Original Research Paper

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General Medicine

ANALYSIS OF CLINICAL PRESENTATION AND INVESTIGATIVE FINDINGS IN PLANTAR FASCIITIS IN TERITIARY CARE HOSPITAL.

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ABSTRACT Plantar fasciitis is common condition causing severe plantar pain, and the its first classical striking symptoms and signs are severe plantar pain tenderness of the first few steps after awakening and causing gait difficulty. The early clinical, sonography and laboratory diagnosis confirmation parameters will definitely help in preventing complex plantar fasciitis and its chronicity leading to degeneration, fasciosis and sequalae. The key finding in sonovascular imaging incudes measurement of plantar fascia thickness, echogenicity vascularity and reactive fluid. plantar fascial thichkness in mean normal is 0.25 cm and mean abnormal is 0.6 cm suggesting thickness. Above 0.25 cm with associated clinical findings is significant and the planning of treatment depends on stage of disease proving the early diagnosis has definite important role in prognosis and follow-up .

Aim: To detect and diagnose and establish the Plantar fasciitis.

Objectives:

Primary objective: Early detection of plantar fasciitis for early intervention in management and preventing the chronicity and its sequelae.

Secondary objective: Utilising the signs and symptoms and confirming with sonography, vascular doppler imaging and laboratory data about plantar fasciitis.

Site of the study: Department of internal medicine, Department of Radiology and Department of orthopaedics, Apollo Hospitals, Greams road, Chennai-600006.

Study period: March 2021 to March 2022

Inclusion criteria: Patients with early morning plantar pain and-clinically suspicious plantar facial minor repitative injury with and with out history of co morbidities.

Exclusion criteria: fractures, ischaemic changes, infective abscess.

KEYWORDS :

INTRODUCTION:

An increased number of patients of approximately 15%of all the foot complaints (1) with clinical symptoms of plantar pain when putting their feet on the floor after waking up in the morning, prolonged bed rest, repetitive plantar minor injuries, bare foot walking on harder surface and associated co morbidities, like osteo arthritis, gout, diabetes, obesity and non suitable shoe wear.

Plantar fascia is thick band connective tissues which holds and keeps plantar arch on plantar surface of foot. The attachment begins at calcaneum and divides into medial central and lateral strips and inserts into heads of metatarsal bones. It is otherwise called as plantar aponeurosis.

Complete tear and trauma and surgical intervention causes reduction in arch stiffness. There are significant biomechanics in gait are involved in further more damage and in disease process.

It can also give rise to degeneration is other wise mentioned as fasciosis as a chronicity following out come of chronic inflammation (2), calcaneal spur also contributes and aggravates pain .Plantar non malignant thickening, psoriasis and inflammatory tears , ankylosis inflammation are additional reasons to look into. Most patients present with heel pain radiating medial part and arch, pain tends to worse in the morning with gradual reduction by evening (3). As appear the plantar fascitis mostly self limiting in 12 months duration the achilles tendon streching is moderately useful however it is unclear in studies achilles tendon tightness of plantar fascia biomechanics has increased plantar facia tendon tightness,no siginicant difference in passive flexion of Gastronemius and soleus (4) general classification of heel pain understood is A. focal soft tissues or B. systemic causes like osteoporosis or degeneration (5).An inflammatory reaction at plantar fascia deploys macrophages, lymphocytes, and plasma cells, later delay causing fibrosis, degeneration and fasciosis, radiography is least specific and calcaneal spur is not precursor for plantar fasciitis (6). Previous heel pain and high BMI, risks plantar fasciitis and this occurence is 10% in life time, enthisopathies in arm and achilles could be provacators and ESWT was approved by NICE in resistant cases. (7). Endoscopic decompression of aponeurosis and nerve and dissection is also a way of promising management (8).

MATERIALS AND METHODS:

Total 66 number of normal individuals are called as control group. Total of 66 Patients with clinical symptoms and clinical signs are called as management group in the present study.

Parameters in the study are: 1. S.no. 2. UHID, 3. Age 4. Gender 5. Clinical symptoms 6. Clinical signs,

7. Sonovascular doppler imaging :

A. echogenicity of the plantar fascia, B.plantar fascia thickness, C. plantar fascial tears, D. Plantar collections, E. Heel soft tissue thickness, F. Doppler vascularity in Posterior tibial artery PTA, Dorsalis Pedis arter DPA and G. Focal soft tissues doppler vascularity . H. Probe pressure tenderness on the plantar surface.

