Ethics Committee

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