Original Article

Prevalence of frozen shoulder among patients with diabetes: a single center experience from Karachi, Pakistan

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Objective: To find the prevalence of frozen shoulder in patients with diabetes mellitus and its association with different demographics and non-demographics variables.

Methodology: This study was carried out at diabetes OPD of Dow University Hospital and included type 1 and type 2 diabetic patients. Data regarding frozen shoulder along with its demographics factors like age, gender, duration of diabetes, type of diabetes, and mode of medication with family history of the diabetes were evaluated. Restriction in capsular pattern of shoulder (LAM) was analyzed to rule out frozen shoulder.

Results: Out of total 190 patients, 115 (60.52%) had shoulder pain, which was dominant in female (34.73%). Out of 115 who had shoulder pain, 63 (54.78%) were diagnosed with frozen shoulder, which was associated with gender (p=0.010), duration of diabetes (p=0.01), HbA1c (p=0.044) and family history (p=0.04).

Conclusion: Diabetes mellitus has association with frozen shoulder and the highest percentage is among female diabetics. (Rawal Med J 202;45:838-841).

Keywords: Diabetes mellitus, adhesive capsulitis, internal rotation.

INTRODUCTION

In frozen shoulder (adhesive capsulitis) the characteristic feature is restricted motion at shoulder joint which is gradual in nature without any specific findings on radiograph. The classic complaint is shoulder pain and many are unable to sleep on the affected shoulder.[1] Clinically, frozen shoulder is divided into three stages, in the first stage (*freezing)*, there is moderate to severe shoulder pain and stiffness and it last for about 2-9 months. The intensity of pain reduces but the shoulder stiffness increases. In the second stage of the disease (frozen), the duration is about 4-14 months. In the third stage (*thawing*) the symptoms gradually start to decrease and restricted motion at the shoulder joint starts to recover and it last for about 5 to 24 months. Older people are more likely to develop frozen shoulder with condition 1.6 times higher in women.[2]

People who are at higher risk to have frozen shoulder are those who have sustained immobility of shoulder such as minor trauma of upper limb, surgery, overuse injury and/or neurosurgery or any systemic illness like DM, disorders of thyroid, CVD, Dupuytren's contracture, and stroke.[3-5] There is deposition of abnormal collagen in articular connective tissues and non-enzymatic glycosylation leading to alteration in the mechanical properties of those tissues and matrix that lead to formation of diffuse arthrofibrosis.[6] The occurrence of musculoskeletal problems in diabetic patients is reported in both population either having type 1 or type 2, focusing mostly on frozen shoulder in Both types of type 2 diabetic patients develop this condition[7] more so in type 1.[8] Its frequency is 2-4 times greater in diabetic patients in comparison to non-diabetics.[9]

In people with diabetes mellitus there is an abnormal deposition of collagen in tendons and cartilage of glenohumeral joint, because in these people more molecules of glucose are binding with the collagen.[10-12] A major role is also played by fibrosis and inflammation.[13] This study was performed to know the prevalence of frozen shoulder in diabetic patients attending diabetic OPD at Dow University Hospital Karachi, Pakistan.

METHODOLOGY

This cross sectional study selected individuals attending diabetic OPD of Dow University Hospital Karachi. Taking confidence interval of 95% and margin of error 7% the sample size was 190,

calculated from Open Epi. All adult diagnosed diabetic patients with age more than 18 years attending diabetic OPD, irrespective of gender and type of diabetes were included in the study. The patients were recruited on basis of HbA1c > 6.6% as per WHO criteria. Diabetic patients having history of trauma, stroke, advanced pulmonary disease, advanced cardiovascular disease was excluded from our study. The study was performed in the duration of September 2018 to July 2019.

Patients were assessed by questionnaire-based interview and assessment of shoulder capsular pattern i.e. painful and restricted movement of shoulder joint upon lateral rotation, abduction and medial rotation (LAM) after taking consent.

Statistical Analysis: Statistical analysis was performed using SPSS version 22. Chi-Square and independent t-test was applied with alpha level of significance p-value of less than 0.05.

RESULTS

A total of 190 people with diabetes type I and II were included, 91 males 99 females. Out of 190, 115 (60.52%) patients had shoulder pain and 75 (39.46%) did not have pain (Table 1). Out of 115 participants who had shoulder pain, 71 (37.36%) had pain in right shoulder, 35 (18.42%) had pain in left shoulder while 9 (4.73%) had pain in both shoulders. 88 (46.31%) patients had their right hand dominant and 27 (14.21%) had their dominant hand left (Table 2).

Table 1. Comparison of biophysical and biochemical parameters with shoulder pain (n=190).

