Role of PET/CT in Breast Cancer

Patrick J. Peller MD
Chief Medical Officer
Eka Medical Center-Jakarta

Adana 4 April 2015
Clinical Roles For FDG PET/CT

• Initial evaluation
  – Diagnosis
  – Staging and prognosis
  – Treatment planning

• Subsequent evaluation
  – Detecting recurrence
  – Staging recurrence
  – Therapy assessment
Normal FDG Breast Uptake

Premenopausal

Postmenopausal

Postmenopausal Estrogen

Postpartum
Breast Cancer Diagnosis
## Breast Cancer Diagnosis

<table>
<thead>
<tr>
<th>Primary size</th>
<th>Sensitivity</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;0.5cm</td>
<td>25%</td>
</tr>
<tr>
<td>&gt;0.5cm-1.0cm</td>
<td>25%</td>
</tr>
<tr>
<td>&gt;1.0cm-2.0cm</td>
<td>84%</td>
</tr>
<tr>
<td>&gt;2.0cm-3.0cm</td>
<td>94%</td>
</tr>
<tr>
<td>&gt;3.0cm-4.0cm</td>
<td>87%</td>
</tr>
<tr>
<td>&gt;4.0cm-5.0cm</td>
<td>93%</td>
</tr>
<tr>
<td>&gt;5.0cm</td>
<td>100%</td>
</tr>
</tbody>
</table>

Incidental Breast Cancer

Incidence of unexpected increased breast--0.82% to 6.3%
Malignancy present--55.6–88.3%
Breast Cancer Staging and Prognosis
Breast Cancer Staging and Prognosis

• 254 consecutive pts. clinically staged as II or III
• PET-CT changed the clinical stage in 77 of 254 pts. (30.3%)
• Unsuspected N3 disease in 40 pats.
• Distant metastases in 53 pts.
• Disease-specific survival was statistically significantly shorter in pts. M1 by PET-CT
• Relative risk of death was 26.60 for M1 vs. M0 pts.
• PET-CT provided powerful prognostic stratification

Breast Cancer Staging and Prognosis
Breast Cancer Staging and Prognosis

• Study group comprised 50 women with inflammatory breast cancer
• Intense FDG uptake in all primary tumors
• FDG avid axillary nodes found in 47 patients
• 19 patients (38%) found have metastatic disease on PET/CT
• PET/CT M1 patients had significant shorter progression-free survival than M0 patients

Breast Cancer Treatment Planning

• Multidisciplinary treatment approach
  – Surgery
  – Radiotherapy
  – Chemotherapy

• Clinical decisions are:
  – Where?, When? In what order?
Breast Cancer Treatment Planning
Breast Cancer Detecting Recurrence
Breast Cancer Detecting Recurrence
Breast Cancer Detecting Recurrence

• Retrospective study from MD Anderson
• 225 patients evaluated for distant metastases
• Conventional Imaging (CT, US, bone scan, plain film)
  • Sensitivity 85.9% ; specificity 67.3%
• FDG PET/CT
  – Sensitivity 97.4% ; Specificity 91.2%

Breast Cancer Staging Recurrence
Breast Cancer Staging Recurrence

• With conventional imaging often difficult to differentiate true recurrence from postsurgical and radiation sequelae

• PET-CT performance:
  – Sensitivity 98.7%; Specificity 85.3%
    Manohar, et al. Nucl Med Comm 2012;33:59.1
  – Sensitivity 93%; Specificity 100%
  – Changed management in 51%
Breast Cancer Therapy Assessment
Breast Cancer Therapy Assessment

• Negative PET following high dose chemo associated with 24 month survival
• PET demonstrates response rate twice that of conventional imaging
• PET powerful and independent predictor of survival

Cachin F J Clin Oncol 2006; 24:3026.
Clinical Roles For FDG PET/CT

• Initial evaluation
  – Diagnosis
  – Staging and prognosis
  – Treatment planning

  Important use: Dedicated imaging device
  Clinical stage ≥IIA

• Subsequent evaluation
  – Detecting recurrence
  – Staging recurrence
  – Therapy assessment

  Best test
Thank You

Member of Sinarmas Healthcare