

Radiological characteristics of the calcaneal spurs in psoriatic arthritis

D.D. Gladman¹, M. Abufayyah²,
D. Salonen³, A. Thavaneswaran⁴,
V. Chandran⁵

¹University of Toronto, Toronto Western Research Institute, and Director, Psoriatic Arthritis Program, University Health Network;

²Clinical Research Fellow Psoriatic Arthritis Program, University Health Network. Currently King Faisal Specialist Hospital & Research Center, Jeddah, Saudi Arabia;

³Department of Radiology, University Health Network, Toronto Western Hospital, Toronto, Ontario, Canada;

⁴Biostatistician, Psoriatic Arthritis Program, University Health Network;

⁵University of Toronto, Deputy Director, Psoriatic Arthritis Program, University Health Network.

Dafna D. Gladman, MD, FRCPC
Mohammed Abufayyah, MD
David Salonen, MD

Arane Thavaneswaran, MMath
Vinod Chandran, MBBS, MD, DM, PhD

Please address correspondence to:

Dr Dafna D. Gladman,
Centre for Prognosis Studies in the
Rheumatic Diseases,
Toronto Western Hospital,
399, Bathurst Street,
1E-410B Toronto,
Ontario, M5T 2S8 Canada.

E-mail: dafna.gladman@utoronto.ca

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ABSTRACT

Objective. *Inflammation at the entheses is a distinguishing feature of psoriatic arthritis (PsA). Enthesitis at the heel is the most common location at the Achilles and plantar fascia insertions on the calcaneus. This study aimed to 1) describe the morphological features and measurements of plantar calcaneal spurs in subjects with PsA and controls and 2) determine radiological features that differentiate between inflammatory and non-inflammatory calcaneal spurs.*

Methods. *Weight bearing lateral foot radiographs of 101 subjects with PsA and 38 control subjects without inflammatory arthritis were examined for plantar calcaneal and Achilles spurs. Three measurements were taken from each radiograph: plantar spur base, mid-segment, and length in millimeters. The differences in radiographic measurements, and the presence of fluffy periostitis of the plantar spurs were then compared between PsA patients and controls.*

Results. *Of the 101 subjects with PsA, 76 (75%) had at least one plantar calcaneal spur and 32 (31.5%) had at least one Achilles tendon spur, compared to 18 (47%) and 3 (8%) respectively in control group ($p=0.004$). Fluffy plantar periostitis was identified in 14 PsA subjects and none of the controls ($p=0.01$). The dimensions of plantar spurs were significantly different between groups – longer mid-segment distinguished patients with PsA from controls.*

Conclusion. *Calcaneal spurs are more common in subjects with PsA than controls. Longer mid-segment measurement was associated with PsA. This study indicates that the presence of fluffy plantar periostitis and broad based and longer mid-segment dimensions are radiological features for inflammatory spurs.*

Introduction

Inflammation at the entheses is a distinguishing feature of psoriatic arthritis (PsA) (1). Enthesitis at the heel is the most common location occurring at either the Achilles or plantar fascia insertion on the calcaneus, and presenting with irregular spiculated bony proliferation. It has been suggested that

the presence of erosions, and the often exuberant appearance of the calcaneal spurs, helps to distinguish inflammatory spurs which occur in spondyloarthritis including PsA, from those seen in patients with diffuse idiopathic skeletal hyperostosis (DISH) and osteoarthritis (OA) (2). Since patients with PsA may also have coexistent OA and DISH, it is important to identify differentiating features which would help recognise those spurs related to the inflammatory process. There is little information on the characteristics of spurs occurring among patients with PsA.

This study therefore aimed to:

1. describe the morphological features and measurements of plantar calcaneal spurs on weight bearing lateral foot radiographs in subjects with PsA and controls and
2. determine radiological features that differentiate between inflammatory and non-inflammatory calcaneal spurs.

Methods

Patient selection

Patients with PsA followed at the University of Toronto PsA clinic were recruited. Patients are followed at the clinic at 6–12 month intervals at which time a complete history, physical examination and laboratory assessments are carried out. Radiographs are taken every 2 years, including weight bearing lateral foot radiographs. Patients who were recorded as having spurs were identified.

Controls were patients *without* inflammatory arthritis who had foot radiographs taken for other indications. These included patients with osteoarthritis or orthopedic conditions.

Assessments

Weight bearing lateral foot radiographs were performed and examined for plantar and Achilles spurs. The presence of spurs was recorded by one observer (MA) who was instructed by DS, a musculoskeletal radiologist. A reliability study was not performed as it has been shown that spurs are recognised reliably by rheumatologists (3). Three measurements were taken from each radiograph: plantar spur base, mid-segment length, and length of the

Competing interests: none declared.

entire spur in millimeters as shown in Figure 1. The presence of fluffy periostitis was documented.

Statistical analysis

The differences in radiographic measurements, and the presence of fluffy periostitis of the plantar spurs were then compared between PsA patients and controls using *t*-tests and Chi-squared analysis.

