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Study of Heel Pain in Rheumatic Diseases

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ABSTRACT

Background: The differential diagnosis of heel and foot pain is extensive, but the most common is mechanical etiology. The anatomic location of the pain can aid in diagnosis. Plantar fasciitis is the most common diagnosis, resulting in medial plantar heel pain, particularly with the first weight-bearing steps after rest.

Objective: We tried to describe most common causes of non-traumatic heel pain in our locality.

Patients and methods: The current study was prospectively conducted between May 2019 and May 2020. The study enrolled 100 patients who were complaining of heel pain. Full history evaluation and clinical assessment were done in all patients

Results: Mean age of enrolled patients was 39.92 ± 14.49 years with range between 18 and 68 years. The majority (52%) of enrolled patients were females and 48 (48%) patients were males. Based on clinical, laboratory and radiological findings of enrolled patients; 45 (45%) had planter fasciitis, 32 (32%) had heel spur and 23 (23%) had Achilles tendinitis.

Conclusion: Non-traumatic heel pain is a common issue in the clinical practice. Planter fasciitis is considered the most frequent etiology of such pain in our setting. Comparative studies between different available modalities for management of heel pain are warranted.

Keywords: Achilles tendinitis, Heel pain, Heel spur, Planter fasciitis

INTRODUCTION

One of the most prevalent foot problems addressed by medical practitioners is chronic plantar heel discomfort. It is estimated that 15% of all adult foot issues requiring professional care are caused by it, and it affects both sporty and non-athletic people [(1)].

It is most frequent in persons over 40, but it has been observed in people as young as seven years old and does not appear to be gender-specific. Most people have pain beneath their medial heel when they bear weight, especially first thing in the morning and when they begin weight-bearing activities like walking [(2)]. Burning, aching, and lancinating pain have all been mentioned as symptoms. Athletes may feel discomfort at the start of a run that intensifies as the race progresses. While it is seldom debilitating, it can significantly restrict weight-bearing activities, leading in a reduction in both athletic and daily activities [(3)].

Heel pain has become a catch-all word embracing a wide range of diseases affecting the heel, as it has with many other disorders when the real etiology is unknown. The most prevalent cause of discomfort, on the other hand, is plantar fasciitis, and the phrases are used interchangeably in the literature [(2)].

Heel discomfort has an unknown origin, however it is most likely complex. Many intrinsic and extrinsic risk factors for the development of the illness have been proposed in the literature and are typically classed as intrinsic or extrinsic. Intrinsic risk factors are anatomical and biological traits that make people more vulnerable to damage [(4)].

There is paucity in the literature about epidemiology of heel pain in our setting so, we designed this work to evaluate the most frequent etiologies of non-traumatic heel pain.

PATIENTS AND METHODS

The current study was prospectively conducted in Internal Medicine Department, Rheumatology Unit, Assiut University from May 2019 to May 2020.

Ethical consideration:

This work was conducted in accordance with Code of Good Practice and the guidelines of Declaration of Helsinki, 7th revision, 2013. Also, approval by Institutional Review Board, Faculty of Medicine, Assiut University was obtained (No.17101163). This study was registered on clinicaltrials.gov with ID no. NCT03311035. Patients signed informed consent.

Inclusion criteria: Any patient was complaining from heel pain was enrolled in the study.

Exclusion criteria: Any patient with recent trauma or foot infection was excluded from the study.

Methods:

All enrolled patients were subjected to full history taking and thorough physical examination. Age, sex and any chronic morbidity as diabetes mellitus, hypertension, ischemic heart disease, and chronic renal failure were recorded.

Patients were asked about onset, course and duration of the heel pain. Any precipitating and relieving factors were recorded. Patients were asked about any associated manifestation as dysentery, diarrhea, urogenital association, skin or oral ulcers. Degree to which this pain affected the daily activities of the patients was assessed, and any medication was recorded.

Full physical examination was done with special consideration to the foot. Any tenderness, swelling or swelling at the heel was noticed. Special

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evaluation was assigned to lumbo-sacral region, oral mucosa, and external genital system.

The following laboratory tests were performed; complete blood picture, liver function test, serum creatinine, serum calcium, and uric acid. Urine analysis for hematuria, pyuria, albuminuria, and proteinuria was done. Rheumatoid factors, C-reactive protein and erythrocyte sedimentation were assessed in all patients. Radiological evaluation of the foot was done with plain X ray at lateral view.

Statistical analysis

The collected data were coded, processed and analyzed using the SPSS (Statistical Package for the Social Sciences) version 22 for Windows® (IBM SPSS Inc, Chicago, IL, USA). Qualitative data were represented as frequencies and relative percentages. Quantitative data were expressed as mean ± SD (Standard deviation), and range.

RESULTS

Baseline data of enrolled patients (table 1):

Basic data of the studied patients are shown in table 1.

