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THE PREVALENCE OF SHOULDER LESIONS IN DIABETES MELLITUS

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ABSTRACT

Introduction:

Musculoskeletal syndromes associated with diabetes mellitus , are ill understood. Lesions of rotator cuff are common and important source of shoulder pain, the supraspinatus frequently undergoes rupture , as such it is the main site of chronic soft tissue rheumatism.

Aim of study:

To study the prevalence of shoulder lesions in diabetes mellitus.

Patients and method:

This cross-sectional study was carried out in Sheikh Zayad Hospital on patients admitted in the medical and orthopedic wards for different causes, from September 2005-september 2006.

Patients with established diagnosis of diabetes mellitus were included in this study. Detailed history was obtained regarding the age, sex, type of diabetes, the duration of diabetes, the dominant hand ,the complications and other associated chronic illnesses.

Results:

200 patients whom known cases of diabetes mellitus were included in this study. They were 116 (58%) female and 84 (42%) male.

The most common shoulder lesion in this study was supraspinatus tendonitis ± bicipital tendonitis, 24 cases (63, 15%), of these 24 cases (9) cases (75%) were male and (15) cases (57, 7%) were female. Frozen shoulder, the second lesion affecting the shoulder in this study, was only 1 case (8, 3%) in male and 7 cases (26, 9%) in female.

Of these 38 cases, 20 cases (52, 63%) the lesion was on the dominant hand, 11cases (28, 95%) the lesion was on the non dominant hand and 7 cases the lesion was bilateral.

Discussion:

Shoulder lesions are common and important musculoskeletal problem and they are more common in patients diabetes mellitus, especially type II.

The most common shoulder lesion was supraspinatus tendonitis ± bicipital tendonitis, followed by frozen shoulder.

Keywords: Supraspinatus, tendonitis, diabetes mellitus

INTRODUCTION

Diabetes mellitus is achronic condition characterized by persistant hyperglycemia with resultant morbidity and mortality related primarily to it's associated microvascular and macrovascular complications[1].

Musculoskeletal syndromes associated with diabetes mellitus, are ill understood[2].

The main function of the shoulder is to put the arm and the hand into apposition so that it is able to operate efficiently. Lesions of rotator cuff are common and important source of shoulder pain , the supraspinatus frequently undergoes rupture , as such it is the main site of chronic soft tissue rheumatism[3].

There are at least five conditions with distinct clinical features and natural history and these are :

1. Supraspinatus tendonitis or impingement syndrome .
2. Rupture of rotator cuff .
3. Acute calific tendintis .
4. Biceps tendonitis and /or rupture .
5. Adhesive capsulitis or frozen shoulder [4].

Pathophysiology : Changes in the connective tissue of patient with diabetes mellitus are due to disturbances in the structural macromolecules of the extracellular matrix. The glycation or Maillard hypothesis is achemical rather than metabolic theory on the origin of diabetes mellitus complications. Now products of glycation reaction known as advanced glycation end products (AGEs), which should accumulate in long lived tissue proteins during normal aging are accumulate at afaster rate in diabbtic due to

hyperglycemia[2].

Cross linking of collagen is also accelerated in diabetes, this measured by decrease rate of digestion of collagenase and this lead to excess collagen in the connective tissue of diabetic patient[2].

Excess of insuline and insuline like growth factors thought to stimulate calcification at entheseal sites , which are areas of increased mechanical stress[6]. It is thought that local ischemia leads to fibrocartilaginous metaplesia and deposition of crystals by chondrocytes , also it is thought that the pain is due to florid vascular reaction which produces swelling and tention in the tendon[4].

In adhesive capsulitis, the pathophysiology remain elusive.It is believed that in patient with diabetes ,the associated microvascular disease causes abnormal collagen repair .Also trauma ,the associated transient inflammatory state with granulation tissue and eventual fibrous adhesion and thickening of the capsule, may cause adhesive capsulitis[7].

Almost all the structures of the shoulder joint have been blamed to be involved in the pathology of frozen shoulder Duplay implicated the subacromial bursa, Pasteur and Lippman the biceps tendon; Codman the supraspinatus, Neviaser the inferior capsule; Depalma the coracohumeral ligament; Macnab the rotator cuff [8].

Clinical features

Supraspinatus tendinitis or impingement syndrome:

It is the most commonly diagnosed shoulder lesion (Smith and Campbell,1992). It is characterized by recurrent or chronic shoulder pain brought on by repetitive trauma or vigorous overhead activities[9]. The pain is dull over the deltoid with radiation down to the lateral aspect of the arm . three pattern of symptoms are encountered[4]:

1. Subacute tendonitis or painful arc syndrome,due to vascular congestion and edema .
2. Chronic tendonitis : recurrent pain ,due to fibrosis .
3. Cuff disruption :recurrent pain ,weakness and loss of movement due to tear in the rotator cuff.

