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Assessing The Association Between Plantar Fasciitis and Hyperuricemia

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ABSTRACT

Objective: To determine the frequency of hyperuricemia in patients diagnosed with plantar fasciitis and to descriptively report their clinical features to determine association.

Study Design: Cross-sectional Study.

Place and Duration of Study: Orthopedics department, Combined Military Hospital, Rawalpindi, Pakistan, from Jan to Dec 2024.

Methodology: A total of 200 patients diagnosed with plantar fasciitis were enrolled using non-probability consecutive sampling. Hyperuricemia was defined as >6.0 mg/dL in females and >7.0 mg/dL in males. Clinical features, including pain laterality, BMI, symptom duration, and presence of calcaneal spurs, were recorded. Statistical analysis was conducted using IBM SPSS Statistics for Windows, Version 21.0, and results analyzed.

Results: Hyperuricemia was identified in 37(18.5%) out of 200 patients. Among those with hyperuricemia, 19(51.4%) had bilateral pain, 13(35.1%) had right-sided pain, and 5(13.5%) had left-sided pain. The majority were overweight or obese, and symptom duration was more than six months in 23(62.2%) of cases. No significant trends or patterns were observed when examining symptom duration, gender, BMI, or calcaneal spur laterality within these patients.

Conclusion: Hyperuricemia was present in 18.5% of patients with plantar fasciitis. Although certain patterns were observed, there was no consistent trend linking hyperuricemia with specific clinical features. Routine uric acid testing may not be necessary in plantar fasciitis patients unless clinical suspicion of inflammatory arthropathy is present.

Keywords: Body Mass Index, Calcaneal Spur, Heel Pain, Hyperuricemia, Plantar Fasciitis, Uric Acid.

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INTRODUCTION

Plantar fasciitis is a common cause of heel pain. As per Riddle *et al.*, the United States reported approximately 1 million OPD visits for pain related to heel.[1] In a study conducted by Ul Abidin *et al.*, the frequency of heel pain in police officers of Peshawar Khyber Pakhtunkhwa was found to be 10.6% of whom plantar fasciitis was diagnosed in 13.2%.[2] Plantar fasciitis is seen in 10% of people and is more common in females and those aged 40-60 years3 and in people with BMI >25.[4] The typical pain of plantar fasciitis is a stabbing pain present on the first step after prolonged rest and goes away after walking about.[5] The typical location is over the plantar medial tuberosity of the calcaneus at the proximal insertion of the plantar fascia.[6] Classic physical examination findings suggestive of plantar fasciitis include reproducible pain with palpation of the plantar medial aspect of the heel. The windlass test, which involves dorsiflexion of the great toe while the patient is standing, which, in the presence of plantar fasciitis, reproduces pain at the insertion of the plantar fascia is of value given its high specificity.[7]

Obesity, age, foot conditions like flat or high arched feet and joint diseases have all been implicated to cause heel pains. Moreover, certain occupations like police and armed forces and people undergoing high physical activities like running and jumping have been found to be at risk of developing plantar fasciitis.[8] Hyperuricemia, defined as serum uric acid more than 6 mg/dl for females and more than 7 mg/dL for males,[9] may or may not be symptomatic. When it is symptomatic, it can lead to gout and kidney stones. Patients with gout may have heel pain that mimics plantar fasciitis. This in turn raises the speculation of whether gout or hyperuricemia can cause plantar fasciitis.

This study was conducted to ascertain whether patients having plantar fasciitis have raised uric acid levels or not. The rationale of this study was to reveal the frequency of hyperuricemia in patients with pain of plantar fasciitis and to identify the need for checking for hyperuricemia as part of the patient's evaluation and management.

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METHODOLOGY

A hospital-based descriptive cross-sectional study was conducted in the Orthopedics department of the Combined Military Hospital, Rawalpindi, Pakistan, from Jan to Dec 2024. Using the WHO calculator,[10] the sample size was calculated to be at least 178 based on prevalence of plantar fasciitis of 13.2% 2, and while assuming a confidence level of 95% and a margin of error of 5%. An article reporting the prevalence data of hyperuricemia in patients with plantar fasciitis alone was not available.

Inclusion Criteria: Patients of either gender, between the ages of 18 and 70 years with typical pain of plantar fasciitis for not less than three months, who consented to participate in the study were included.

