www.jmscr.igmpublication.org
Index Copernicus Value: 79.54
ISSN (e)-2347-176x ISSN (p) 2455-0450
crossrefDOI: https://dx.doi.org/10.18535/jmscr/v7i3.12

IGM Publication
Journal Of Medical Science And Clinical Research
An Official Publication Of IGM Publication

Research Article

Prevalence of Cheiroarthropathy in Diabetic Patients in a Tertiary Care Centre – an Observational Study

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Abstract
Introduction: *Diabetic cheiroarthropathy (diabetic stiff hand syndrome) is a clinical condition characterized by thickened skin and painless limitation of mobility of small joints of the hand. The objective of the study was to find out the prevalence of cheiroarthropathy in type 2 diabetes mellitus patients and to study its relationship with age, gender, duration of diabetes, glycaemic control and BMI.*
Methods: *A cross sectional study was conducted in 300 patients with type 2 DM. Diabetic cheiroarthropathy (diabetic stiff hand syndrome)or limited joint mobility was evaluated clinically by the 'prayer sign' in which the patients were asked to approximate the palmar surfaces of their interphalangeal joints, with the fingers fanned and the wrist maximally extended. If they were unable to do so, the test was considered positive. The data were statistically analysed.*
Results: *Cheiroarthropathy was seen in 21.7% of patients with type 2 diabetes. There was a statistically significant association between occurrence of cheiroarthropathy and increasing age, duration of diabetes and poor glycaemic status.*
Conclusion: *Cheiroarthropathy is a commonly prevalent musculoskeletal disorder among patients with type 2 diabetes, its occurrence ebeing more prevalent with increasing age, long duration of diabetes and poorly controlled glycaemic status.*
Keywords: *Type 2 diabetes mellitus, cheiroarthropathy, age, gender, duration of diabetes, glycaemic status, BMI.*

Introduction

Diabetes mellitus is characterized by impaired ability of the body to produce or respond to insulin. It leads to increased concentration of glucose in the blood. Diabetes mellitus is associated with a variety of musculoskeletal complications and their prevalence has increased in the recent years, certainly affecting the health status and quality of life [1],[2].

Diabetic cheiroarthropathy (stiff hand syndrome or limited joint mobility syndrome) is a common complication of diabetes mellitus[3]. It is characterized by thickened skin and painless limitation of mobility of the small joints of the hand. Pathophysiology of diabetic cheirarthropathy involves glycosylation and crosslinking of collagen, which are facilitated by hyperglycaemia. The collagen proliferates extensively in the skin, subcutaneous tissues, tendons, muscles, and periarticular tissue and this results in thick and inelastic tissues[4],[5]. In its advanced stages, the fingers remain permanently contracted at the metacarpophalangeal and proximal interphalangeal joints, and the skin becomes thick and shiny, similar to scleroderma[6]. There is a strong association between the increasing severity of joint limitation and the increased prevalence of microvascular disease in diabetes mellitus [7],[8],[9]. Treatment mainly consists of improving or maintaining good glycaemic control and daily stretching excercises of joints[10]. This prevents or delays progression of joint stiffness. In this study, we aim to find out the prevalence of cheiroarthropathy in patients with type 2 diabetes mellitus and to study its relationship with age, gender, duration of diabetes, glycaemic control and BMI.

Materials and Methods

The study was conducted in patients with type 2 diabetes mellitus, who attended the Diabetes Clinic at a tertiary centre. A cross sectional study was carried out in 300 patients of both genders, aged between 18 and 65 years. Patients with deformities due to trauma or surgery, those with medical disorders like cerebrovascular accidents, thyroid disorders, liver dysfunction, malignancy, patients with cognitive deficits, pregnant patients and those who could not give consent for the study were excluded. Informed written consent was obtained from all the participants, prior to the study. The study was approved both by the Institutional Research Committee and the Institutional Ethics Committee.