Table (1): Baseline data of enrolled patients

	n= 100
Age (years)	39.92 ± 14.49
Range	18-68
Body mass index (kg/m^2)	29.25 ± 4.90
Range	20-37
Class of body mass index	
Normal (18.5-24.9) (no, %)	35 (35%)
Overweight (25-29.9) (no, %)	40 (40%)
Obesity class I (30-34.9) (no, %)	20 (20%)
Obesity class II (35-39.4%) (no, %)	5 (5%)
Sex	
Male (no, %)	48 (48%)
Female (no, %)	52 (52%)
Occupation	
Employee (no, %)	35 (35%)
Housewife (no, %)	52 (52%)
Farmer (no, %)	13 (13%)
Residence	
Rural (no, %)	35 (35%)
Urban (no, %)	65 (65%)
Smoking (no, %)	12 (12%)
Diabetes mellitus (no, %)	18 (18%)
Hypertension (no, %)	17 (17%)

Data expressed as frequency (percentage), mean (standard deviation), range

Site and duration of the heel pain among enrolled patients (table 2):

Mean duration of the heel pain in the current study was (4.70 ± 1.67) months. Only 4 (4%) patients presented by bilateral heel affection. Fifty one (51%) patients had heel pain, which was mainly localized at the bottom of foot.

Table (2): Site and duration of the heel pain among enrolled patients

	N= 100
Duration (months)	4.70 ± 1.67
Range	1-8
Side	
Right (no, %)	70 (70%)
Left (no, %)	26 (26%)
Both sides (no, %)	4 (4%)
Site	
Bottom of foot (no, %)	51 (51%)
Heel pad (no, %)	27 (27%)
Over tendon Achilles (no, %)	22 (22%)

Data expressed as frequency (percentage), mean (standard deviation), range

Characteristics of heel pain and its associated manifestations (table 3):

Stitching pain was the most common characteristic pain. In 70 (70%) patients was worsening at morning. Daily activity of 12 (12%) patients was greatly affected secondary to the heel pain. The pain occurred at rest in 11 (11%) patients. The most common precipitating factors were standing and weight bearing.

Table (3): Characteristics of heel pain and its associated manifestations

	N= 100
Character of the pain	
Diffuse pain over tendon Achilles (no, %)	14 (14%)
Localized pain over tendon Achilles (no, %)	8 (8%)
Pin sticking (no, %)	17 (17%)
Stabbing pain (no, %)	14 (14%)
Stitching pain (no, %)	46 (46%)
Worsening at night (no, %)	30 (30%)
Worsening at morning (no, %)	70 (70%)
Affects the daily activity (no, %	12 (12%)
Pain at rest (no, %)	11 (11%)
Precipitating factors	
Weight bearing (no, %)	46 (46%)
Exercise (no, %)	18 (18%)
Running (no, %)	21 (21%)
Stair climbing (no, %)	5 (5%)
Standing (no, %)	49 (49%)
Walking (no, %)	6 (6%)
GIT symptoms (no, %)	13 (26%)
Numbness (no, %)	5 (10%)

Data expressed as frequency (percentage). GIT: gastrointestinal.

Clinical evaluation and baseline laboratory and radiological data among enrolled patients (table 4):

It was noticed that 75 (75%) patients at foot pad while 15 (15%) patients had tenderness at tendon Achilles. All studied patients have no pyuria,

albuminuria or proteinuria. All of them have negative rheumatoid factor. Based on lateral x ray on foot; 75 (75%) patients have normal findings while heel spur presented in 25 (25%) patients.

Table (4): Baseline laboratory and radiological data among enrolled patients

	N= 100
Aspartate transaminase (u/l)	19.06 ± 4.14
Alanine transaminase (u/l)	24.12 ± 5.93
Bilirubin (mg/dl)	0.86 ± 0.21
Albumin (g/dl)	3.45 ± 0.34
Protein (g/dl)	8.2 ± 0.46
Platelets (10^9/l)	222.45 ± 19.78
Hemoglobin (g/dl)	12.22 ± 1.92
INR	1 ± 0.03
Erythrocyte sedimentation rate (ml/h)	37.38 ± 8.49
Uric acid (mg/dl)	6.11 ± 0.58
Positive rheumatoid factors	0
Serum calcium (gm/dl)	8.89 ± 1.23
Lateral x ray on foot	
Normal findings (no, %)	75 (75%)
Heal spur (no, %)	25 (25%)

Data expressed as frequency (percentage), mean (standard deviation). INR: international randomized ratio

Final diagnosis among enrolled patients (table 5):

Based on clinical, laboratory and radiological findings of enrolled patients 45% had planter fasciitis.

Table (5): Final diagnosis among enrolled patients

	N= 100
Planter fasciitis (no, %)	45 (45%)
Heel spur (no, %)	32 (32%)
Achilles tendinitis (no, %)	23 (23%)

Data expressed as frequency (percentage).

DISCUSSION

Heel pain is a common musculoskeletal foot disorder that can interfere with daily activities and has a multifactorial etiology. A number of mechanical factors that result in excessive load at the plantar fascia insertion are thought to play a role in the condition's onset [(5)].

