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## International Foot & Ankle Foundation

FOR EDUCATION AND RESEARCH

*The Foot and Ankle Online Journal*

*Official Publication of the IFAF*

## Evaluation of the results of autologous blood injection in the treatment of refractory heel pain

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The Foot and Ankle Online Journal 6 (10): 2

**Background:** *Plantar heel pain is one of the most common problems of the foot treated by health care professionals. As the precise etiological diagnosis of a painful heel still remains unknown, this entity remains enigmatic and frustrating to both the physician and the patient. The present study was done to assess the efficacy of autologous blood injection in the treatment of refractory heel pain.*

**Methodology:** *Fifty patients (average age of 46.7 years), 18 (36%) males and 32 (64%) females with refractory heel pain of more than 6 months duration underwent autologous blood injection. Patients were clinically evaluated and reviewed with visual analogue scale (VAS) pain scores pre-procedure and post procedure at 6 weeks followed by a final follow up at 6 months.*

**Results:** *Our study showed a significant reduction in VAS scores which reduced from a mean score of 8 (range 6-10) to a mean score of 4 (range 2-9) at 6 weeks and 2(range 0-9) at 6 months.*

**Conclusion:** *Autologous blood injection can be used as a treatment modality in patients with heel pain.*

**Key words:** Autologous blood, heel pain, plantar fasciitis

**Accepted:** September, 2013

**Published:** October, 2013

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In 1922, Stiell stated that painful heel appears to be a condition which is seldom efficiently treated, for the simple reason that the causation is not exactly diagnosed.<sup>1</sup>

It was 40 years later that Lapidus and Guidotti, in their article "Painful heel", stated that the name *painful heel* is used deliberately in preference to any other more precise etiological diagnosis, since the cause of this definitive clinical entity still remains unknown. This entity of painful heel still remains enigmatic and often frustrating to both the doctor and the patient.<sup>2</sup>

The exact cause of painful heel is uncertain. It is known that the degenerative changes with increasing age are the most constant findings in the elastic adipose tissue of the heel pad.<sup>3-5</sup>

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Aging also brings about a gradual reduction in collagen and water content as well as in elastic fibrous tissue. Woolnough called the entity “tennis heel”, and postulated that repeated traction with aging and repeated trauma, produces microscopic tears and cystic degeneration in the origin of the plantar fascia and the flexor digitorum brevis immediately beneath the plantar fascia.<sup>4</sup> Other theories include the windlass mechanism and the neurogenic causes.<sup>5</sup>

As the etiology of plantar fasciitis is unclear, diagnosis is usually based on clinical signs including: plantar heel pain when weight-bearing after a period of rest, pain that eases with initial activity, but then increases with further use as the day progresses, and pain on palpation.<sup>6</sup> The various treatment options for this condition includes rest, massage, stretching, ultrasound, extra-corporeal shock wave therapy, cold/heat therapy, orthotics, anti-inflammatory medications, injection of corticosteroids and surgery in refractory cases.<sup>7,8</sup>

The findings of existing clinical trials provide some support for the use of corticosteroid injection in the short term management of plantar fasciitis.<sup>9</sup> However; a recent systematic review concluded that the effectiveness of this treatment has not been sufficiently established, indicating that further research is required. Local steroid injections can provide good short-term relief of symptoms, but are associated with complications such as the rupture of plantar fascia and fat pad atrophy.<sup>10,11</sup>

Treatment with autologous blood injections acts by providing various cellular and humoral mediators like growth factors which result in healing and relief of pain without any risk of plantar fascia rupture and fat pad atrophy.<sup>12</sup> As autologous blood injection in heel pain is the least studied, we carried out this study to find out the efficacy of this form of treatment in cases of refractory heel pain in which other treatment modalities had failed thus acting as their own controls.

## Material and Methods

In our study, 50 patients with refractory heel pain were included following informed consent and institutional review board approval. Inclusion criteria included all patients with unilateral symptoms of at least 6 months with failure to conservative treatment including stretching, orthotics, local steroid injections or other conservative treatment modalities. Exclusion criteria included patients with symptoms of less than 6 months duration, current skin or soft tissue infection at the site, systemic inflammatory diseases, patients with bilateral involvement and patients who had received a steroid injection or other intervention within 3 months period.

A record of the patient’s pain using a visual analogue scale (VAS) was obtained prior to the procedure using a range of 0 to 10, with 0 representing no pain and 10 the worst pain ever experienced. Two millimeters of autologous blood was drawn from the antecubital fossa of the patient. The heel along with the foot was prepared and draped and 2 ml of 2% lignocaine was infiltrated along the surface followed by insertion of a 23 G needle at the most tender point and the blood was slowly injected into the site of maximum pain. Patients were advised to follow up at 2 and 6 weeks and a final follow up at 6 months. All injections were performed by two senior orthopaedic surgeons. The VAS was recorded prior to the procedure and recorded again at 6 weeks and 6 months post injection follow-up.