Equipment Used :

Philips epiq convex 2-5MHz broad band probe, vascular doppler and fully soft ware loaded machine.

Lab Investigation:

By BMI index machine, blood test for cholesterol and blood sugar levels.

Clinical examination of patients presented in department of medicine with plantar feet pain and difficulty in walking was diagnosed after excluding other causes and these patients are subjected to lab investigation and high frequency sonography with doppler study findings.

66 controlled individuals are asymptomatic, normal weight, no injury and not known co morbidities.

Age group both male and female control group and clinically syptomatic patients are between the ages 18 to 60 years and above.

RESULTS:

In the present study the mean age of symtomtic patients management group 51.36±12.56 and normal asymptomatic controlled group mean age is 50.59±16.35.

Symtomatic Management group male to female ratio M:F ratio is 44:22 and normal controlled group M:F ratio is 47:19.

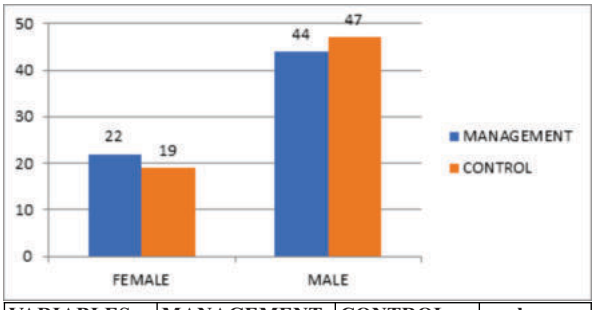
Control group shows no clinical symptoms and no clinical signs, normal echogenicity, normal sonovascular doppler , no plantar fascia tears, no soft tissue collections, no increase in soft tissue focal vascularity, no probe pressure tenderness, norrmal posterior tibial arterial PTA flow in 97%, normal dorsalis pedis arterial DPA flow in 97%, well controlled hypertension in 20% ,well controlled diabetes mellitus is 22%,slightly increased BMI is 10% repetitive trauma. normal total cholesterol in all control.

In plantar fasciitis the following observations are made gender ratio is male : female ratio is 44:22, plantar pain 100%, plantar signs 100% of plantar fascia sonography show hypoechoic changes in 72.%, tears in 18%, fluid collection arround fascia is 44%, increased heel pad thickness is 52%, reduced vascularity is 76% ,reduced posterior tibial artery flow in %37, dorsalis pedis arterial reduced flow in 27% probe tenderness in 66.7%, hypertension in 54.5%, diabetes mellitus in 57.6%, high BMI in 42.4%, repitative trauma in 40.9% high total cholesterol in 56.1%.

When compared with control all the parameters in plantar fasciitis are higher in levels and contributing significantly of plantar fasciitis diagnosis in its early presentation and more in prevalence.

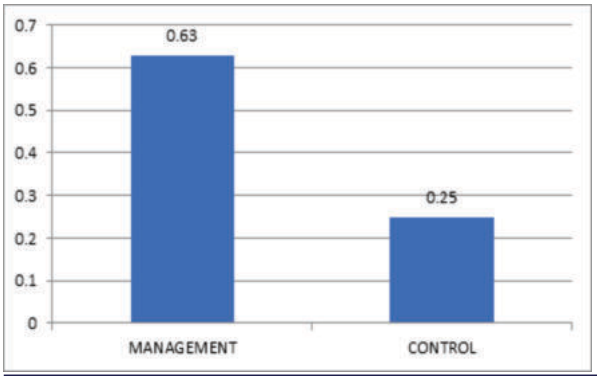
By controlling of comorbidities there is reduction in incidence . The most striking feature is increases plantar fascial thickness normal 0.25-0.03 cm and in plantar fasciitis is 0.63-0.16 cm.

