Correlation of Clinical, Operative and Histopathologic Diagnosis of Interdigital Neuroma and the Cost of Routine Diagnosis

Sandra Klein MD
Kathryn O’Connor MD
Jeremy McCormick MD
Jeffrey Johnson MD
Disclosures

• The authors have no conflicts to disclose relative to this study:

  **Correlation of Clinical, Operative and Histopathologic Diagnosis of Interdigital Neuroma and the Cost of Routine Diagnosis**

• Disclosures for all authors are listed in the Final AOFAS mobile app

• Washington University acknowledges OMeGA Medical Grants Association and the support of Zimmer, DePuy Synthes, and Biomet Orthopedics for their generous Foot & Ankle Fellowship grant.
Introduction:

- Interdigital neuromas are a benign process with no known risk for malignant transformation
- Commonly found in the 3/4 interspace, there is an overall incidence between 50-87/100,000
- Up to 3% of patients with neuromas undergo surgical excision
- Physical exam is the most reliable mechanism for diagnosis with limited role of MRI and Ultrasound during diagnostic work up
- The cost of routine histologic examination of removed nerve specimens can be up to $500.
Aim:

• The goal of this study is to evaluate the accuracy of the clinical and intraoperative diagnosis of IDN and correlate these with the histopathologic results of IDN.

• We hypothesize that in cases where histopathologic results deviate from IDN, clinical and intraoperative findings were observed that predicted a variation from the expected findings of IDN on histopathologic exam.

Design:

• Retrospective review of three fellowship trained foot and ankle surgeons of all cases including CPT code 28080
Methods:

- Cases from 4/97-7/14 were reviewed
- Charts were reviewed for:
  - Causes of forefoot pain in clinic
  - Clinical diagnosis
  - Postoperative course
- Surgical records were reviewed for:
  - Preoperative and postoperative diagnosis
  - Any documented abnormal findings during neuroma excision procedures
  - Additional procedures
- Histopathology reports were reviewed for:
  - Histologic diagnosis
- Diagnosis at each stage of care were compared to determine the accuracy of clinical and surgical diagnosis compared to histological diagnosis.
Results:

- 133 neuromas in 123 patients were identified
- 68 left sided, 65 right sided
- 48% 2/3 space, 51% ¾ space
- 29 MRI, 6 U/S with no concerning results
- 71 injections given during preoperative course
- 47 pts had other procedures at the time of neuroma excision
  - Weil osteotomy, hammertoe corrections, hallux valgus and others
**Results:**

- During clinical evaluation 4 pts with 5 neuromas had concern for alternate cause of pain including:
  - RA nodule x2
  - Stress reaction
  - Ganglion cyst
  - 3rd MTP synovitis
- During surgical intervention one pt had findings not fully expected
  - Cystic lesion found along with neuroma in case of revision neuroma excision
- Histopathology found benign nerve tissue in 132/133 cases
  - One case had no nerve tissue identified, in the setting of a rheumatoid nodule.

<table>
<thead>
<tr>
<th>Clinical Dx</th>
<th>Surgical Dx</th>
<th>Pathology Dx</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>IDN vs stress reaction*</td>
<td>IDN</td>
<td>IDN</td>
<td>Hx of 2nd met. stress fracture</td>
</tr>
<tr>
<td>IDN vs RA nodule*</td>
<td>IDN and RA nodule</td>
<td>IDN and RA nodule</td>
<td>PMH of RA Same pt as below 1st surgery</td>
</tr>
<tr>
<td>IDN vs RA nodule vs bursitis*</td>
<td>IDN encased in soft tissue mass of RA nodules</td>
<td>RA nodule</td>
<td>PMH of RA Same pt as above 2nd surgery</td>
</tr>
<tr>
<td>IDN vs Cyst*</td>
<td>IDN and cyst</td>
<td>IDN and Cyst</td>
<td>MRI found ganglion cyst at 3/4 space</td>
</tr>
<tr>
<td>IDN vs 3rd MTP synovitis*</td>
<td>IDN</td>
<td>IDN</td>
<td>MRI found 3/4 interosseous muscle strain</td>
</tr>
<tr>
<td>Recurrent IDN</td>
<td>IDN and cystic lesion*</td>
<td>IDN and synovial tissue</td>
<td>U/S reported fluid in interspace, no clear cyst</td>
</tr>
</tbody>
</table>

* Indicates point during treatment where of abnormal finding was identified

RA=Rheumatoid.

- Histology confirmed the suspected alternative diagnosis (RA nodules, benign cysts) in all 6 cases of clinical or operative concern
- No cases had a change in post operative course based on histology findings
Conclusions:

- Clinical and intraoperative diagnosis of neuroma are highly accurate when compared to histologic diagnosis.
- In all cases where there was concern for an alternate cause of pain or pathology the surgeon correctly identified this in the clinical or intraoperative assessment.
- All histology was benign and identified nerve in 132/133 cases and results did not alter the post operative course in any case.
- It is reasonable to consider eliminating routine pathology in cases of neuroma without other clinical concern.
- Cost savings of ~$480 per case would have resulted in $63840 over the course of these treatments.
References:


