The correlation between outcome of extracorporeal shock wave therapy and findings of MR images for chronic plantar fasciitis

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Our disclosure is in the Final AOFAS Program Book.
We have no potential conflicts with this presentation.
Background

There are a few reports that investigated the ability to predict the therapeutic effect following extracorporeal shock wave therapy (ESWT) from the MR image findings prior to ESWT.  

Our purpose

To compare the MR image findings prior to ESWT and the therapeutic effect 6 months following ESWT, and investigate whether or not a therapeutic effect may be presumed from the MR image findings.
Patients and Methods

> 46 patients 50 feet
  # All patients had not effective conservative therapy over three months.

> Mean age: 55.3 y.o. (from 16 to 79 y.o.)

> Mean duration of symptoms: 23.8 months (from 4 to 240 months)

> Device for ESWT: Epos Ultra device® (Dornier MedTech Japan, Inc.)
  # All patients received 3800 shocks (3500 shocks at 0.36 mJ/mm²) for a total of 1300 mJ/mm².
Clinical success was defined as 50% improvement of VAS after a six-month follow-up.

Clinical evaluation: Visual Analogue Scale (VAS)

Radiological evaluation: MR images before ESWT

The following findings were investigated on the short tau inversion recovery (STIR) images in the sagittal plane:

- Thickened plantar fascia
- Soft tissue edema
- Intrasubstance increased signal intensity
- Bone marrow edema
## Results

MR image findings before ESWT and clinical success after ESWT

<table>
<thead>
<tr>
<th></th>
<th>Improved group (44 feet)</th>
<th>Non-improved group (6 feet)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thickness of PF</td>
<td>5.1 ± 3.2 mm</td>
<td>4.5 ± 2.3 mm</td>
</tr>
<tr>
<td>HSIA in the PF</td>
<td>36 feet</td>
<td>2 feet</td>
</tr>
<tr>
<td>Edema in the vicinity of PF</td>
<td>41 feet</td>
<td>4 feet</td>
</tr>
<tr>
<td>BME of the calcaneus</td>
<td>11 feet</td>
<td>2 feet</td>
</tr>
</tbody>
</table>

PF, plantar fascia; HSIA, high signal intensity area; BME, bone marrow edema
Multiple logistic regression analysis between the presence of improved symptoms and the four items among the MR image findings

<table>
<thead>
<tr>
<th></th>
<th>OR</th>
<th>p value</th>
<th>95% CI for OR</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Lower</td>
</tr>
<tr>
<td>Thickness of PF</td>
<td>1.05</td>
<td>0.76</td>
<td>0.76</td>
</tr>
<tr>
<td>HSIA of PF</td>
<td>8.11</td>
<td>0.03</td>
<td>1.21</td>
</tr>
<tr>
<td>Edema in the vicinity of PF</td>
<td>6.46</td>
<td>0.08</td>
<td>0.79</td>
</tr>
<tr>
<td>BME of the calcaneus</td>
<td>0.56</td>
<td>0.56</td>
<td>0.08</td>
</tr>
</tbody>
</table>

OR, Odds ratio; CI, confidence interval;

Logistic regression analysis of the presence of improved symptoms and the four items among the MRI findings revealed a positive correlation between the presence of improved symptoms and HSIA in the PF upon MRI.
Maier et al.\textsuperscript{2} reported that the presence of bone marrow edema was a good predictive variable for a satisfactory clinical outcome of ESWT. But there were a few patients with bone marrow edema before ESWT in our study.
<table>
<thead>
<tr>
<th>MR image findings</th>
<th>Pathologies</th>
</tr>
</thead>
<tbody>
<tr>
<td>Edema in the vinicity of PF</td>
<td>inflammation</td>
</tr>
<tr>
<td>HSIA in the PF</td>
<td>angiofibroblastic hyperplasia</td>
</tr>
<tr>
<td>BME</td>
<td></td>
</tr>
<tr>
<td>Thickness of PF</td>
<td></td>
</tr>
</tbody>
</table>

Berkowitz et. al (1991)

We guess the presence of inflammation was good predictive variable for a satisfactory clinical outcome of ESWT.
Conclusions

• We investigated the relationship between MRI findings before ESWT and the treatment outcome of ESWT.
• An HSIA in the PF predicted symptom improvement more easily than other MRI findings.

References