Calcaneal spur: A study of 500 cases in Erbil

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Abstract

The present study was undertaken to determine the epidemiological and clinical characteristics, risk factors, treatment and outcome of 500 patients with calcaeneal spur seen at one community teaching hospitals serving a single district with a population of 1500 000 inhabitants. The study was done over a 3-years period from May 2005 to May 2008 (36months) in Erbil Governorate, Iraq. The patients were fulfilling specific criteria and treated with a combination of non steroidal anti-inflammatory drugs, physiotherapy (wax baths, Ultrasound, stretching exercises) and change of footwear habits. The patients were followed up until the complete disappearance of their complaints. The study found that the incidence were increased with female gender, age, flat shoes, unfit shoes, the physical activity play significant role in spur formation. The largest number of the patients (47%) was in the age group of 21-40 years. These findings support the theory that plantar calcaneal spurs may be an adaptive response to longitudinal traction of the heel rather than vertical compression at the calcaneal enthesis. The present study conclude that Shoes type is very important, and should fit well and provide ample cushioning and support throughout the heel, arch, and ball of the foot so that weight is distributed evenly throughout the foot (a raised heel and arch support). As with other types of heel pain, a heel spur can be treated with conservative treatment methods which are simple, cheaper, less side effect.

Introduction

Osseous spurring of the plantar aspect of the calcaneus was first documented in 1900 by the German physician Plettner, who coined the term *Kalkaneussporn* (calcaneal spur) [1]. A common side effect and potential cause of heel pain is the heel spur, a bony growth on the underside of the heel bone. The spur, which is often visible in X ray, appears as a bony protrusion that can extend forward as much as half an inch. This calcium deposit is the result of the body at temptation to cope with the load and stress that the site is subjected too. When there is no indication of bone enlargement, the condition is sometimes referred to as "heel spur syndrome."

Heel spurs result from strain on the muscles and ligaments of the foot, by stretching of the long band of tissue that connects the heel and the ball of the foot, and by repeated tearing away of the lining or membrane that covers the heel bone.

The pathophysiology of calcaneal spurs is poorly understood. The traditional explanation, which could be termed the *longitudinal traction hypothesis*, suggests that repetitive traction of the insertion of the plantar fascia into the calcaneus leads to inflammation and reactive ossification of the enthesis [2]

An alternative explanation proposed by Kumai and Benjamin, which could be termed the *vertical compression hypothesis*, argues that calcaneal spurs develop in response to repetitive compression rather than traction.

Specifically, they suggest that calcaneal spurs are fibrocartilagenous outgrowths which form in response to calcaneal stress fractures, in an attempt to protect the calcaneus against micro cracks [3] .Furthermore, a recent histological study has indicated that the bony trabeculae of spurs are vertically oriented, suggesting that the stresses responsible for spur formation may be the result of vertical loading .[4]

These conditions may be the result of: biomechanical imbalance, running or jogging, improperly fitted or worn-out shoes,

These conditions may be the result of: biomechanical imbalance, running or jogging, improperly fitted or worn-out shoes, & obesity. There is a 'chicken or the egg' situation regarding heel spurs. Heel spurs appear to the result of the body attempting to adapt to the stress of the foot. Simultaneously, they may also be the source of additional pain in the heel.

The most commonly described therapies are non steroidal anti-inflammatory drugs (NSAIDs), heel pads, exercises, night splints and Ultrasound at a dosage of 0.5 W/cm^2 , pulsed 1:4, 3 Mz for 8 minute for eight treatments in 4 weeks [5].

In their allocated intervention month, each patient received a night splint made of polypropylene with the ankle placed in 5° of dorsiflexion. Foam was used distally on the splint to give 30° dorsiflexion at the MTP joints [6]. In intractable cases, corticosteroid injections may be of benefit, surgical procedures may be the last choice. Recently Radiotherapy Muecke et al [7], [8] and extracorporeal shock wave therapy (ESWT) are treatment where sound waves are sent through the damaged tissue in order to stimulate the damaged tissue and encourage healing. [9, 19]

Patients & Methods

This study is retrospective analysis of 500 patients with calcaneal spur, recorded in the period from May 2005-May 2008 (36months) in Erbil Governorate Iraq (1.5 millions of population). Calcaneal spur was diagnosed on the basis of compatible clinical picture such as a history of morning pain and tenderness in the 1st few meter when get up from the bed, which become better after 5 -20 minute and characteristic radiographic finding of spur . Complete histories were taken from all 500 patients. The age, sex, type of their shoes and occupation recorded, asked for any morning stiffness and pain in the heel, sign and symptom of inflammatory bowel disease, fever, oral ulcers, conjunctivitis, and trauma. Complete physical examinations were done for all studied patients.