Test :the impingement sign , pain elicited by raising of the affected arm of the patient with one hand and stabilize the scapula with the other hand.[4]

Adhesive capsulitis or frozen shoulder :

It is a relatively common disorder characterized by the spontaneous onset of shoulder pain accompanied by progressive limitation of both active and passive movement of glenohumeral joint.[10] The movements are restricted in capsular pattern

with greater loss of external rotation than abduction and internal rotation [10]. It affect more commonly diabetic patient with prevalence of 10% in type 1 and 22% in type 2, while it is only 2% in general population .[10] It affect females slightly more than males , typically between 40-60 year , the non dominant hand is more likely involved[11].

Acute calcific tendonitis:

This may follow deposition of calcium hydroxyapatite crystals in the critical zone of supraspinatus tendon . Affect patient 30-50 year , presented with aching following overuse , develope and in creasein severity within hours[4].

Bicipital tendonitis:

Usually occur together with rotator cuff impingement , tenderness is sharply localized to the biciptal groove. Test: resisted flexion with elbow straight and forearm supinated , often cause pain (speed test)[4].

Rotater cuff distruption:

In the most advance stage of the disorder may resulting in partial or full thickness tear which may follow chronic tendonitis . Passive abduction is full and once the arm has been lifted above the head, the patient can keep it by his deltoid, but when he lower it sideway it suddenly drop (drop arm test) [4].

Osteoarthritis of the acromioclavicular joint:

It is suggested that prevalence of OA is higher in young and middle age diabetic patients, and joint changes started earlier and much more sever in diabetic[2]. Test: resistant cross adduction of the forward flexed shoulder with the elbow extend , elicit pain (cross adduction test)[12].

Investigations:

1. Lab. Investigations : FBS, Bl.Urea, ESR, To evaluate the state of diabetic control and its systemic complications.[14]
2. Radiological examination :

a) Plain x-ray : it may shows erosions, sclerosis, or cyst formation in chronic tendonitis .it also may shows OA changes of acromioclavicular joint ,calcification of supraspinatus .

b) Cervical region x-ray and chest x-ray is important to exclude referred pain.

c) Ultrasonography : it can demonstrate large cuff tears, but it is heavily operated .

d) Magnetic resonance image : it shows the precise anatomy of coracoacromial arch and acromioclavicular joint and provide valuable information on the site and size of the cuff tear[4].

Thickening of coracohumeral ligament and joint capsule in the rotator cuff interval are characteristic MRI finding in frozen

shoulder[15].

Sometimes it may reveals afibrous band traversingthe glenohumeral joint space [7].

PATIENTS AND METHOD

This cross-sectional study was carried out in Sheikh Zayad Hospital on patients admitted in the medical and orthopedic wards for different causes, from September 2005-september 2006.

200 patients with established diagnosis of diabetes mellitus were included in this study. Detailed history was obtained from these patients regarding the age, sex, type of diabetes, the duration of diabetes, the dominant hand ,the complications and other associated chronic illnesses.

For the patients with shoulder problems, also we concentrated on the history of trauma or other joints involvement .For these patients we do a full physical orthopedic examination of the shoulder region with the concentration on the special tests for each suspected particular shoulder lesion, and we choose one test for each lesion as follow:

- Neer's impingement sign test: supraspinatus tendonitis.
- Painful arc test: sub acromial lesion.
- Speed's test: bicipital tendonitis.
- Cross adduction test: acromioclavicular joint pathology.
- Drop arm test: rotator cuff tears.

Also, we examine the cervical spine and neurological examination of upper limb to exclude referred pain from these sites.

This concentration on detailed history and physical orthopedic examination because we depend almost completely on the clinical diagnosis of the shoulder lesions rather than the radiological investigations ,especially MRI which is very informative but very expensive .Even simple plain x-ray which is less informative, it is not available routinely through out the period of our study .

RESULTS

During the period of study, which extended from September 2005- September 2006, 200 patients whom known cases of diabetes mellitus were included in this study .They were 116 (58%) female and 84 (42%) male.

Initially 43 cases were complaining from shoulder pain and/or stiffness ,but after exclusion of 2 cases as they were a referred pain , 2 cases as a part of generalized osteoarthritis with the other joints involvement , and 1 case was post traumatic stiffness .So we left with only 38 cases (19%) with shoulder lesions ,from these 26 cases (68,4%) were female and 12 cases (31,6%) were male. Regarding the type of diabetes, they were 34 cases (89, 5%) type II (non insulin dependant diabetes mellitus) and only

4 cases (11, 5%) were type I (insulin dependant diabetes mellitus).

