Applications of PET in Head and neck cancer – cons

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Case 1

59y/o male patient, NPC, T1N0M0
R/T
Immediate post-treatment F/U: no lesion
1 year later, severe headache

~The British Journal of Radiology, 77,257-260,2004
MRI

PET

~The British Journal of Radiology, 77, 257-260, 2004
Case 1

- Nasopharyngeal debridement:
  - Osteoradionecrosis
  - Hyperbaric oxygen
- PET, 2 months later: no lesion observed

~The British Journal of Radiology, 77, 257-260, 2004
MRI indeterminate study

<table>
<thead>
<tr>
<th></th>
<th>TP</th>
<th>TN</th>
<th>FP</th>
<th>FN</th>
<th>Sens</th>
<th>Spec</th>
<th>PPV</th>
<th>NPV</th>
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<tr>
<td>Primary</td>
<td>11</td>
<td>19</td>
<td>6</td>
<td>1</td>
<td>91.6</td>
<td>76</td>
<td>64.7</td>
<td>95</td>
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<td>Regional node</td>
<td>9</td>
<td>4</td>
<td>3</td>
<td>1</td>
<td>90</td>
<td>88.9</td>
<td>75</td>
<td>96</td>
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<tr>
<td>Distal</td>
<td>5</td>
<td>20</td>
<td>3</td>
<td>0</td>
<td>90.6</td>
<td>62.5</td>
<td>100</td>
<td>91.9</td>
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<tr>
<td>Overall</td>
<td>17</td>
<td>10</td>
<td>8</td>
<td>2</td>
<td>80.5</td>
<td>55.6</td>
<td>68</td>
<td>83.3</td>
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</tbody>
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N = 47

False positive in 8 cases

False negative in 2 cases

~THE JOURNAL OF NUCLEAR MEDICINE 45(10), 1669-1676, 2004
Pretreatment Staging

- **T stage**: no obvious benefit
- **Cervical nodal staging**

<table>
<thead>
<tr>
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<th>PET</th>
<th></th>
<th>CT</th>
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<th>MRI</th>
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<td>25~87</td>
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<td>Spec</td>
<td>88~100</td>
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<td>65~81</td>
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<td>Spec</td>
<td>47~81</td>
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<td>Spec</td>
<td>88</td>
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</tbody>
</table>

- Find secondary primaries or distant metastasis
- High false positive in some study
- Cost effectiveness needed further investigation

~Seminars in Nuclear Medicine, 34(3), 2004:180-197
~Seminars in Radiation Oncology, 14(2), 2004:121-129
Finding the occult primary cancer

- Detection rate 10~60%
- False positive rate 24%, 38% and 46% in three studies

~Seminars in Nuclear Medicine, 34(3), 2004:180-197
~Seminars in Radiation Oncology, 14(2), 2004:121-129
### Post-treatment Recurrence

<table>
<thead>
<tr>
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<th>Sens</th>
<th>Spec</th>
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<td>CT/MR</td>
<td>38~90%</td>
<td>38~85%</td>
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<tr>
<td>PET</td>
<td>71~100%</td>
<td>57~99%</td>
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~Seminars in Nuclear Medicine, 34(3), 2004:180-197
~Seminars in Radiation Oncology, 14(2), 2004:121-129

The role in deciding post-R/T neck dissection?

Sens:45% Spec:100% NPV:14%

Conclusion

- PET is an alternative image tool
- Oncology and non-oncology use
- PET may be helpful in head and neck cancer
- New labeling agent?
Thanks for your attention