Lateral view X-ray of the heels was taken and shows variable size of Calcaneal spur. Patient with sign and symptom of spondyloarthropathy are completely excluded in this study. Patient with foot malformations and those patients with body mass index (BMI) equal or above 25 are also excluded. They were followed up at two weekly intervals following treatment. Until completed pain relief after the therapy program, which occur at variable period. The therapies include NSAID, shoes modification with heel pad insertion and 6 days course of physiotherapy consist of daily session of Wax bath followed by Ultrasound therapy [10].

Results

The majority of cases are from the age group 30-40 years (47%), as shown in table 1.and figure 2. The incidence in female is 76% and 24% in male; female to male ratio 3.1–1 as appeared in (table 2).

No much difference in incidence between urban and rural patients which are more liable for spure; (57.6%) figure 2. The incidence in house wife (44.6%) followed by hard working patients (29.4%) and those with sedentary lifestyles takes (26%) of the studied patients...

This study shows that (76%) wearing flat shoes. Both side are liable for spur development, unilateral in (72.8%); Right heel (40.6%) commoner than the Lt , and in (27.2%) of cases are bilateral, (table3).

10-15 minute of morning pain and tenderness is founded in (55.2%) of patients. Asymptomatic spur accidentally founded at the sound side in (24%). Rheumatoid factor were done for all patients and it founded that (90.4%) of patient are rheumatoid factor negative.

Table 4 shows that (96.2%) improved conservatively, (2%) needed local injection and (1.8 %) (9 patients) still complaining even after local injection.

Discussion

All patients meet the criteria of the diagnosis; based on the presence of pain and tenderness in the heel especially at morning when the patient gets up from the bed. Prevalence of both spurs increases considerably with the rising age Riepert T et

al [11] which goes with this study; were the majority of cases are from the age group 30-40 years (47%). An increase in heel fat pad thickness with aging and increased body weight reduces the elasticity of the heel fat pad. In addition, subcalcaneal spurs diminish the elasticity of the heel fat pad and play a role in the formation of heel pain. [12]

The incidence in female who take on her Owen all home duties are 76% and 24% in male; female to male ratio 3.1 – 1, which is similar to other study done in Harare, Zimbabwe [13].

The rural patient is more liable for spur; (57.6%) which may be due to their habit to wear special flat soft shoes called (klash) which disturbed Weight distribution during walking and maximized the stress on the week facial heel pad as age progresses. This was explained by the fact that the stimulating factor for the development of heel spur (calcaneal exostosis) is controversial. In a sample of elderly cadaveric specimens, using radiographic, gross morphological and histological investigation, demonstrated that heel spurs are generally not found in the trajectory of traction from the plantar aponeurosis enthesis or plantar muscles. Rather, they are variably associated with soft tissues including loose connective tissue, fibro cartilage, muscle, and aponeurosis.

Furthermore, the bony trabeculae of the spur are not aligned in the direction of soft tissue traction. However, this is rather in the direction of stress on the calcaneus during walking and standing. These results substantiate the view that the heel spur may be a skeletal response to stress and may serve to protect the bone against the development of micro fractures [14]. This is true for the effect of physical activity on the appearance of the spur which reflected by the high incidence in housewife(44.6%) who spend a lot of their time serving their home and helping males at work in rural areas. This is followed by hard working patients (29.4%) and those with sedentary lifestyles are not protected and are found in (26%).

This study also shows that (76%) of those who wear flat shoes and are over-weight are excluded in this study. All these cases are having BMI below or equal to 25 which maximized the recurrent local trauma during walking and working: giving similar effect to that in pes planus which are also excluded. These findings support the longitudinal traction theory that plantar calcaneal spurs may be an adaptive response to the heel rather than vertical compression at the calcaneal enthesis.

This goes with the fact that excessive weight gain, aging, and gender may be important factors effecting the lowering of the pitch and the increasing of spur formation. [15].

It is also possible that extrinsic factors, such as footwear, occupational environment and level of physical activity may play a role in determining whether people with plantar calcaneal spurs develop symptoms. Each of these suggestions warrants further investigation.

Shoes are very important, and should fit well and provide ample cushioning and support throughout the heel, arch, and ball of the foot so that weight is distributed evenly throughout the foot (a raised heel and arch support). The patient should be avoid walking barefoot on hard surfaces and replace old shoes before they wear out, especially during run or exercise in. When exercising, start off slow and ease into new routines to prevent sudden or excessive stress on tissue and greater flexibility in the tissue makes them less susceptible to damage.

Both sides are liable for spur development, unilateral in (72.8%); Right heel not much commoner than the Lt (40.6%).and in (27.2%) bilateral, which similar to the study done by Riepert T et al. [11], 10-15 minute of morning pain is founded in (55.2%) of patient.

Asymptomatic spur accidentally founded in (24%) and this goes with the fact that planter heel pain usually caused by plantar fasciitis and heel spur is a side effect and is not related to the cause of the symptoms [16]. Clearly, the presence of a plantar calcaneal spur does not always lead to the development of heel pain. That is why

some spurs are associated with symptoms while others are not is yet to be adequately investigated, but possible explanations include the size of the spur (i.e. very large spurs may be more likely to be symptomatic [17]

However, it is a common misconception that the pain of plantar fasciitis is the direct result of the often (50%) associated anterior calcaneal spur ("heel spur"). In fact, a study of 461 asymptomatic patients showed x-ray evidence of heel spurs in 27% of those studied. Rubin et al [8]
Latex fixation test for rheumatoid factor were done for all patient and it founded that (90.4%) of patient are latex negative.

