Clinical Area: FDG PET for head and neck cancer: lymph node staging

Keywords: FDG PET, lymph node, head and neck cancer, conventional imaging modalities


Study Type: Comparison of diagnostic tests

Study Aim: To compare the performance of FDG PET and conventional imaging modalities at detecting cervical lymph node metastases of head and neck cancer.

Outcomes
- Primary: Sensitivity, sensitivity

Design
- Number of subjects: N=60
- Description of study population: 16 female/44 male; mean age=58 ± 10 years (range 38-76 years).
- Procedure: FDG-whole body PET. Patients received physical examinations by the head and neck surgeon and preoperative endoscopy (including biopsy) within two weeks before the PET scan. Also preceding the PET scan, patients had CT scans, MRIs and high resolution ultrasounds.

Validity
- Independent blind comparison with a gold standard or follow-up of those not receiving the gold standard test? Yes, independent blind comparison. Gold standard was histopathological evidence.
- Was “normal” defined? Yes, defined as level of standard uptake values (SUV). Lesions with SUV> 2.0 were considered malignant.
- Appropriate spectrum of disease? Yes.
- Consecutive patients? Not specified.
- Methods described in enough detail to enable you to replicate the test? Yes.
- Reproducible results? Yes.

Conclusions regarding validity of methods:
Reasonably well-done study with a moderate sample size. Patients may not have been consecutive which could introduce selection bias.
Results
Comparison of FDG PET and conventional imaging with histopathological findings (n=60 patients)

<table>
<thead>
<tr>
<th>Method</th>
<th>Sensitivity</th>
<th>Specificity</th>
<th>PPV</th>
<th>NPV</th>
</tr>
</thead>
<tbody>
<tr>
<td>PET</td>
<td>90</td>
<td>94</td>
<td>58</td>
<td>99</td>
</tr>
<tr>
<td>CT</td>
<td>82</td>
<td>85</td>
<td>35</td>
<td>98</td>
</tr>
<tr>
<td>MRI</td>
<td>80</td>
<td>79</td>
<td>27</td>
<td>98</td>
</tr>
<tr>
<td>Sonography</td>
<td>72</td>
<td>70</td>
<td>19</td>
<td>70</td>
</tr>
</tbody>
</table>

PPV=positive predictive value; NPV=negative predictive value

Total number of resected lymph nodes in comparison with histopathological findings (n=1284 nodes)

<table>
<thead>
<tr>
<th>Method</th>
<th>True-Positive</th>
<th>False-negative</th>
<th>False-positive</th>
<th>True-negative</th>
</tr>
</thead>
<tbody>
<tr>
<td>PET</td>
<td>105</td>
<td>12</td>
<td>75</td>
<td>1092</td>
</tr>
<tr>
<td>CT</td>
<td>96</td>
<td>21</td>
<td>175</td>
<td>992</td>
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<tr>
<td>MRI</td>
<td>94</td>
<td>23</td>
<td>250</td>
<td>917</td>
</tr>
<tr>
<td>Sonography</td>
<td>84</td>
<td>33</td>
<td>350</td>
<td>817</td>
</tr>
</tbody>
</table>

Authors’ Conclusions
“In conclusion, this prospective histologically controlled study confirms FDG PET as the procedure with the highest sensitivity and specificity for detecting lymph node metastases of head and neck cancer.”

Reviewer’s Conclusions
This relatively valid study found that FDG PET performed well compared to conventional imaging modalities in correctly identifying lymph node metastases in patients with head and neck cancer prior to surgery. Sensitivity, specificity and positive predictive value were higher than for MRI, ultrasonography and CT scans. The study did not provide information on changes in patient management due to FDG PET findings.