

Prevalence of plantar fasciitis and calcaneal spurs in obese diabetics – a cross sectional study

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Abstract

Background: Plantar fasciitis (PF) is a degenerative syndrome of the plantar fascia resulting from repeated trauma at its origin on the calcaneus. PF is reported to be the most common cause of inferior heel pain in diabetic and non diabetic patient population. Calcaneal spurs (CS) have commonly been implicated as a risk factor for PF. To this purpose we have evaluated the frequency of Calcaneal spur (CS) in obese patients with Type-2 diabetes.

Methods: Both male and female Obese (BMI ≥ 30 kg/m²), type 2 diabetic patients above the age of 18 years, with a history of plantar heel tenderness and/or pain beginning in the morning or while performing activity after periods of rest were included in the study. Patients with any history of trauma to the heel within the previous 3 months, symptoms lasting less than six months, pregnancy, chronic inflammatory diseases, vascular diseases, malignant diseases, lymphatic edema, any skin lesion over the plantar aspect of the heel, who had received a steroid injection or orthotic device or performing stretching exercises or using heel pads within the previous 3 months were excluded. All patients underwent peripheral neuropathy examination and Calcaneal x-rays. Peripheral neuropathy was assessed by thermal threshold testing for hot and cold in the left foot, vibration threshold in the left medial malleolus and left great toe and microfilament test.

Results: A total of 64 obese diabetic patients were included into the study. The mean age of the patients was 54 ± 5.6 years. There were 24 males and 40 females. The median duration of diabetes was 4.2 years (1-10 years). The mean HbA1c was 8.4 ± 0.9 . Among them 21(32.8%) were having peripheral neuropathy, 50(78%) plantar fasciitis while 41(64.3%) were having calcaneal spur.

Conclusion: The presence of peripheral neuropathy and poor diabetes control seems to be the main reasons of CS formation. CS existence seems to be in a relationship with diabetic complications; therefore, obese diabetic patients may be more prone to these complications. Therefore, weight reduction should be encouraged in these patients not only for metabolic control but also for the development of CS.

Keywords: Plantar fasciitis (PF), Calcaneal spur (CS), Heel Pain, Obesity, Diabetes Type-2

Introduction

Plantar fasciitis (PF) is a degenerative syndrome of the plantar fascia resulting from repeated trauma at its origin on the calcaneus. PF is reported to be the most common cause of inferior heel pain in diabetic and non diabetic patient population.⁽¹⁻²⁾ Calcaneal spurs (CS) have commonly been implicated as a risk factor for PF. Approximately one-half of patients diagnosed with PF have heel spurs.⁽³⁾ Calcaneal spur (CS) is a small osteophyte (bone spur) located on the calcaneus (heel bone) causes severe heel pain on walking and causes morbidity.

An inferior calcaneal spur is located on the inferior aspect of the calcaneus and is typically a response to plantar fasciitis over a period, but may also be associated with ankylosing spondylitis (typically in children). A posterior calcaneal spur develops on the back of the heel at the insertion of the Achilles tendon. A posterior calcaneal spur is often large and palpable through the skin and may need to be removed as part of the treatment of insertional Achilles tendonitis. CS was diagnosed by clinically clinical examination of foot and confirmed by a radiological evaluation.

Aydoğan aydoğdu et al⁽⁴⁾ has shown that CS occurs commonly in patients with obese diabetes. Roxas M⁽⁵⁾ studies have identified obesity or sudden weight gain, reduced ankle dorsiflexion, pes planus, and occupations that require prolonged weight-bearing as the greatest risk factors associated with CS syndrome. To this purpose we have evaluated the frequency of calcaneal spur (CS) in obese patients with Type-2 diabetes.

Materials and methods

This cross sectional study was conducted in the department of orthopedics during the period September 2012 and November 2013. Institutional Ethical committee has approved the study protocol. Both male and female

Obese (BMI ≥ 30 kg/m²), type 2 diabetic patients above the age of 18 years, with a history of plantar heel tenderness and/or pain beginning in the morning or while performing activity after periods of rest were included in the study. Patients with any history of trauma to the heel within the previous 3 months, symptoms lasting less than six months, pregnancy, chronic inflammatory diseases, vascular diseases, malignant diseases, lymphatic edema, any skin lesion over the plantar aspect of the heel, who had received a steroid injection or orthotic device or performing stretching exercises or using heel pads within the previous 3 months were excluded. Demographic and duration of diabetes data was collected from the patients. Additionally, laboratory data as available from records were also noted. All patients underwent peripheral neuropathy examination and Calcaneal x-rays. Peripheral neuropathy was assessed by thermal threshold testing for hot and cold in the left foot, vibration threshold in the left medial malleolus and left great toe and microfilament test. Peripheral nerve abnormalities were defined as 95% of the normal range in a non-diabetic adolescent control group (15). Standing height and body weight were measured in light indoor clothing without shoes. Body mass index (BMI) was calculated as weight divided by height squared (kg/m²).

Statistical analysis

Data was entered in excel spread sheet 2007. Statistical analysis was performed using SPSS-16. Data was described as the mean, standard deviation, frequency, and proportion. CS and sex, categorical variables were analyzed using the χ^2 test; continuous variables were analyzed using the t test, and Mann-Whitney U-test. Correlations between variables were calculated via Spearman correlation test. A significance level of 0.05 was used in all analyses.