GROUP	FEMALE	MALE
MANAGEMENT	22	44
CONTROL	19	47



VARIABLES	MANAGEMENT MEAN-SD	CONTROL MEAN-SD	pvalue
AGE	51.36-12.56	50.59-16.35	0.965 NS
THICKNESS	0.63-0.16	0.25-0.03	0.000*

- THERE IS NO DIFFERENCE IN THE MEAN AGE OF MANAGEMENT AND CONTROL.
- THERE IS SIGNIFICANT IN THE THICKNESS MANAGEMENT HAS 0.63 HIGH COMPARED TO CONTROL 0.25



VARIABLES		MANAGEMENT	CONTROL
CLINICAL SYMPTOM :	PRESENT	66	-
	ABSENT	-	66
SIGNS:	PRESENT	51	-
	ABSENT	15	66
HYPO PF :	PRESENT	17	-
	ABSENT	19	66
TEARS PF :	PRESENT	55	-
	ABSENT	11	66
COLLE PF :	PRESENT	36	-
	ABSENT	30	66
SOFT THICK :	PRESENT	35	-
	ABSENT	31	66
FOC VASCUl :	PRESENT	50	-
	ABSENT	16	66
PT ART :	PRESENT	40	65
	ABSENT	26	1
DP ART :	PRESENT	47	65
	ABSENT	26	1
PR TENDER :	PRESENT	44	-
	ABSENT	22	66
HYPERTENSION	PRESENT	36	57
	ABSENT	30	9
DIABETES MELLITUS :	PRESENT	38	55
	ABSENT	28	11
BM INDEX:	PRESENT	28	3
	ABSENT	38	63
REP TRUAMA:	PRESENT	39	66
	ABSENT	27	-
TOTAL CHOLESTEROL:	ABNORMAL	37	-
	NORMAL	29	66

CONTROLS :

CLSYMP

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	ABSENT	66	100.0	100.0	100.0

SIGNS

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	ABSENT	66	100.0	100.0	100.0

HYPO PF

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	ABSENT	66	100.0	100.0	100.0

TEARS PF

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	ABSENT	66	100.0	100.0	100.0

COLLEC PF

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	ABSENT	66	100.0	100.0	100.0

SOFT TISSUE THICK

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	ABSENT	66	100.0	100.0	100.0

FOC VASCUL

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	ABSENT	66	100.0	100.0	100.0

PT ARTERY

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	ABSENT	65	98.5	98.5	98.5
	PRESENT	1	1.5	1.5	100.0
	Total	66	100.0	100.0	

DP ARTERY

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	ABSENT	65	98.5	98.5	98.5

	PRESENT	1	1.5	1.5	100.0
	Total	66	100.0	100.0	

PR TEND

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	ABSENT	66	100.0	100.0	100.0

HTN

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	ABSENT	57	86.4	86.4	86.4
	PRESENT	9	13.6	13.6	100.0
	Total	66	100.0	100.0	

DM

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	ABSENT	55	83.3	83.3	83.3
	PRESENT	11	16.7	16.7	100.0
	Total	66	100.0	100.0	

BM INDEX

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	ABSENT	63	95.5	95.5	95.5
	PRESENT	3	4.5	4.5	100.0
	Total	66	100.0	100.0	

REP TRAUMA

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	ABSENT	66	100.0	100.0	100.0

TOTAL.CHOLESTEROL

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	N	66	100.0	100.0	100.0

MANAGEMENT:

CL SYMP

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	PRESENT	66	100.0	100.0	100.0

SIGNS

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	ABSENT	15	22.7	22.7	22.7
	PRESENT	51	77.3	77.3	100.0
	Total	66	100.0	100.0	

HYPO PF

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	ABSENT	19	28.8	28.8	28.8
	PRESENT	47	71.2	71.2	100.0
	Total	66	100.0	100.0 JB	

TEARS PF

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	ABSENT	55	83.3	83.3	83.3
	PRESENT	11	16.7	16.7	100.0
	Total	66	100.0	100.0	

COLLE PF

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	ABSENT	36	54.5	54.5	54.5
	PRESENT	30	45.5	45.5	100.0
	Total	66	100.0	100.0	

SOFT THICK

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	ABSENT	31	47.0	47.0	47.0
	PRESENT	35	53.0	53.0	100.0
	Total	66	100.0	100.0	

FOC VASCUL

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	ABSENT	50	75.8	75.8	75.8
	PRESENT	16	24.2	24.2	100.0
	Total	66	100.0	100.0	