Plantar fasciitis has been the most commonly used term for this condition, owing to early beliefs that pain is caused by an inflammatory reaction at the fascial enthesis. It is now clear that the condition is more commonly caused by a degenerative process, making the term "fasciitis" less appropriate for broader use [(6)]. There is paucity in studying pattern of non-traumatic heel pain. So, this study was designed to assess most common causes of non-traumatic heel pain.

The present study enrolled 100 patients with non-traumatic heel pain. Mean age of the participants was (39.92 ± 14.49) years and 63% of them were > 40 years old. Mean body mass index (BMI) was (29.25 ± 4.90 kg/m^2) with range between 20 and 43 kg/m^2 and majority (65%) of them were overweight. Fifty two (52%) patients were females

In agreement with the current study, a study by **Lapidus and Guidotti [(6)]** reported a percentage distribution of ages (by decade) for a sample of their patients (n= 323), revealing a distribution skewed towards increased age, centred on 50–59 years. **Rano *et al.* [(7)]** reported that patients with heel pain were reported to be significantly older than controls (47.5 ± 1.4 years versus 38.4 ± 2.2 years; p = 0.001) and with **Rome *et al.* [(1)]** (24.6 ± 7.7 years versus 21.7 ± 5.1 years; p = 0.01).

Thomas *et al.* [(8)] suggested that plantar heel pain affects approximately one in 10 adults aged 50 years and over in the general population, with approximately 80% experiencing some form of disability due to their heel pain. Also, they found that prevalence of heel pain was slightly higher among females' patients. **Priesand *et al.* [(9)]** found that prevalence rates of heel pain in patients with diabetes, particularly type II diabetes. Also, females in all groups had higher prevalence of heel pain than males, with those patients with diabetes having higher prevalence rates than those without diabetes. Hyperglycemia is one of the main risk factors involved in the pathogenesis of diabetes complications via multiple pathways, including increased protein glycation and a gradual build-up of advanced glycation end products with subsequent increased plantar fascial thickness, as shown in an imaging image of plantar fasciitis [(10)].

This study supported many other studies that found that overweight patients are more prone to heel pain. Excess body mass causes greater forces to load the foot during weight bearing, potentially increasing stresses at the heel. A higher BMI has been linked to a higher risk of foot pain in general. A BMI of more than 30 kg/m^2 is linked to an increased risk of heel pain, and several studies have found higher BMI scores in people with plantar heel pain when compared to asymptomatic controls [(2, 9,11)]. These findings strongly suggest a link between having a high BMI and having plantar heel pain. Furthermore, some evidence suggests that a high BMI is associated with more self-reported disability in people with heel pain, as well as a worse prognosis after surgical intervention. In contrast, BMI appears to have no effect on outcomes after conservative management [(12)]. There was no significant difference in BMI between a group of 36 symptomatic runners and a control group of asymptomatic runners in a study involving runners with heel pain. This implies that increased BMI does not appear to be a significant factor in the development of heel pain in athletes. As a result, current evidence suggests that heel pain is associated with a higher BMI in non-athletic populations but not in athletic populations [(1)]. In contrast, a study by **Wearing *et al.* [(13)]** found that there was no significant difference in BMI between patients with heel pain and the control group. However, findings from this study should be interpreted with caution because of the small sample size (n = 10).

In the present study; 45 (45%) patients have planter fasciitis, 32 (32%) have heel spur and 23 (23%) have Achilles tendinitis. This in agreement with **Trojian and Tucker** [(14)] who found that the most common cause of heel pain in adults is the planter fasciitis, with a lifetime incidence of about 10% and an increased incidence in women 40 to 60 years of age.

Prichasuk and Subhadrabandhu [(15)] was the only case-control study to analyse the association between heel pain and the presence of calcaneal spur. Calcaneal spur (defined as a bony horizontal projection from the plantar calcaneal tuberosity >2 mm) was present in 54 of 82 (66%) cases, compared with 62 of 400 (16%) controls ($p < 0.001$). **Kibler *et al.*** [(16)] reported that 12 of 43 (28%) feet showed 'radiographic evidence of heel spur formation', and **Rano *et al.*** [(7)] reported that 26 of 59 (44%) case radiographs 'displayed a spur'.

The precise relationships between spur formation and surrounding soft tissue were not reported because the majority of studies investigating the presence of subcalcaneal spur used plain film X-ray. Nonetheless, one study found that the location of spurs was closely related to the origins of the abductor hallucis and flexor digitorum brevis [(17)].

Subcalcaneal spur formation has traditionally been attributed to repetitive longitudinal traction of the plantar fascia, followed by inflammation and reactive ossification. Recent histological and clinical studies, however, suggest that vertical compressive forces may be more important [(18)]. Spur formation can occur in loose connective tissue, surrounding fibrocartilage may not be aligned with the direction of traction, and spur trabeculae commonly form perpendicular to its long axis, according to histological evidence. Furthermore, clinical studies have shown that spur development is unrelated to medial arch height and can occur after surgical plantar fascia release [(19)].

CONCLUSION

Heel pain is a common, disabling symptom among adults aged 50 years and over. Planter fasciitis is the most common cause of heel pain. Future prospective studies of heel pain are warranted to confirm if the associations identified could be causal.

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