Patient characteristics like age, gender, BMI, glycaemic status and duration of diabetes mellitus were documented. A detailed clinical history followed by clinical examination was done. Diabetic cheiroarthropathy (diabetic stiff hand syndrome) or limited joint mobility was evaluated clinically by the 'prayer sign' in which the patients were asked to approximate the palmar surfaces of their interphalangeal joints, with the fingers fanned and the wrist maximally extended. If they were unable to do so, the test was considered positive.

Statistical Analysis

All the data were coded and entered in Microsoft excel sheet, rechecked and analysed using statistical package for social sciences (SPSS 18.0) software. Quantitative variables are presented as mean and standard deviation. Qualitative variables are presented as frequency and percentages. Comparison is done using Chi square test.

Results and Discussion

In our study, it was found that 65(21.7%) out of the 300 patients with type 2 diabetes mellitus had cheiroarthropathy.

Our results are comparable with those of Ravindran Rajendran et al [11]. They found prevalence of cheiroarthropathy among diabetic patients to be 28.5%. Ray et al also found prevalence of limited joint mobility to be 29%[12]. In another study by RP Agrawal et al, 22.6% of diabetic patients were suffering from cheiroarthropathy[13].

Table 1 Association between gender andcheiroarthropathy

Gender	Cheiroarthropathy		Total n (%)
	Present n (%)	Absent n (%)	
Males	29 (26.6%)	80 (73.4%)	109 (100%)
Females	36 (18.8%)	155 (81.2%)	191 (100%)
Total	65 (21.7%)	235 (78.3%)	300 (100%)

Chi- square = 2.46; df = 1; p value =0.117; OR (95% CI) = 0.64 (0.367- 1.12). p value of 0 .117 implied that there was no significant association between gender and cheiroarthropathy.

Distribution of selected variables in subjects with cheiroarthropathy

Table 2 Mean (SD) of selected variables in subjects with cheiroarthropathy

	Cheiroarthropathy		p value
	Present Mean (SD)	Absent Mean (SD)	
Age	53.20(6.78)	48.90(10.01)	0.001
Duration of diabetes in years	18.69(4.57)	14.34(7.39)	<0.001
FPG	164.48(46.15)	157.49(56.72)	0.362
PPPG	238.77(64.23)	228.39(75.67)	0.314
HbA1c	9.84(1.80)	9.19(1.76)	0.009
BMI	24.86(3.49)	24.99(3.21)	0.771

In our study it was found that the prevalence of cheiroarthropathy in diabetics increases with increasing age.

The mean duration of diabetes mellitus was 18.69 years. The study showed strong association between longer duration of diabetes mellitus and incidence of cheiroarthropathy. Studies by Gamstedt A et al[14] also showed a highly significant association between the duration of diabetes and occurrence of cheiroarthropathy.

The mean HbA1c of patients with cheiroarthropathy was 9.84 and there was found to be significant association between poor glycemic control and incidence of cheiroarthropathy. A study conducted by Ramchurn et al[15], also found strong association between poor glycemic control and incidence of cheiroarthropathy.

In this study there was no statistically significant association between BMI and cheiroarthropathy among diabetic patients.

Conclusion

The study was done to find the prevalence of cheiroarthropathy in 300 patients with Type 2 diabetes mellitus and its association with age, gender, duration of diabetes, glycaemic control and BMI. Early recognition of cheiroarthropathy is important as it plays an significant role in the individual's Activities of Daily Living and Quality of Life. We came to the conclusion that cheiroarthropathy is commonly prevalent in patients with type 2 DM and is significantly associated with increasing age, longer duration of diabetes and poor glycaemic status.

Limitation of Study

The major limitation of our study was the absence of a control group for comparison.

Source of Support

No financial support was received from any agency for this study.

Acknowledgements

We would like to express our sincere gratitude to the patients and other members of the team involved in this study.

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Abbreviations

BMI- Body mass index
DM-Diabetes mellitus
FPG- Fasting plasma glucose
PPPG- Postprandial plasma glucose