Results

One hundred and one patients with PsA and 38 controls were included. Their characteristics are described in Table I. Of the 101 subjects with PsA, 76 (75%) had at least one plantar calcaneal spur and 32 (31.5%) had at least one Achilles tendon spur, compared to 18 (47%) and 3 (8%), respectively in control group ($p=0.004$). The presence of fluffy plantar periostitis was identified in 14 PsA subjects but in none of the controls ($p=0.01$) (Table II). The dimensions of plantar spurs were significantly different between groups (Table II). The base and mid segment of the spurs in PsA patients was wider than that in controls.

Discussion

Calcanei are the most common sites for bony spurs. In a study of 121 adults from a prehistoric hunter-gatherer population calcaneal spurs were scored as present or absent on the dorsal or plantar side and analysed in regards to their relationships with age, sex, osteoarthritis, cortical index, femoral head breadth and muscle markers (4). The study demonstrated that calcaneal spurs frequencies increased with age, and there was a positive correlation with osteoarthritis in both upper and lower limbs. Associations between the presence of calcaneal spurs and sex, body mass index, radiographic measures of foot posture, self-reported co-morbidities and current or previous heel pain were explored in a study of 140 women and 76 men aged 62-94 (5). Of the 216 participants, 119 (55%) had at least one plantar calcaneal spur and 103 (48%) had at least one Achilles tendon spur. Those with plantar calcaneal spurs were more likely to have Achilles tendon spurs.



Fig. 1. Measurements of the Dimensions of Spurs. A: plantar spur base; B: mid-segment length; C: length of the entire spur.



Fig. 2. Fluffy spurs about the calcaneous.

There was no gender effect but plantar spurs correlated with obesity and osteoarthritis.

When spurs are identified among patients with PsA the question is whether these are related to the underlying disease or are due to concurrent conditions such as DISH or OA.

A recent study documented a relationship between plantar fasciitis and calcaneal spurs (6). A study comparing patients with plantar fasciitis with healthy controls found that calcaneal spurs were common in both groups, albeit more frequent in the plantar fasciitis group (85% vs. 46%). However,

plantar fascia thickness and fat pad abnormalities resulted in the best group differentiation ($p<0.0001$) with sensitivity of 85% and specificity of 95% for plantar fasciitis (7).

Our study provides further evidence that calcaneal spurs are associated with PsA. Although the frequency of spurs in the controls was high (at least one plantar spur occurred in 31.5% of the patients, it was significantly higher among the patients with PsA at 75%, similar to the differences noted by Osborne *et al.* who compared patients with plantar fasciitis to those without the clinical complaint (7). There was also a

Table I. Demographic features of patients and controls.

Variable	PsA		Controls		p-value
	Mean (SD) or frequency (%)				
	n=101		n=38		
Sex	Males	65 (64.4%)	15 (39.5%)		0.008
	Females	36 (35.6%)	23 (60.5%)		
Age		41.1 (10.8)	49.2 (14.7)		0.003
Obesity		42 (44.7%)	6 (46.1%)		0.92
DISH		4 (4.0%)	0 (0.0%)		0.21

Table II. Spurs and their measurements in PsA and controls.

Variable	PsA		Controls		p-value
	Mean (SD) or frequency (%)				
	n=101		n=38		
Plantar Spurs		76 (75.0%)	18 (47%)		0.0024
Bilateral		56	11		
Unilateral		20	7		
Fluffy Plantar Spurs		14 (8.4%)	0 (0.0%)		0.013
Achilles Spurs		32 (31.5%)	3 (8%)		0.004
Right Base		0.76 (0.30)	0.43 (0.14)		
Left Base		0.70 (0.31)	0.54 (0.19)		
Base*		0.71 (0.28)	0.46 (0.15)		<0.0001
Right Mid		0.52 (0.23)	0.23 (0.08)		
Left Mid		0.49 (0.26)	0.26 (0.12)		
Mid*		0.49 (0.22)	0.23 (0.09)		<0.0001
Right Length		0.47 (0.24)	0.42 (0.19)		
Left Length		0.45 (0.24)	0.46 (0.18)		
Length*		0.45 (0.21)	0.42 (0.17)		0.57

*Base, Mid and Length is based on the unilateral measurement and if bilateral then an average of the left and right measurement was taken.

statistically significant difference in the occurrence of Achilles insertion spurs in patients with PsA demonstrating a much higher prevalence than those in the controls. Importantly, fluffy periostitis occurred only among patients with PsA.

The measurements of the plantar spurs, in terms of the base and mid segment

were higher among the patients with PsA compared to controls, while the length of the spurs did not distinguish between inflammatory and non-inflammatory spurs. Although there were more males in our PsA group than in the controls group, sex has not been found to be a factor in the occurrence of spurs (5). On the other hand, controls were older than

the PsA patients. Age has been associated with the occurrence of spurs, but despite the expectation that older individuals would have more spurs, we still found the prevalence higher among our PsA patients. Importantly, there was no statistically significant difference in the prevalence of obesity or DISH between the two groups.

In summary, our study provides for the first time, radiological differentiating features between inflammatory and non-inflammatory spurs including the presence of fluffy plantar periostitis and broad based and mid-segment dimensions.

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