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Case Control Combinative Analysis of Heel Pain Due To Calcanial Spur in Patients With T2DM and Obesity

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Abstract:
Introduction: *Patients suffering from heel pain feels like walking on a sharp object in the first few steps after gets up from sleep or a brief rest but disturb the routine and in its severe form force the patient to crawl this suffering given the consensus to categorize, analyze the factors responsible for these sufferings. The factors like traumatic, neurologic,arthritic,metabolic, and others were excluded only patients with Type 2 Diabetes mellitus (T2dm) and Obesity were included. The prevalence of heel pain in general population range from 3.6 to 7%*
Methods*: This study was conducted in the Out Patient Department of Orthopedics'HEEL PAIN CLINIC' at Madha Medical College& Research Institute from august 2015 to august 2016 after obtaining ethical committee permission. A total 310 subjects were included in the study of which 210 were type 2 diabetics and 100 were non diabetics. Of the 210 diabetic subjects, 135 were females and 75 were males. Of the 100 non diabetics, 42 were females and 58 were males.*
Results:*Total of 210 patients in which 135 females and 75 males with Type 2 diabetes with heel pain. In diabetic subjects, 22 were newly diagnosed with diabetes, 102 were in 2-5 years category, 80 were in 6-10years duration and 6 subjects were in more than 10 years duration. Of the 210 diabetics, 36 were with HbA1c of more than 7.A control of 100heel pain patients without diabetes. Out of 210 diabetic subjects, 66 were obese with BMI more than> 30. Out of 100 non diabetic subjects, 52 were obese with BMI more than>30 , and 16 non diabetic subjects showed calcaneal spur that were also obese 2 non diabetic with normal BMI. X-Ray both feet lateral views showed 118 diabetic patients to have calcaneal spur, predominantly in more than 6 years duration of diabetes*
Conclusion: *Incidences of Calcaneal Spur seen in the x-rays and thickness of heel pad in T2DM and Obese patients were relatively increased so also the existence of diabetic neuropathy. Multidisciplinary evaluation reduces the diabetic foot complications*
Keywords: *calcaneal spur C.S, Plantar Fasciitis PF, Heel pain Type 2 D.M., Obesity,*

I. Introduction

Plantar fascia and ligaments holding the metatarsal bones form the arch of the foot gets stretched during the stance phase and back to its arched shape during the swing phase of gait. This repetitive stretching and relaxation of plantar fascia from its attachment in the calcaneum tends to form the calcaneal spur (1,4).The word "fasciitis" assumes inflammation is an inherent component of this condition. However, recent research suggests that some presentations of PF manifest non-inflammatory (10,12). There are various risk factors for the development of calcaneal spur, among which obesity and diabetes are the commonest ones. Obesity per se is a risk factor for the occurrence of diabetes (6). They both act by different mechanisms- diabetic neuropathy causing collagen alteration (13) resulting in joint rigidity (11) and obesity causing reduction in the height of the arch of the foot. But some previous studies also reveal that there is no relation between type 2 DM and calcaneal spur (5,7), therefore the aim of the study was to evaluate the incidence of spur (calcaneal) and compare its occurrence in obese and type 2DM patients

II. Material and method

This study was conducted at the Department of Orthopedics after the concurrence of the institutional ethical committee, Madha medical college and research institute Chennai in Aug 2015 to Aug 2016

Participants: The participants were selected with severe heel pain while taking up a foot step after a sleep or after a brief period of rest , Obese Class 1type BMI above >30 kg/m2 , T2DM, age 18 years and above who were able to answer the questionnaire. Patients with trauma,arthritic, neurogenic, other vascular diseases were excluded. Data's from demographic and diabetic status were collected. All patients were taken clinical, biochemical, and X- Ray of the feet lateral views and peripheral neurological and vascular status were evaluated. Standing height and weight by which BMI were calculated.