Variables		Total 190 (100%)	Shoulder pain		
			Yes=115 (60.52%)	No=75 (39.47%)	P value
Age		190 (100%)	50.54±9.568	50.68±12.126	0.929
Gender	Male	91 (47.89)	49 (25.78%)	42 (22.10%)	
	Female	99(52.10%)	66 (34.73%)	33 (17.36%)	0.071
Diabetes type	Type 1	6 (3.15%)	2 (1.05%)	4 (2.10%)	
	Type 2	184 (96.84%)	113(59.47%)	71 (37.36%)	0.166
Duration		190 (100%)	8.905±6.522	8.305±6.517	0.537
Family history	Positive	149 (78.42%)	99 (52.10%)	50 (26.31%)	
	Negative	41(21.57%)	16 (8.42%)	25 (13.15%)	0.001
Mode of medication	Oral	138 (72.63%)	85 (44.73%)	53 (27.89%)	
	Insulin	17 (8.94%)	10 (5.26%)	7 (3.68%)	0.881
	Both	35 (18.42%)	20 (10.52%)	15 (7.89%)	
Level of HbA1c		190 (100%)	9.339±1.725	8.815±1.947	0.03

Table 2. Side of shoulder pain and dominant hand (n=115).

Variable	Side involved	Shoulder pain
Involved Shoulder	Right	71 (37.36%)
	Left	35 (18.42%)
	Bilateral	9 (4.73%)
Dominant Hand	Right	88 (46.31%)
	Left	27 (14.21%)

Table 3. Frozen shoulder association with different variables.

Variable		Total 115 (60.52%)	Frozen shoulder		p-value
			YES=63	NO=52	
Age		115	51.10±9.662	49.87±9.503	0.495
Gender	Male	49	20 (17.39%)	29 (25.21%)	0.010*
		(42.60%)			
	Female	66	43 (37.39%)	23 (20%)	
		(57.39%)			
Diabetes Type	Type 1	2	2 (1.73%)	0	0.195
		(1.73%)			
	Type 2	113	61 (53.04%)	52 (45.21%)	
		(98.26%)			
Duration	Positive	99 (86.08%)	58(50.43%)	41 (35.65%)	0.042*
Family History	Negative	16 (13.91%)	5 (4.34%)	11 (9.56%)	
Level of HbA1c		115	9.339±1.725	8.815±1.947	0.053*
Mode Of Medication	Oral	85 (73.91%)	50 (43.47%)	35 (30.43%)	0.330
	Insulin	10 (8.69%)	4 (3.47%)	6 (5.21%)	
	Both	20 (17.39%)	9 (7.82%)	11 (9.56%)	

Table 4. Frozen shoulder in right or left shoulder and dominant hand (n=63).

Variable	Side involved	Participants with frozen shoulder n=63
Involved Shoulder	Right	43 (37.39%)
	Left	20 (17.39%)
	Bilateral	0
Dominant Hand	Right	47 (40.86%)
	Left	16 (13.91%)

Out of 115 patients who had shoulder pain, 63 (54.78%) were diagnosed with frozen shoulder in which 20 (31.74%) were males and found dominant in females (68.26%). Out of 63 who had frozen shoulder, 2 (1.73%) had type 1 diabetes and 61 (53.04%) had type II DM, 58 (50.43%) had positive family history of diabetes and 5 (4.34%) did not have family history of DM. 50 (43.47%) patients were taking oral mode of medication, 4 (3.47%) were taking insulin 9 (7.82%) were taking both (Table 3). In 43 (68.25%) patients, right shoulder

was affected, and left shoulder was affected in 20 (17.39%) patients and no bilateral shoulder involvement was found. Out of 63 participants with frozen shoulder, 47 (40.86%) had their right hand dominant and 16 (13.91%) had left dominant hand (Table 4).

DISCUSSION

Many musculoskeletal conditions are related with diabetes mellitus, many of which are subclinical and linked with duration of disease and its poor control.[14] In diabetes musculoskeletal system is affected in many ways because of hyperglycemia.[15] However, there is a synergistic effect of connective tissue disorders, neuropathy or vasculopathy on the increased prevalence of these conditions in diabetes mellitus.[16]

In present study, there was association of frozen shoulder with gender, family history, HbA1c and duration of diabetes while no significant association was found between frozen shoulder and age, type of diabetes and mode of medication. In this study, the prevalence of frozen shoulder was found to be 54.78% in diabetic patients, however different studies have shown different prevalence of frozen shoulder in diabetic population. Moreover up till now, this is the highest reported percentage of frozen shoulder in diabetic patients.

In the present study, females had a higher prevalence of frozen shoulder than male. This result is similar to a study in which frozen shoulder was more common in female participants.[7] There was also high prevalence in those who had positive family history of diabetes and these findings were similar with another study.[17] No association was found between frozen shoulder and mode of medication, but it was seen most of the patients with frozen shoulder were taking oral medication.

The association between age and frozen shoulder was also not found and most of the patients with right frozen shoulder were right-handed. The sample size of the study was small and more variables could be included. Treatment and management of this debilitating condition was not included in the study which is our recommendation also.

CONCLUSION

Diabetes mellitus has association with frozen shoulder and cause further disturbance in patients' daily routine life. The study concluded the highest percentage of frozen shoulder among diabetic patients with female predominance.

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