Exclusion Criteria: Patients with a history of foot surgeries or significant deformities were excluded from the study. Individuals with systemic inflammatory conditions such as rheumatoid arthritis or lupus were also excluded. Additionally, pregnant women and those with severe comorbidities, including chronic kidney disease or uncontrolled diabetes, were not selected. Patients previously diagnosed with gout or hyperuricemia were likewise excluded.

Permission was sought from hospital ethical committee (IERB Number 815 dated January 6, 2024). A diagnosis was made during the examination using the Windlass test. Although the diagnosis was primarily clinical, radiological evidence was also considered for confirmation in a few but not all cases. Basic demographic data, clinical history, and the duration of symptoms of the participants were noted down. Patients' pain was evaluated through the visual analogue scale, with scores from 0 (for no pain) to 10 (for worst pain). Blood samples were collected to determine serum uric acid level, and hyperuricemia was defined as a serum uric acid level of more than 6 mg/dl for females and more than 7 mg/dl for males. We used SPPS version 21 for data analysis. Descriptive statistics were used to calculate Mean±SD for quantitative data like age, Uric Acid, BMI, and duration of pain. Frequencies and percentages were calculated for qualitative variables. Chi-square test was used to assess the association between categorical variables.Independent samples t test was used fo compre Mean Serum Uric Acid levels according to gender.The p-value ≤0.05 was considered significant.

RESULTS

The total number of 200 patients diagnosed with plantar fasciitis who participated in the study comprised 118(58%) females and 82(42%) males. (Table-I) The participants' mean age was 49.17 years (SD+11.64), ranging from 22 to 70 years. Of the 200 participants, 88(44%) had unilateral plantar fasciitis, whereas 112(56%) had both sides involved. Right-sided pain was more common (n=59) than left-sided pain (n=29) in unilateral cases. Most of the patients, 128(64%), had a BMI greater than 25 and were classified as overweight or obese. The mean BMI was 27.472 (SD+2.72). 111 (55.5%) patients had pain for more than 6 months.

Table-I: Mean Serum Uric Acid Levels According to Gender (n=200)

Gender	n (%)	Mean±SD (mg/dL)	*p*-value
Male	84(42%)	5.73±0.98	0.001
Female	116(58%)	4.84±1.43	
Total	200	5.22±1.33	

The mean serum uric acid level in the study was 5.21 mg/dl (SD+1.33). The mean serum uric acid for males was 5.73 mg/dl (SD+0.98) and 4.84 mg/dl (SD+1.43) in females. Whereas the mean uric acid levels in patients with hyperuricemia were 7.52 mg/dl (SD+0.579).

Of the 200 patients in the study, only 37(18.5%) had hyperuricemia. 10(27%) were male (13.5% of all males) and 27(73%) were female (30.33% of all females) (*p*-value 0.041). Of these, 19(51.4%) had bilateral pain, 13(35.1%) had right-sided, and 5(13.5%) had left-sided pain (*p*-value 0.707). In the same cohort, 23(62%) were overweight, and 8(21.6) were obese, and only 6(16.2%) had normal weight (*p*-value 0.744). Most of the patients, 23(62.2%), reported having pain for more than 6 months (*p*-value 0.366). In this same cohort, 9(24.3%) patients had bilateral calcaneal spurs, and 10(27%) had right-sided calcaneal spurs, whereas the same number had left-sided calcaneal spurs. 8(21.6%) patients had no calcaneal spurs at all (*p*-value 0.726). The detailed demographic data is shown in Table-II.

DISCUSSION

The findings of the study indicated that among the patients with hyperuricemia, the majority were females, n=27 (73%). This finding may relate to the greater percentage of raised BMI observed in our study population, which comprised mostly of

housewives with sedentary lifestyles on the female side and serving or retired armed forces personnel with active lifestyles on the male side. Similarly, obesity was observed in 25.9% of females. Within the hyperuricemia group, 25.9% of females were obese, and 66.6% were overweight. In the same cohort, 10% of males were obese, and 50% were overweight. These findings indicate a possible association, though no causality is implied, that the higher rates of obesity and overweight status among females may have contributed to this hyperuricemia.