PT ARTERY

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	N	40	60.6	60.6	60.6
	R	26	39.4	39.4	100.0
	Total	66	100.0	100.0	

DP ARTERY

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	N	47	71.2	71.2	71.2
	R	19	28.8	28.8	100.0
	Total	66	100.0	100.0	

PR TEND

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	ABSENT	22	33.3	33.3	33.3
	PRESENT	44	66.7	66.7	100.0
	Total	66	100.0	100.0	

HTN

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	ABSENT	30	45.5	45.5	45.5
	PRESENT	36	54.5	54.5	100.0
	Total	66	100.0	100.0	

DM

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	ABSENT	20	30.3	30.3	30.3
	N	8	12.1	12.1	42.4
	PRESENT	38	57.6	57.6	100.0
	Total	66	100.0	100.0	

BM INDEX

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	ABSENT	38	57.6	57.6	57.6
	PRESENT	28	42.4	42.4	100.0
	Total	66	100.0	100.0	

REP TRAUMA

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	ABSENT	39	59.1	59.1	59.1
	PRESENT	27	40.9	40.9	100.0
	Total	66	100.0	100.0	

TOTA CHOLESTEROL

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	ABSENT	29	43.9	43.9	43.9
	PRESENT	37	56.1	56.1	100.0
	Total	66	100.0	100.0	

DISCUSSION:

Plantar fascia is responsible for raising and stabilizing the arch during gait via windlass mechanism, number of deformities prepone plantat fasciitis, the first step morning pain,and history of timing, onset, location and intensity has an important role (9). Plantar fascia bowing maintain longitudinal arch and magnetic resonance imaging and sonography are excellent imaging tools but sonograpgy has advantage for guided procedure (10). Every single step produces impact of 110% on body weight when walking and reaching upto 250% while running and soft tisse heel pad edema also increases thickness with hetrogenicity in the echogenicity (11). In a study impact of plantar fascitiis on the quality of life FHSQ score (foot health status questionnaire) show lower in females and more in males due to more phsical activity of females (12).

The mean age is sixth decade females and obese with modern techniques used are botox injection ,low dose radiotherapy, PRP-Plasma rich protien, dry needling and whole blood injection, reduces the inflammation and edema (13).simple measures can often tried to lessen the symtoms by sudden acute impact. (14) plantar heel pain is about 4%-7% due to social isolation, reduced functional capabilities (15).Management of plantar fasciitis is based on central thick plantar fascia compared medial and latreal thin bands (16). Many researchers consider plantat fasciitis is due to degeneration followed by surrounding inflammation and VAS visual analogue scale of 0-10,

higher the scale - healing is slower (17). Plantar heel pain routine bood tests are required initially and electromyography is to be considered when required (18). ADQ-abductor digiti quinti entrapment is usually missed and may be confused with plantar fasciitis with edema (19). Histological findings show granulomatous tissue, micro tears, collagen disarray, micro calcification, intrasubstance tears ¾ resolve in 12 months. Differntial diagnosis are calcaneal injury, infection, sickle cell bony pain ,contusion, neuropathic pain, osteoporosis and malignancy (20) plantar heel pain is 59% in indian population due to various reasons, pathomechanics are useful in analysis(21). Present extra corporeal shock wave therapy –ESWT is good choice prior to surgery(22). Ruptures and isolated partial rupture with neurovascular involvement with tendinopathy may cause to severe pain and increased at insertion and surrounding soft tissue and this helps in follow-up sono doppler .The biomechanical altered manifestation depends on effective utilisation of new tool and depend on clinical under standing and their bio mechanical properties along with computerisation makes advantageous in equal distribution with interpreted graphic display. Platelet-rich plasma shows significant healing with revascularisation of fascia causes show marked reversibility.

CONCLUSION:

Clinical diagnosis, vascular sonograhy with laboratory findings are excellent combination in diagnosis management and follow up and well contributes out come.

Suggestions:

More high resolution of probes and micro level vascular doppler pickup equipment and well calibrated acoustic radiation force impulse role in elasticity of tissue, upgradation of resolution in sonography.

Limitation:

Gross heel pad thickness with poor window , acute inflammation heel soft tissues and traumatic fractures.

Conflict Of Interest: none declared.
Consent and ethical approval: approved by institutional board .

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