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Current prevalence of rotator cuff tear in Type 2 diabetes mellitus patients and its association with type of diabetic drug regime (OHA'S vs. insulin therapy) – A prospective study

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ABSTRACT

Background: A prospective study to assess the prevalence of rotator cuff (RC) tears in patients with Type 2 diabetes mellitus. **Aims and Objectives:** The purpose of this study is to assess the prevalence of RC tear in Type 2 diabetes mellitus patients presenting with shoulder pain to the outpatient clinic. **Materials and Methods:** A total of 100 diabetic patients with shoulder pain and restriction of movements formed the study group and were prospectively studied using magnetic resonance imaging and were evaluated with regard to the presence of RC tear. The factors that were analyzed included HBA1C levels, duration of diabetes, and type of diabetic medication. All these factors were evaluated with regard to their correlation with RC tear. **Results:** In our study, we found that the prevalence of RC tear was 37% and there seemed to be a significant correlation between HBA1C levels (P = 0.007) as well as prolonged duration of diabetes (P = 0.006) with RC tear. It has been established in our study that the occurrence of RC tear is lesser in oral hypoglycemic agents group as compared to insulin group in treating diabetic patients. **Conclusion:** One independent risk factor for RC tear is diabetes. The prevalence of RC tear is higher in the diabetic population with increased HBA1c levels and prolonged duration of diabetes mellitus. Metformin usage in diabetes mellitus has been associated with reduced incidence of RC tear due to diminished impregnation of advanced glycation end products with in the RC tendon.

Key words: Rotator cuff tear; Oral hypoglycemic agents; Insulin; Diabetes mellitus; Shoulder pain

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INTRODUCTION

Shoulder pain is one of the most common complaints of diabetes patients, which causes movement restriction, functional disability and reduction in quality of life.[1] Diabetic patients have a higher prevalence of shoulder diseases, with the most common disabling shoulder diseases being adhesive capsulitis and rotator cuff (RC) tendinopathy.[2] The purpose of this study is to assess the prevalence of RC tear in Type 2 diabetes mellitus patients presenting with shoulder pain to the outpatient clinic.

Aims and objectives

To assess the current prevalence of rotator cuff tear in TYPE 2 diabetes mellitus patients with shoulder pain.

MATERIALS AND METHODS

A total of 100 diabetic patients with shoulder pain and restriction of movements formed the study group and were prospectively studied using magnetic resonance imaging imaging and were evaluated with regard to the presence

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of RC tear. The factors that were analyzed included HBA1C levels, duration of diabetes, and type of diabetic medication. All these factors were evaluated with regard to their correlation with RC tear.[3]

Inclusion criteria

1. All patients with diabetes having shoulder pain and stiffness
2. H/O Diabetes for more than 1 year
3. Age more than 18 years
4. Patients presenting without H/o trauma.

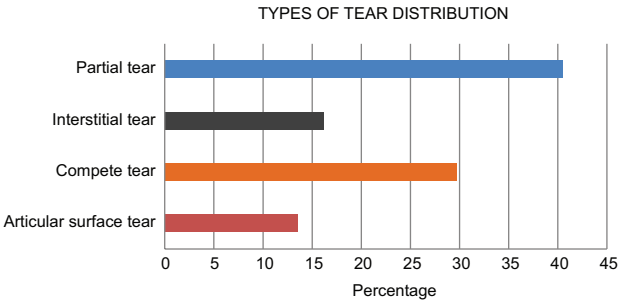
Exclusion criteria

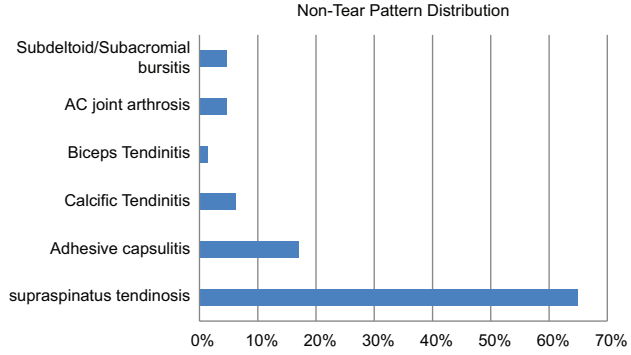
1. Patients without diabetes
2. Patients with H/O trauma
3. Post-operative cases
4. H/O massage
5. Patients with H/O malignancies
6. Referred pain to the shoulder
7. H/O Rheumatoid disorders.

RESULTS

The types of RC tear distribution were articular surface tear is 13.5%, complete tear is 29.7%, interstitial tear is 16.2%, partial tear is 40.5%, and types of non-tear distribution were supraspinatus tendinosis (65%), adhesive capsulitis (17%), calcific tendinosis (6.3%), acromial clavicular (AC) joint arthrosis (4.7%), sub-acromial/subdeltoid bursitis (4.7%), and Biceps tendinitis (1.5%) (Table 1).