Most of the patient (96.2) improved by conservative medical therapy which conserve time, cost, early mobility and less side effect [18], (2%) needed local injection and (1.8 %) (9 patients) still complaining after local injection.

As a conclusion, The incidence was increased with female gender, age, flat shoes, unfit shoes, and the physical activity play role in spur formation. Shoes are very important, and should fit well and provide ample cushioning and support throughout the heel, arch, and ball of the foot so that weight is distributed evenly throughout the foot (a raised heel and arch support). The patient should be avoid walking barefoot on hard surfaces and replace old shoes before they wear out, especially during run or exercise in. When exercising, start off slow and ease into new routines to prevent sudden or excessive stress on tissue. The calf muscles and the tissue of the feet should be kept stretched. Greater flexibility in the tissue makes them less susceptible to damage.

These findings support the longitudinal traction theory that plantar calcaneal spurs may be an adaptive response to the heel rather than vertical compression at the calcaneal enthesis.

As with other types of heel pain, a heel spur can be treated with conservative treatment methods. Discomfort can be reduced through NSAID. However, these methods may have varying effects. If more conservative methods fail to produce positive, local injection of steroid at the most tender spot via the medial aspect of the heel pad, surgery may be considered to remove the spur or to release tension on the plantar fascia to stop further damage

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Table (1): Show the age distribution of patients

Age groups	Number	Percentage
20 – 30	22	6.3
30 – 40	235	47
40 – 50	90	18
50 – 60	105	21
>60	48	9.6
Total	500	100

Table (2): Sex distribution

Sex distribution	Number	Percentage
Male	120	24
Female	380	76
Total	500	100

Table (3): Side distribution.

Side distribution	Number	Percentage
RT	203	40.6
Lt	161	32.2
Bilaterial	136	27.2
Total	500	100

Table (4): Improvement

Improvement	Number	Percentage
Conservative	481	96.2
Local injection	10	2 %
Still complaining	9	1.8%
Total	500	100%

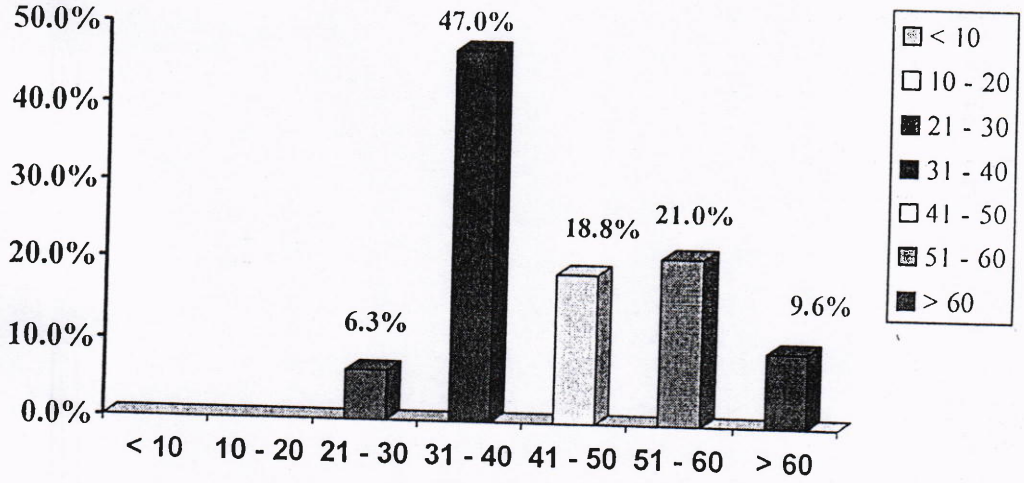

Figure (1): age distribution

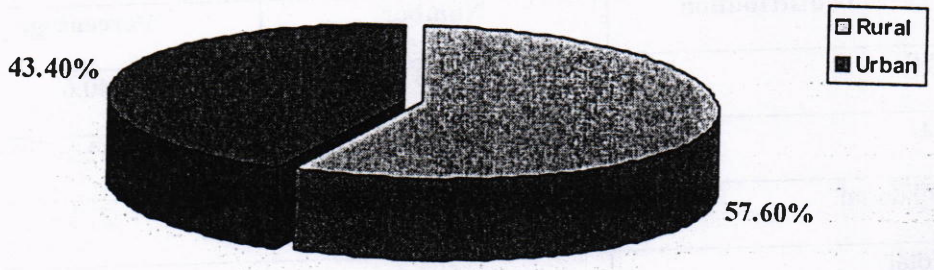

Figure (2): distribution among rural and urban