Results

A total of 64 obese diabetic patients were included into the study. The mean age of the patients was 54 ± 5.6 years. There were 24 males and 40 females. The median duration of diabetes was 4.2 years (1-10 years). The mean HbA1c was 8.4 ± 0.9 . Among them 21(32.8%) were having peripheral neuropathy, 50(78%) plantar fasciitis while 41(64.3%) were having calcaneal spur.

The clinical, neurological and radiological features were described in table-1.

Discussion

The aim of this study was to evaluate the prevalence and correlates of plantar calcaneal spurs in obese diabetic population. As obesity is a well-recognized risk factor for heel pain. CS range has been previously reported as 11%-16% in young to middle-aged healthy populations.⁽⁶⁻⁷⁾ The strongest association with calcaneal spurs was obesity, with 45% of participants classified as obese having spurs, compared to only 9% of those who were not obese. The range of CS (70%) in our obese patients with T2DM is in accordance with Bassiouni, who reported a 72% incidence rate of CS in patients with

rheumatologic disorders above the age of 61.⁽⁸⁾

Diabetes mellitus was reported as a risk factor for CS in this meta-analysis. Thickening of the plantar fascia has been shown in patients with T2DM.⁽⁹⁾ Diabetes duration and HbA1c levels were significantly different within the T2DM group, with regard to the presence of CS. This can be explained by the fact that it is difficult to predict the time for the onset of T2DM and consequently the duration of the disease. T2DM may have existed in a patient for a long time before the diagnosis. HbA1c may change gradually in patients with lifelong T2DM. The existence of peripheral neuropathy, increasing age, and higher BMI, seem to be the main reasons of CS formation⁽⁴⁾ CS may have a relationship with different diabetic complications. These patients may be prone to foot ulcers.

Study Limitations

Caution has to be executed in interpreting our results because of small sample size was not randomly selected, so the prevalence of calcaneal spurs reported here may not be generalisable to the broader community.

Table 1: The clinical, neurological and radiological features.

	All patients (n=64)	Diabetes \leq 4 years (n=30)	Diabetes > 4 years (n=34)	P value
Patients (M/F)	24/60	11/19	13/21	ns
Age (years)	55 ± 11.5	52 ± 10.5	56 ± 8.0	ns
BMI (kg/m ²)	31.1 ± 3.3	33.1 ± 4.3	31.1 ± 3.3	ns
HbA1c (%)	8.4 ± 0.9	7.6 ± 0.9	9.4 ± 1.2	<0.05
Fasting glucose(mg/dL)	145.4 ± 24.0	126.5 ± 8.3	150.4 ± 24.0	<0.05
Neuropathy positive	21(32.8%)	7 (23.3%)	14 (43.7%)	<0.05
Calcaneal spur- positive	41(64.3%)	12 (39.7%)	29 (86.9%)	<0.05
Plantar fasciitis present	50(78%)	21 (70%)	29 (86.9%)	<0.05

Conclusion

The presence of peripheral neuropathy and poor diabetes control seems to be the main reasons of CS formation. CS existence seems to be in a relationship with diabetic complications; therefore, obese diabetic patients may be more prone to these complications. Therefore, weight reduction should be encouraged in these patients not only for metabolic control but also for the development of CS.

Conflict of interest: None**References**

1. Cornwall MW, McPoil TG. Plantar fasciitis: etiology and treatment. *J Orthop Sports Phys Ther* 1999; 29:756-76
2. Singh D, Angel J, Benthall G, Trevino SG. Fortnightly review. Plantar fasciitis. *BMJ* 1997;315:172-173.
3. DeMaio M, Paine R, Mangione RE, Dre/D Jr. Plantar fasciitis. *Orthopedics* 1993;16:1153-1163.
4. Aydoğan aydoğdu¹, halil akbulut², tolga ege³, ilker taşçı⁴, derun ertuğrul⁵, ümit aydoğan¹, abdullah taşlipinar², increased calcaneal spur frequency in patients with obesity and Type-2 Diabetes Mellitus. *Turk J Phys Med Rehab* 2014;60:12-6
5. Roxas M. Plantar fasciitis: diagnosis and therapeutic considerations. *Alternative medicine review: a journal of clinical therapeutic*. 2005 Jun;10(2):83-93.
6. Riepert T, Drechsler T, Schild H, Nafe B, Mattern R. Estimation of sex on the basis of radiographs of the calcaneus. *Forensic Sci Int* 1996; 77:133-40.
7. Irving DB, Cook JL, Menz HB. Factors associated with chronic plantar heel pain: a systematic review. *J Sci Med Sport*. 2006; 9:11–22. doi: 10.1016/j.jsams.2006.02.004.
8. Bassiouni M. Incidence of calcaneal spurs in osteo-arthritis and rheumatoid arthritis and in control patients. *Ann Rheum Dis* 1965; 24:490-3.
9. Craig ME, Duffin AC, Gallego PH, Lam A, Cusumano J, Hing S, et al. Plantar fascia thickness, a measure of tissue glycation, predicts the development of complications in adolescents with type-1 diabetes. *Diabetes Care* 2008; 31:1201-6.