III. Statistical Analysis

All the statistical analysis was interpreted by using Statistical Package for the Social Sciences (SPSS). For each descriptive variable, the mean, standard deviation, frequency and proportion of the total study population with that variables were calculated. To examine the variables by Calcaneal spur, and sex, categorical variables were analyzed using the X2 test, continuous variables were analyzed using test, and continuous variables with skewed distribution were analyzed using the Mann Whitney U- test. Correlations between the variables were calculated via Spearman correlation test. a significant level of 0.05was used in all analysis.

IV. Results

Total of 210 patients in which 135 females and 75 males with Type 2 Diabetes and with heel pain. In diabetic subjects, 22 were newly diagnosed with diabetes, 102 were in 2-5 years category, 80 were in 6-10years duration and 6 subjects were in more than 10 years duration. Of the 210 diabetics, 36 were with HbA1c of more than 7. A control of 100heel pain patients without diabetes. Out of 210 diabetic subjects, 46 were obese with BMI more than 30. Out of 100 non-diabetic subjects, 52 were obese with BMI more than 30, and16 non-diabetic subjects showed calcaneal spur that were also obese and 2 with calcaneal spur with normal BMI. X-Ray both feet lateral views showed 118 diabetic patients to have calcaneal spur, predominantly in more than 6 years duration of diabetes.

Chart1: The correlation of duration of Diabetes Mellitus with incidence of calcaneal spur (Table 1) shows that the maximum number of cases in those with duration of Diabetes between 2 -5 years – 60 people out of 210. 52 out of 210 belong to category of 6- 10 years of duration of T2DM, 4 out of 210 belong to newly diagnosed category and 3 out of 210 belong to more than 10 years of T2DM category.

Table 1 -Duration of DM with calcaneal spur

Duration Of DM	No. of Patients	Calcaneal Spur	Percentage
New	22	4	18%
2 to 5 Years	102	60	59%
6 to 10 years	80	52	65%
>10Years	6	2	33%

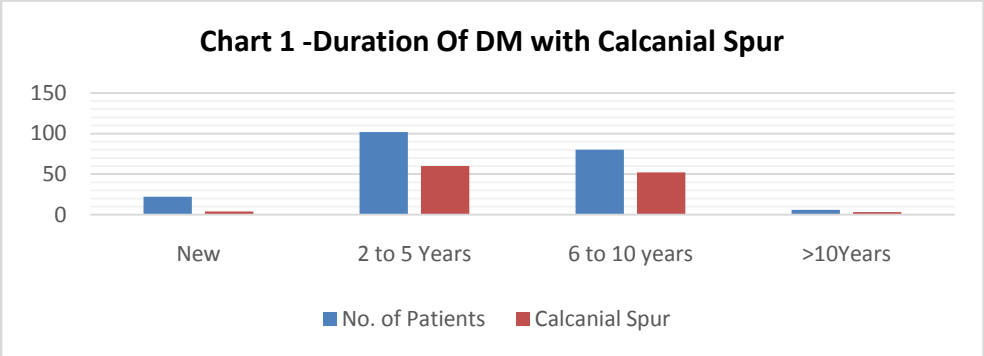


Chart 2: out of the 210 diabetic patients, about 118 patients (i.e.) accounting to 56%, had calcaneal spur. Whereas, among the non-diabetic control of 100 people, only18 people (i.e.) 18% had calcaneal spur.