## Results

Between May 2010 to June 2012, 54 patients were included in the study having met the inclusion criteria. Out of these, 4 patients were lost to follow-up while 50 patients completed the study and were followed for a period of 6 months following the injection. There were 32 (64%) females and 18 (32%) males in our study. The age of the patients ranged from 26 to 63 with an average age of 46.7 years. The mean period of symptoms was 11 months (range 6 to 28 months).

Gender	Side	Age (years)	Duration of symptoms (months)
Male= 18 (36%)	Right= 17 (34%)	<30= 2 (4%)	6 – 12= 11 (22%)
Female = 32 (64%)	Left= 33 (66%)	30 – 50= 39 (78%)	12 – 18= 33 (66%)
		>50= 9 (18%)	18 – 36= 6 ( 12%)

**Table 1:** Distribution of patients on basis of gender, age, laterality and duration of symptoms.

Visual analogue scale (VAS) score	NO. OF PATIENTS (Total=50)		
	Pre procedure	At 6 weeks	At 6 months
0 – 3	0	12 (24%)	41 (82%)
4 -7	11 (22%)	33 (66%)	4 (8%)
8 – 10	39 (78%)	5 (10%)	5 (10%)

**Table 2** The VAS scores prior to the treatment and at 6 weeks and final follow up at 6 months.

The left side was more frequently involved 33 (66%) as compared to 17 (34%) on right side. (Table 1)

In our patients, the median VAS pain score at pre procedure was 8 (range 6-10) which decreased to a mean of 4 (range 2- 9) at 6 weeks and a mean score of 2 (range 0 – 8) at 6 months. Statistical analysis revealed a significant decrease in the score ( $p<.001$ ). (Table 2)

Out of 50 cases, 4 (8%) patients showed an initial improvement but had a recurrence of symptoms with minimal or no change in VAS scores at 6 months. Five (10%) of the cases failed to respond to the treatment. Statistically significant improvement was seen in rest of the 41 (82%) cases both at 6 weeks and 6 months follow-up. Among complications 11 (22%) patients reported an initial temporary increase in pain which resolved within 2 – 3 days, with 3 (6%) patients requiring short term use of narcotics. There was no infection, neurovascular damage, plantar fascia rupture in our study group.

## Discussion

Plantar heel pain is one of the most common foot complaints presenting to a healthcare professional.<sup>13</sup> Reliable incidence data is lacking in many countries including our country. In USA, its incidence has been estimated to be around 10% and accounts for over one million medical visits every year.<sup>13, 14</sup>

A clear etiology still remains unknown, but plantar fasciitis is reported as the most common cause and the terms are frequently used interchangeably in the literature. Conservative treatment is used for this condition in majority of the cases and surgery being used in cases with failed conservative treatment. Surgery carries the risk of nerve injury, infection, rupture of the plantar fascia, and failure to improve the pain.<sup>15</sup> Corticosteroid injections have been shown to be effective in improving symptoms however it has been associated with various complications such as rupture of plantar fascia, calcaneal osteomyelitis and fat pad atrophy.<sup>10, 11</sup>

No such complication occurred in our series. In our study 41 (82%) of the patients had an excellent outcome with only 5 (10%) patients showing no relief and 4 (8%) cases showing a recurrence at final follow up.

In a study of autologous blood injections in plantar fasciitis by Frontera, 80% cases responded to the treatment.<sup>12</sup> Other treatment options like extracorporeal shock wave therapy (ESWT) have been tried recently, however there is contradictory evidence and recommendations for the efficacy of extracorporeal shockwave therapy (ESWT), as a treatment modality for plantar fasciitis.<sup>16</sup>

The introduction of autologous blood into an area of inflammation will initiate the inflammatory cascade and promote healing in an otherwise degenerative process such as tendinosis or fasciosis. Barrett, et al.<sup>17</sup> also reported on the use of injectable Autologous Platelet Concentrate (APC+) for the treatment of plantar fasciosis. The hypothesis was that by injecting APC+ into recalcitrant, symptomatic plantar fascia was thought to cause a reparative effect leading to a resolution of symptoms. He termed this technique *plantar fasciorraphy*. His study included 9 patients who enrolled in the study. Of the 9 patients enrolled, 6 patients reported complete relief of symptoms post injection. At one year post study, 7 (77.8%) of the 9 patients had complete relief of symptoms.

## Conclusion

Autologous blood injection appears to be a viable and effective treatment in chronic heel pain. It appears to be safe, cost effective and effective form of treatment even in cases who do not respond to other treatment modalities.

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