Testing a Scoring System for Predicting Lymph Node Malignancy in Ultrasound Guided FNA Practice

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Proposed Scoring System (S)

- $0.06 \times \text{(age)} + 4.76 \times \text{(S/L ratio)} + 2.15 \times \text{(internal echo)} + 1.80 \times \text{(vascular pattern)}$

- $S < 7$….Benign
- $S > 7$….Malignant

*Reference: Li-Jen Liao et al “Real-time and computerized sonographic scoring system for predicting malignant cervical Lymphadenopathy Head and Neck, Published on line, 19 Aug 2009*
Example 1
27 year old HIV+ male with bilateral cervical lymphadenopathy, FNA of largest one
$S_1$

- $= 0.06 \times 27 + 4.76 \times (0.86/2.38) + 2.15 \times (0) + 1.80 \times (0)$
- $= 3.46 < 7$

- FNA Cytology: Benign
- Flow: -
Example 2

51 year old male with Hx of PTC, FNA of Level IV LN
$S_2$

- $= 0.06 \times 51 + 4.76 \times (0.33/0.54) + 2.15 \times (1) + 1.80 \times (0)$
- $= 8.12 > 7$

- FNA Cytology: Positive for met PTC
Study Design

• Retrospective study
• N=83
• USG-FNA of Head and Neck LNs
• Period: 7/1/2008 to 4/28/2010
• Factors: age, S/L ratio, internal echo and vascular pattern
• Gold standard: FNA cytology diagnosis, flow surgical diagnosis (some cases)
• Score calculation and statistical analysis
Cut off = 7

- > 7 indicative for malignancy
- < 7 indicative for benign
## Results

<table>
<thead>
<tr>
<th>USGFNA (N=83)</th>
<th>Malignant Pathology</th>
<th>Benign Pathology</th>
<th>Statistics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Score &gt;7 (malignant)</td>
<td>38 (TP)</td>
<td>8 (FP)</td>
<td><strong>PPV</strong> (TP/TP+FP) 83%</td>
</tr>
<tr>
<td>Score &lt;7 (benign)</td>
<td>0 (FN)</td>
<td>37 (TN)</td>
<td><strong>NPV</strong> (TN/TN+FN) 100%</td>
</tr>
<tr>
<td>Statistics</td>
<td><strong>Sensitivity</strong> (TP/TP+FN) 100%</td>
<td><strong>Specificity</strong> (TN/TN+FP) 82%</td>
<td><strong>Accuracy</strong> (TP + TN)/(TP + FP + FN + TN) 90%</td>
</tr>
<tr>
<td>Case #</td>
<td>Age</td>
<td>sex</td>
<td>S(cm)</td>
</tr>
<tr>
<td>------------</td>
<td>-----</td>
<td>-----</td>
<td>-------</td>
</tr>
<tr>
<td>PC-10-07873</td>
<td>89</td>
<td>F</td>
<td>0.31</td>
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<tr>
<td>PC-09-05708</td>
<td>59</td>
<td>M</td>
<td>1.86</td>
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<tr>
<td>PC-10-04289</td>
<td>77</td>
<td>F</td>
<td>0.66</td>
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<tr>
<td>PC-10-05713</td>
<td>63</td>
<td>F</td>
<td>0.3</td>
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<tr>
<td>PC-09-31763</td>
<td>61</td>
<td>M</td>
<td>0.44</td>
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<tr>
<td>PC-09-24923</td>
<td>60</td>
<td>M</td>
<td>1.4</td>
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<tr>
<td>PC-10-04297</td>
<td>64</td>
<td>M</td>
<td>0.69</td>
</tr>
<tr>
<td>PC-09-20181</td>
<td>62</td>
<td>M</td>
<td>1.84</td>
</tr>
</tbody>
</table>
8 “False Positive” Cases

• 3/8 (37.5%) → True Positive!
Case 1

59 yr old male with Hx of PTC 3yrs ago, now with a level II RT neck mass and B-symptoms
• FNA Cytology:
  – Reactive lymphoid population and acute inflammatory cells
• Flow: -
• Culture: -
• S=8.25 !
• Recommended further investigation
Repeat FNA of the Same Node
11 month later
Immuno Profile

- P63: +
- Pancytokeratins: +
- TTF-1: -
- TG: -
- S100: -
- Synaptophysin: -
- Chromogranin: -
Final FNA diagnosis

• Metastatic squamous cell carcinoma, poorly differentiated
Surgical Resection of RT Tonsil: Poorly Differentiated SCC
(MS10-53227)
Case 2

64 yr old male with Hx of tonsilar SCC S/P Chemo/Radiation Tx, now with PET+ level IV node
FNA of the level IV node
(Pc10-4297)
\[ S = 10.15! \]

- Recommended further investigation
Repeated FNA after 3 months
Metastatic SCC
(Pc10-17151)
Case 3
62 yr old male LT neck LN and Hx of being scratched by a cat
Ancillary studies

- **CD3, CD4, & CD5:**
  - + in most of smaller cells
- **CD79a & CD20:**
  - + in small and larger cells
- **CD30:**
  - + in rare blasts
- **CD15 and CD68:**
  - + in follicular dendritic cells

- **Special stains:**
  - Steiner: -/?
  - AFB: -
  - GMS: -

- **Flow:**
  - B-cells were polyclonal based on K&L
• FNA cytology:
  – Compatible with reactive lymphoid hyperplasia presently, however, Hodgkin’s or other types of malignancy cannot be ruled

• S=10.63 !

• Recommend further investigation
Surgical excision of the node 2 months later
Diffuse large B-cell lymphoma, Grade 3A, partially involved

- CD20: +
- CD79a: +
- BCL6: +
- PAX5: +
- MUM-1: +
- CD23: + in disrupted follicular dendritic cell network

- CD5: -
- CD10: -
- Cyclin D1: -
- BCL2: -
- CD30: -
Lesson learnt

• Repeat USG-FNA should be performed in high Score cases
• **Surgical bx** may be necessary for high Score cases
Conclusion

• This scoring system may serve as a complementary tool to USG-FNA practice in determining:
  – How aggressive a FNA procedure should be
  – How a FNA sample of LN should be triaged for ancillary study
  – How closely a patient with lymphadenopathy should be followed up.
Recommendation

Flow Chat for LN Work Up