Bone Marrow Edema in Plantar Fasciitis: A Preliminary Analysis

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BONE MARROW EDEMA IN PLANTAR FASCIITIS: A PRELIMINARY ANALYSIS

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MY DISCLOSURE IS IN THE FINAL AOFAS PROGRAM BOOK.

I HAVE NO POTENTIAL CONFLICTS WITH THIS PRESENTATION.
INTRODUCTION

- Plantar fasciitis (PF) is a commonly encountered entity in the foot and ankle practice and can account for 11 – 15% of office visits with approximately 1 million people being treated for this problem every year.
- Multiple nonsurgical modalities are available to the practitioner including: ice, rest, stretching, padding/strapping, weight loss, avoidance of walking barefoot, orthotics, non-steroidal anti-inflammatory medications, corticosteroid injection(s), physical therapy, night splints and immobilization. Continued pain warrants additional imaging to evaluate the calcaneus, the plantar fascia and the surrounding soft tissue structures.
- Treatment of plantar fasciitis can be costly to the health care system. If etiologies of intractable heel pain can be identified, this may help health care practitioners more effectively manage this condition in a way that reduces the cost of treatment.
- Various studies have explored the role of MRI in plantar heel pain. There have been reports of bone marrow edema in the calcaneus, however; the role of this finding in the treatment algorithm for plantar fasciitis is still unclear.
METHODS

- Patients who presented to the Weil Foot & Ankle Institute between 2002 and 2010 and treated by the senior authors for a primary diagnosis of plantar fasciitis were eligible for inclusion in this study.

- In order to be included, the patients needed to present for more than 6 months and have medical records complete with the following information:
  - Age, body mass index (BMI), MRI, VAS scores, symptoms, treatments rendered and patient visits to full resolution of symptoms.
  - Patients were excluded if medical records were not complete with this information, if the MRI was unobtainable or if the primary diagnosis was not plantar fasciitis.
90 patients (94 feet) were found to meet inclusion criteria.
20 patients (24 feet) were excluded for incomplete medical records.

<table>
<thead>
<tr>
<th>Condition</th>
<th>Incidence</th>
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<tbody>
<tr>
<td>Bone marrow edema</td>
<td>61/94 (54.9%)</td>
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<tr>
<td>Infra-calcaneal heel spur</td>
<td>73/94 (65.8%)</td>
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<tr>
<td>Subcutaneous edema</td>
<td>54/94 (48.6%)</td>
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<td>Intra-fascial edema</td>
<td>23/94 (20.7%)</td>
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<td>Defect in the plantar fascia</td>
<td>12/94 (10.8%)</td>
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</table>
When patients were divided into two groups based on the presence or absence of bone marrow edema, a chi-squared analysis failed to find significant differences in demographic data.

The time that symptoms were present prior to presentation to the Weil Foot & Ankle Institute were not found to be significantly different between groups, however, it should be noted that the standard deviation of this value is high indicating the need for further analysis.

<table>
<thead>
<tr>
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<th>With bone marrow edema</th>
<th>Without bone marrow edema</th>
<th>p</th>
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<tbody>
<tr>
<td>Age</td>
<td>47.5 ± 7.9 (31 - 71)</td>
<td>51.6 ± 10.0 (31 - 74)</td>
<td>0.133</td>
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<tr>
<td>BMI</td>
<td>30.1 ± 6.6 (18.9 – 45.9)</td>
<td>30.4 ± 6.2 (20.8 – 47)</td>
<td>0.493</td>
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<td>Initial VAS score</td>
<td>7.6 ± 2.1 (2 - 10)</td>
<td>8.1 ± 1.9 (2 - 10)</td>
<td>0.060</td>
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<tr>
<td>Symptoms present prior</td>
<td>30.7 ± 36.5 (6 – 144)</td>
<td>38.2 ± 35.6 (6 – 120)</td>
<td>0.075</td>
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<td>Patient visits to symptom resolution</td>
<td>6.5 ± 4.0 (1 – 21)</td>
<td>6.6 ± 4.6 (2 – 17)</td>
<td>0.145</td>
</tr>
</tbody>
</table>
**Patterns of Bone Marrow Edema**

A&B. Bone marrow edema localized to the infracalcaneal spur.
C. Bone marrow in the tension trabeculae between the plantar fascia and the achilles tendon.
D. Bone marrow in the posterior 1/3\(^{rd}\) of the calcaneus.
E. Bone marrow edema to less than 50% of the bone.
F. Bone marrow edema that is diffuse to the entire bone.
In this study, bone marrow edema was present on the MRI of 54.9% of the patients with chronic, symptomatic heel pain.

Although there were no statistical differences found between patients with and without heel pain, there were also several large standard deviations found suggesting that further and alternate analyses may be necessary to elucidate the true meaning of this data.

There were 5 distinct patterns of bone marrow edema noted. This has not been previously described in the literature. The importance of these patterns of bone marrow edema are largely unknown and warrant further investigation.
References:


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