Table 1: The below horizontal bar diagram shows types of rotator cuff tear distribution and non-tear pattern distribution among the study group





The comparison of types of tears between oral hypoglycemic agents (OHA) and insulin group was done by the Pearson's Chi-square test. The results were χ^2=6.745, P=0.009<0.01,

Table 2: The below-stacked bar diagram shows comparison of type of tear between medication

Variable	Tear	N	Mean	SD	t-value	P-value
HBA1C	Present	37	9.2	1.4	2.759	0.007**
	Absent	63	8.4	1.4		

**Highly statistical significance at P<0.01 level

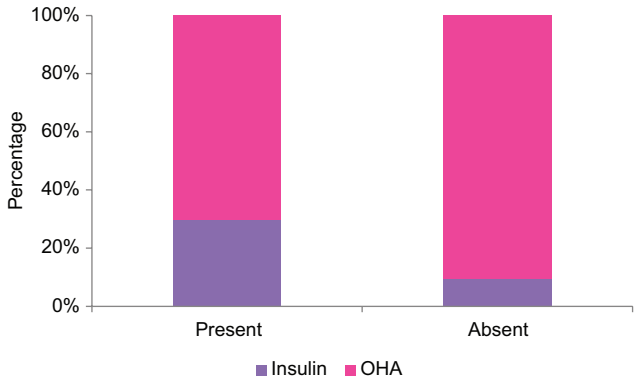
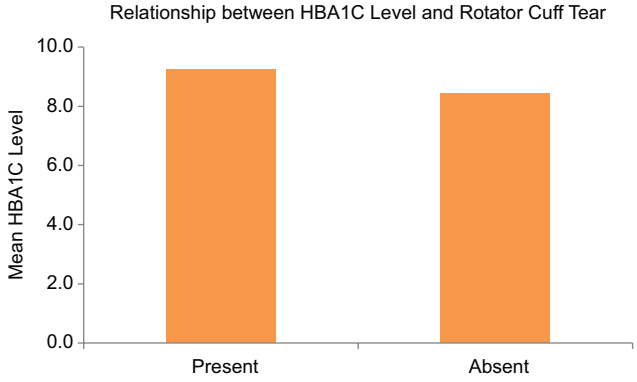


Table 3: The below vertical bar diagram shows HBA1C level and tear comparison

	Tear		Total	χ^2-value	P-value
	Present	Absent			
Medication					
Insulin					
Count	11	6	17	6.745	0.009**
%	29.7%	9.5%	17.0%		
OHA					
Count	26	57	83		
%	70.3%	90.5%	83.0%		
Total					
Count	37	63	100		
%	100.0%	100.0%	100.0%		

**Highly statistical significance at P<0.01 level



which indicates a significant statistical difference between medication and tear (Table 2).

The relationship between HBA1C levels and RC tear were established. Unpaired t-test was used, and the results were t-value=2.759, P=0.007<0.01 which shows highly statistical significance difference at P<0.01 level (Table 3).

DISCUSSION

A total of 100 diabetic patients formed the study group. This included 42 females and 58 males. The most common complaint in this study was shoulder pain and restriction of movements.[4] Although most studies agree that adhesive capsulitis is the primary cause of painful shoulder stiffness in people with diabetes, it is reasonable to propose that RC tear is one of the predominant causes of shoulder pain in the diabetic population.

Our study which was done among the diabetic population showed the prevalence of RC tear as 37% which goes in line with Ken Yamaguchi et al.,[5] study except for the age group involved. Our study shows increased incidence in the younger age group. We also found the distribution of different types of tear as follows: Articular surface tear is 13.5%, complete tear is 29.7%, interstitial tear is 16.2%, and partial tear is 40.5%. As well as types of non-tear distribution are as follows, Supraspinatus tendinosis (65%), adhesive capsulitis (17%), calcific tendinosis (6.3%), AC joint arthrosis (4.7%), sub-acromial/subdeltoid bursitis (4.7%), and Biceps tendinitis (1.5%), respectively.[6]

Zdenka Turk, Irena Mišur, Nikša Turk, and Bojan Benko et al., conducted study and showed that the amount of AGE products in tendons increased with diabetes and decreased when glycemic status was controlled.[7-9]

In our study, we also found that there is a higher prevalence of RC tear in patients with prolonged duration of diabetes (mean 7.8 years).[10]

Renin Changa, Ting-Yu Tuc, et al., conducted a study and found that metformin use is associated with a lower risk of RC disease in patients with Type 2 diabetes mellitus patients with.[11]

Our study also found a statistically significant correlation that the prevalence of RC tear is lower in patients taking oral hypoglycemics establishing a low prevalence of RC tear in OHA'S group.

Limitations of the study

Sample size is too low.

Sample size of comparing OHA and insulin group has not get much significance because of the unfavorable comparative sample size.

CONCLUSION

Diabetes acts as an independent risk factor for RC tear. In our study, we found the prevalence of RC tear as 37%. Patients with uncontrolled diabetes are potentially at higher risk of shoulder pain and RC tear. The prevalence of RC tear is higher in the diabetic population with increased HBA1c levels and prolonged duration of diabetes mellitus. Metformin has been associated with reduced incidence of tendinopathy and it has a role in the prevention of RC disease. This inference leads us to propose that strict glycemic control along with the use of OHA's might prevent RC tear among the diabetic population.

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Authors' Contributions:
AS- Concept and design of the study, clinical protocol, data collection, analysis and contribution, literature survey, manuscript preparation; **PKK**- Manuscript revision, editing, final drafting and submission of article; **BVK**- Concept, statistical analysis, and interpretation, reviewed the literature; **VM**- Preparation and final drafting of the manuscript, review manuscript, coordination, and revision of the manuscript.

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