Assessment of sural nerve-originated neuropathic pain after ankle surgery

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Introduction
Neurological complications following ankle surgery may be the cause of chronic pain and disability. The sural nerve (SuN) is in particular susceptible to trauma because of its suprafascial course.

Methods
Observational retrospective survey
- 530 patients, operated in the period from January 2007 to 2014, were invited to an online questionnaire.
- Pain symptoms were assessed using the McGill Pain Questionnaire, the DN4 and the CISS.
- Risk factor analysis was performed through a logistic regression model.

Blinded case-control study
- From all survey participants 14 symptomatic patients, 14 asymptomatic patients and 14 healthy volunteers were selected.
- The SuN was identified using 18 MHz high-frequency ultrasound imaging and routine physical examination.
- Cross-sectional area (CSA), echogenicity and vascularization were measured.

Results
- A total of 271 patients completed the questionnaire.
- Mean follow-up period was 4.5 years (± 1.9) and the prevalence of neuropathic pain symptoms was 78 (28.8%).
- The following parameters were associated with neuropathic pain: hypertension (p = 0.055), diabetes (p = 0.075), a thyroid disorder (p = 0.056), lower back pain (p = 0.056) and the use of pain medication (p = 0.023).
- In multivariate analysis, no significant predictors were identified.
- The SuN was clearly identified in all 43 participants.
- CSA and vascularization were increased in symptomatic patients.
- No significant differences were found in nerve echogenicity.

Discussion
- The main limitation of the survey is its retrospective design; a potential of recall bias exists.
- This study shows no significant differences between the symptomatic and asymptomatic groups in terms of echogenicity. Ankle surgery might have altered the echogenicity of the nerve or the computerized echogenicity measurement technique might have inadequate applicability in the evaluation of peripheral nerves.
- Future research should focus on a quantitative method to score echogenicity.

Table 1: Sonographic findings

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Symptomatic patients</th>
<th>95% CI</th>
<th>Asymptomatic patients</th>
<th>95% CI</th>
<th>Healthy controls</th>
<th>95% CI</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>CSA in mm²</td>
<td>9.1 ± 2.6</td>
<td>5.7-14.4</td>
<td>5.8 ± 1.5</td>
<td>2.9-8.7</td>
<td>6.1 ± 1.8</td>
<td>2.9-8.7</td>
<td>0.000</td>
</tr>
<tr>
<td>Echogenicity</td>
<td>112 ± 13</td>
<td>92-133</td>
<td>111 ± 11</td>
<td>94-128</td>
<td>100 ± 12</td>
<td>100-136</td>
<td>0.983</td>
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<tr>
<td>Vascularization</td>
<td>9 (64)</td>
<td>1(7)</td>
<td>2 (14)</td>
<td>0.002</td>
<td></td>
<td></td>
<td></td>
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</tbody>
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References