Table 2 -Diabetic & Non- Diabetic with calcaneal spur

Type	Number	calcaneal Spur
Diabetic	210	(56%)118
Non-Diabetic	100	(18%)18

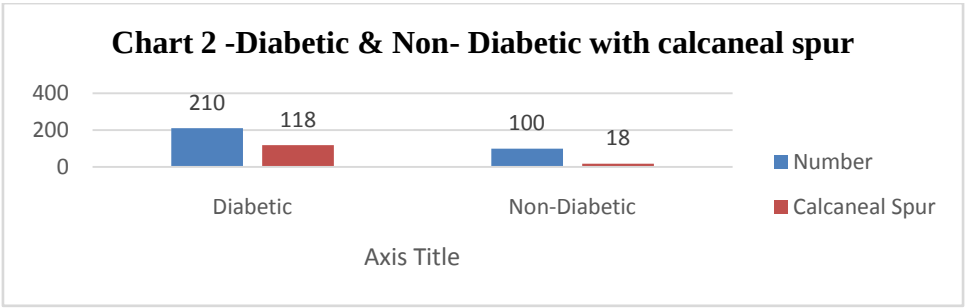
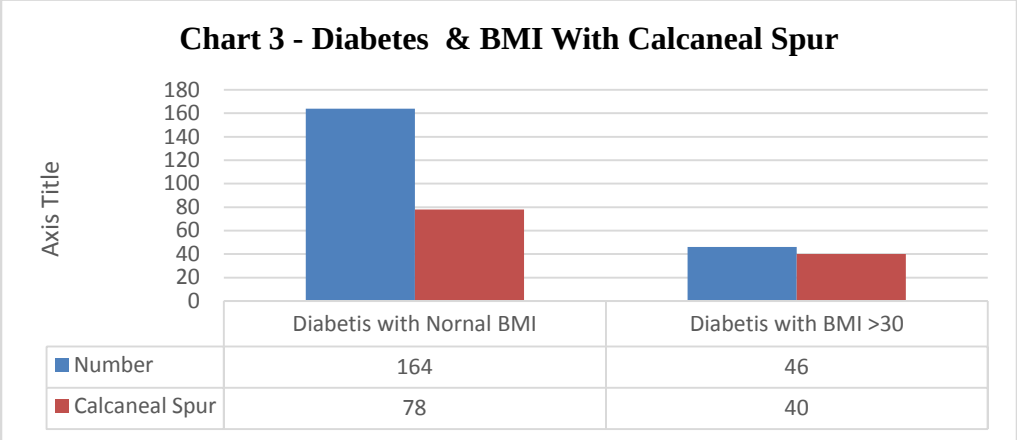


Chart 3: Among the Diabetic patients, those with normal BMI (i.e. <30) were 164, out of which 78 (47%) had calcaneal spur. Those with BMI more than 30 were 46 patients, out of which 40 (86%) have calcaneal spur.

Chart 3 - Diabetes& BMI With Calcaneal Spur		
Type	**Number**	**Calcaneal Spur %**
Diabetes with Normal BMI	164	78 (47%)
Diabetes with BMI >30	46	40 (86%)



V. Discussion

This study reveals a positive correlation between Diabetes Mellitus and calcaneal spur with the occurrence of calcaneal spur at 56% in diabetes compared to 18% in non-diabetic control group. Also, the occurrence is higher in those with duration of diabetes of 2 to 10 years. This correlation may be owing to the fact that, thickening of plantar fascia (2) has been shown in patients with T2DM (3) and Diabetes neuropathy also causes muscle atrophy, increased joint rigidity collagen alteration in fascia and tendons and non enzymatic glycosylation of keratin (11). We also found that the occurrence of calcaneal spur seems to be higher in obese patients (5, 8). This supports the finding of previous studies (3,9) increased vertical heel pressure, accelerated degenerative processes and flattening of the medial longitudinal arch in obese patents. However, there are several limitations to our study this is a cross sectional study with a smaller number of people, and the results will not prove the correlation between calcaneal spur and obesity and Diabetes. It is not conclusive hence; further studies with large populations are needed to evaluate the occurrence of calcaneal spur in Diabetes and Obesity.

VI. Conclusion

The radiological appearance of Calcanial spur is related with obesity, increasing age, T2DM, peripheral neuropathy such patients has to be closely followed by screening complication of diabetes to keep the diabetes status under controlWeight reduction is encouraged .Treating specialist should pay more attention to the increased incidence of Calcanial spur in patients with T2DM and to avoid all the possible diabetic foot complication

Conflict of interest: Nil

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