The mean age of the affected patients was (56, 2) years, while the mean age of the non affected patients was (46) years .The mean of the duration diabetes in the affected group was (10) years, while the mean duration of diabetes in the non affected group was (5, 8) years.

The most common shoulder lesion in this study was supraspinatus tendonitis ± bicipital tendonitis, 24 cases (63, 15%), of these 24 cases (9) cases (75%) were male and (15) cases (57, 7%) were female.

Frozen shoulder, the second lesion affecting the shoulder in this study, was only 1 case (8, 3%) in male and 7 cases (26, 9%) in female.

Of these 38 cases, 20 cases (52, 63%) the lesion was on the dominant hand, 11cases (28, 95%) the lesion was on the non dominant hand and 7 cases the lesion was bilateral.

Table 1: the distribution of the types of shoulder lesions

Type of shoulder lesion	Number of cases	Male	female
Supraspinatus ± bicipital tendonitis	24 (63, 15%)	9 (75%)	15 (57, 7%)
Frozen shoulder	8 (21,07%)	1 (8, 33%)	7 (26, 92%)
Acromioclavucular O.A	5 (13, 15%)	2 (16, 67%)	3 (11, 54%)
Rotator cuff tear	1 (2, 63%)	----------	1 (3, 84%)
total	38 (100%)	12 (100%)	26 (100%)

Table 2: shoulder lesions in the dominant & non dominant hand.

Number of cases	Dominant hand	Non dominant hand	Bilateral	Total
Male	5 (41, 67%)	3 (25%)	4 (33, 33%)	12 (100%)
Female	15 (57, 69%)	8 (30, 77%)	3 (11, 54%)	26 (100%)
Total	20 (53, 63%)	11 (28, 95%)	7 (18, 43%)	38 (100%)

DISCUSSION

Shoulder lesions are a common problem among patients with diabetes mellitus with a prevalence rate of (19%) in this study, really we couldn't found another study about shoulder lesions in diabetes mellitus, but most of the study in this issue said that frozen shoulder is much more common in patients with diabetes mellitus with a prevalence of (10-22%) ,while it is only (2,5%) in general population as in the study by B Galarraga .

The mean age of the affected patient (56,2) years with more female /male ratio (2,2:1) , (68,4%) female & (31,6%) male and this

goes with the results of Simeon Niel Asher[11] & B Galarraga[10] .

The mean duration diabetes ,in this study, in the affected patients was (10) years , while in the non affected patients it was (5,8) years and from these ,we can say that shoulder lesions are more common with patients with the long duration of diabetes in the middle age group .This results goes with that of LL Smith et al .

In our study we found that shoulder lesions were much more in type II diabetes (89,5%) , while only (11,5%) in type I .This results goes with the most of other studies on frozen shoulder like that by Salil K Pal et al & B Galarraga (22%) for type II and (10%) for type I , but does not goes with the results of other studies by Albert W Pearsall and Sanjay S.Desai as they found that it is more common in type I diabetes (36%) .

From this study we found that ,the most common lesion was the supraspinatus tendonitis ± bicipital tendonitis (63,15%) , more commonly affecting male (75%) , while female although it is the most common shoulder lesion ,but it is only (57,7%) . Actually we couldn't found a direct relation between tendonitis and diabetes mellitus , but in general the most common cause of shoulder pain is tendonitis of rotator cuff as demonstrated by the study of Lori B.Siegel *et al* [7].

Frozen shoulder in our study was more common in female (26, 9%), while it is only (8, 3%) in male and this is corresponding to the results of other studies like that of BGalarraga [10].

The dominant hand was involved in (52, 63%) of the affected patients, (28, 95%) for the non dominant hand and in (18, 42%) of patients the lesion was bilateral. In other studies on frozen shoulder like by Simeon Niel Asher [11], they demonstrated a higher incidence in the non dominant hand, but in other as in the study by B Galarraga he found that bilateral involvement is much more common.

CONCLUSION

Shoulder lesions are common and important musculoskeletal problem and they are more common in patients diabetes mellitus, especially type II.

The most common shoulder lesion was supraspinatus tendonitis ± bicipital tendonitis, followed by frozen shoulder.

From the results we can say that shoulder lesions are common among middle age patients with long duration of diabetes .the dominant hand being the most commonly affected, followed by bilateral involvement.

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