Table-II: Demographic Data (n=200)

		Patients with Normal Uric Acid Levels (n=163) Frequency (%)	Patients with Hyperuricemia (n=37) Frequency (%)	Total n=200 Frequency (%)	*p*-value
Age (years)	18-29 years	9(5.5)	1(2.7)	10 (5.0)	0.638
	30-49 years	81(49.7)	21 (56.8)	102 (51.0)	
	50-70 years	73 (44.8)	15 (40.5)	88 (44.0)	
Gender	Male	74 (45.4)	10 (27.0)	84 (42.0)	0.041
	Female	89 (54.6)	27 (73.0)	116 (58.0)	
BMI (Kg/m2)	18-24.9	31(19.0)	6 (16.2)	37(18.5)	0.744
	25-29.9	105(64.4)	23 (62.2)	128 (64.0)	
	>30	27 (16.6)	8 (21.6)	35(17.5)	
Pain laterality	Bilateral	93 (57.1)	19 (51.4)	112 (56.0)	0.707
	Left	24 (14.7)	5 (13.5)	29(14.5)	
	Right	46 (28.2)	13 (35.1)	59(29.5)	
Calcaneal spur	Bilateral	48 (29.4)	9 (24.3)	57(28.5)	0.726
	Left	32 (19.6)	10 (27.0)	42 (21.0)	
	Right	41 (25.2)	10 (27.0)	51(25.5)	
	Nil	42 (25.8)	8 (21.6)	50 (25.0)	
Duration of symptoms (months)	>6 months	88 (54.0)	23 (62.2)	111(55.5)	0.366
	≤6 months	75(46.0)	14 (37.8)	89(44.5)	

The relationship between serum uric acid levels and body mass index (BMI) has been well-documented in a study by Chen *et al*.,[11] For instance, Wang *et al.,* established that hyperuricemia was 2.98 times more prevalent in overweight individuals and 5.96 times more prevalent in obese individuals compared to those with normal or underweight BMI.[12] A similar distribution was noted in our study, as 62.2% (n=23) of hyperuricemia patients in our study were overweight. Additionally, serum uric acid levels are known to increase with age, as supported by Zitt *et al*.[13] In our study, only one patient with elevated serum uric acid levels was under 30 years of age, further reinforcing the established relationship between age and serum uric acid levels.

Calcaneal spurs, which are often associated with foot pain, have been studied extensively in relation to various conditions. Individuals with calcaneal spurs are more likely to have diabetes, a higher BMI, and foot osteoarthritis, as reported by Kumar *et al*.,[14] Literature, including studies like Shi *et al*., has also concluded that calcaneal spurs can be present in painless feet.[15] In our study, 25% of patients had no visible calcaneal spurs on their X-rays, and the presence or absence of calcaneal spurs did not consistently align with the laterality of plantar fasciitis, similar to the findings given by Li *et al*.,[16] Among 112 patients with bilateral foot pain, only 28.6% had bilateral calcaneal spurs. Similarly, only 27.5% of patients with left-sided plantar fasciitis pain had left-sided calcaneal spurs, and 32.2% of those with right-sided pain had right-sided calcaneal spurs. These findings support literature as concluded by Okcu *et al*.,[17] Studies like conducted by Menz *et al*., have reported that calcaneal spurs, though associated with foot pain, are not a definitive indicator of plantar fasciitis. This highlights the need for further research to better understand the complex relationship between calcaneal spurs, foot pain, and plantar fasciitis.[18]

The 18.5% frequency of hyperuricemia observed in this cohort suggests a significant metabolic presence among patients with plantar fasciitis. While the findings indicate strong associations with BMI, age, gender, and calcaneal spurs. These data characterize the current clinical pattern of the population without defining a direct causal link.

LIMITATIONS OF STUDY

We concede that pain, being a subjective symptom, may have been exaggerated by patients. Furthermore, many of our patients were educated and may have researched causes of foot pain, and this, in turn, may have added to the problem of over-reporting. For this same reason, we excluded the visual analogue scale from our results.

RECOMMENDATION

Since hyperuricemia occurred in a minority of cases, with no clear patterns across clinical variables, and in the absence of inflammatory signs, routine screening for uric acid does not appear necessary in patients with pain of plantar fasciitis unless clinically indicated.

CONCLUSION

The study concluded that the frequency of hyperuricemia was 18.5% among the patients presenting with plantar fasciitis. The descriptive findings highlight potential associations between gender, BMI, age, and calcaneal spurs with hyperuricemia in patients with plantar fasciitis; the study design does not allow for determination of causality or risk. Future analytical studies are recommended to explore these relationships more rigorously.

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Authors' Contribution

Following authors have made substantial contributions to the manuscript as under:

SAUA & MSA: Data acquisition, data analysis, critical review, approval of the final version to be published.

NC & AM: Study design, data interpretation, drafting the manuscript, critical review, approval of the final version to be published.

MH & AR: Conception, data acquisition, drafting the manuscript, approval of the final version to be published.

Authors agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

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