The predictive value of MRI for syndesmotic instability of ankle fracture

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Conflict of interest

The authors have no conflicts of interest to declare
Introduction

• Instability of the distal tibiofibular syndesmosis

• Incongruity of the ankle mortise, resulting in poor function, pain, and early osteoarthritis

• Plain radiographs rarely show syndesmotic injuries

• No gold standard for diagnosing syndesmotic injury and instability
Introduction

• Magnetic resonance imaging (MRI), specific signal change pattern for the syndesmotic ligament complex in syndesmosis injury

• The aim of the present study:

The MRI findings of the syndesmotic ligament and the results of an intraoperative stress test in unstable ankle fracture were assessed.
Materials and Methods

• Retrospective
• June 2012 and July 2016
• Single tertiary hospital (Korea University Guro Hospital)

Inclusion
- SER/Weber B, PER/Weber C
- Pre-operative MRI assessment
- Intraoperative stress

Exclusion
- Skeletally immature or had bilateral ankle fractures, a concomitant tibial shaft fracture, a pathologic fracture, a previous fracture, other notable injury of either ankle, peripheral neuropathy, or soft-tissue infection
Materials and Methods

Intraoperative stress test

AITFL (anteroinferior tibiofibular ligament)
Materials and Methods

PITFL (posteroinferior tibiofibular ligament)

Interosseous ligament
**Results**

Complete tear of the PITFL was the most reliable predictor of syndesmotic instability: sensitivity 62%; specificity 94%; positive predictive value 84%.

<table>
<thead>
<tr>
<th>Syndesmotic instability</th>
<th>Positive (N = 26)</th>
<th>Negative (N = 48)</th>
<th>Sensitivity</th>
<th>Specificity</th>
<th>Positive predictive value</th>
</tr>
</thead>
<tbody>
<tr>
<td>AITFL</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intact</td>
<td>0</td>
<td>0</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>Partial tear</td>
<td>1</td>
<td>4</td>
<td>4%</td>
<td>83%</td>
<td>2%</td>
</tr>
<tr>
<td>Complete tear</td>
<td>25</td>
<td>44</td>
<td>96%</td>
<td>17%</td>
<td>36%</td>
</tr>
<tr>
<td>PITFL</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intact</td>
<td>0</td>
<td>2</td>
<td>NA</td>
<td>96%</td>
<td>NA</td>
</tr>
<tr>
<td>Partial tear</td>
<td>10</td>
<td>43</td>
<td>38%</td>
<td>1%</td>
<td>19%</td>
</tr>
<tr>
<td>Complete tear</td>
<td>16</td>
<td>3</td>
<td>62%</td>
<td>94%</td>
<td>84%</td>
</tr>
<tr>
<td>Interosseous ligament</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intact</td>
<td>0</td>
<td>0</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>Partial tear</td>
<td>0</td>
<td>0</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>Complete tear</td>
<td>13</td>
<td>41</td>
<td>50%</td>
<td>15%</td>
<td>24%</td>
</tr>
</tbody>
</table>

\[\text{Complete tear of the PITFL was the most reliable predictor of syndesmotic instability: sensitivity 62\%; specificity 94\%; positive predictive value 84\%}\]
Many authors have studied the MRI findings in syndesmotic injury.

All of these studies have used MRI as the reference standard.

Decision for surgical treatment of syndesmotic instability depends on the results of the stress test.

Comparison of MRI and the intraoperative stress test has benefit for predicting the need for surgical treatment for syndesmotic instability.
Discussion

- Complete tear of the PITFL: most reliable predictive value
- Interobserver agreement: excellent
- 62% of sensitivity: not enough to justify the costs of MRI
Conclusion

• We suggest that a complete tear of the PITFL on MRI has additional diagnostic value for syndesmotic instability.

• However, the sensitivity might not be high enough to justify the costs of MRI, its cost-effectiveness should be considered.
References


