FDG-PET/CT
Melanoma - Staging

Newly diagnosed melanoma:
1. Non-visualization of primary tumor (after excision)
2. The primary tumor is located in the neck
3. The patient has disseminated disease
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1. Non-visualization of primary tumor (after excision)
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3. *The patient has disseminated disease*

Primary tumor - frontal scalp
Nodal metastases - right axilla & left neck
Melanoma
Performance of FDG Imaging

• Overall performance (*Schwimmer, meta-analysis QJNM*): sensitivity 92%, specificity 90%
• Stage 1-2 (>80% localized disease): limited use
• Stage 3 (<15% regional disease):
  Sensitivity 87%, PPV – 91% (*Tyler, Cancer* 2000)
  Upstage to stage 4: 17% (*Bastiaannet, Br J Surg* 2006)
• Stage 4 (<5% metastatic disease):
  Sensitivity 94%, Specificity 83%
FDG-PET/CT, Melanoma of Upper Back
S/a resection, Follow-up, Abdominal Pain

1. Negative FDG PET/CT
2. Multiple FDG+ sites: metastatic melanoma
3. Multiple FDG+ sites: 2nd primary colon ca with metastases
4. Multiple FDG+ sites: physiologic
1. Negative FDG PET/CT
2. *Multiple FDG+ sites: mets of melanoma*
3. Multiple FDG+ sites: 2\textsuperscript{nd} colonca with mets
4. Multiple FDG+ sites: physiologic

Metastasis in Stomach

Metastases in small bowel & mesenteric LN
Melanoma – Localization & Treatment

• Primary: Skin, Women - extremities / Men - trunk

• Metastases:
  – lymph nodes, skin, soft tissue, lung liver
  – unusual spread: GIT, myocardium, leptomeninges

Importance of correct staging - Treatment options

• Surgical excision – treatment of choice for:
  – local disease
  – single regional LN
  – isolated distant metastases

• Limited success rate: limb perfusion chemotherapy, tumor vaccines, radiotherapy
Melanoma – Lt. Adrenal Metastasis
Treatment Planning (Surgery?)

1. The patient has a single metastasis – proceed with surgery
2. The patient has additional metastases – surgery should be cancelled
3. The additional FDG+ focus in the right upper abdomen is according to the physiologic biodistribution of the tracer and of no clinical significance
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2. The patient has additional metastases – surgery should be cancelled
3. The additional FDG+ focus in the right upper abdomen is within the physiologic biodistribution of the tracer and of no clinical significance
Melanoma - Adrenal Mass Treatment Planning (Surgery?)

1. Single metastasis – proceed with surgery
2. The patient has additional metastases – surgery should be cancelled
3. Additional FDG+ focus in the right upper abdomen, within the physiologic FDG biodistribution, of no clinical significance

Additional metastasis in retroperitoneal LN, retrospectively detected on CT
FDG-PET/CT in Melanoma
Changes in Management

• Sparing unnecessary surgical procedures
  (4-24% clinically limited disease are non-resectable following FDG-PET/CT)
• Referral to previous unplanned surgery
• Referral/Addition of immuno/chemotherapy
• Addition of radiotherapy

250 pts: treatment change - 48%

Reinhardt, JCO, 2006
The patient shows:

1. Complete response
2. Partial response
3. Stable disease
4. Tumor Progression
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New Inguinal LN Metastasis
Melanoma

Indications for FDG Imaging

• Detection of metastases (regional & distant)
• Staging of intermediate >2mm & high-risk > 4mm tumors
• Restaging of high-risk tumors
  • Low risk melanoma (thin <1mm):
    favorable prognosis; 15% chance for mets
  • High risk melanoma (thick >4mm):
    50-70% of all melanoma, 5-year survival <50%, 10% distant mets
• Extent of disease in clinically resectable disease
• Monitoring response to chemo- and radiotherapy
• Further evaluation of equivocal findings on CT
• Follow up in high-risk patients
The use of FDG PET/CT is recommended:

• Initial evaluation of clinical stage II and IV
• Suspected recurrence and metastases.
• In addition to conventional imaging for restaging of recurrent melanoma.
F, 62y, Breast ca, s/a surgery 2 yrs, Rising CEA

1. Negative FDG-PET/CT study, physiologic uptake in rectum
2. 2\textsuperscript{nd} primary malignant tumor in rectum
3. Metastasis in sacral bone
FDG-PET/CT in Breast Cancer, Rising Serum Markers Occult Recurrence? The Significance of Incidentaloma in the GI Tract

Israel et al, JNM 2006

Biopsy: adenocarcinoma

1. Negative FDG-PET/CT study, physiologic uptake in rectum
2. 2nd primary malignant tumor in rectum
3. Metastasis in sacral bone
FDG-avid Focus in Left Chest

M, 50y, FUO

Normal CT of chest and abdomen

1. FDG+ uptake in chest wall, most probably recent fracture in rib

2. FDG+ in left breast – cancer

3. FDG+ in left breast in a male patient – of no clinical significance

4. FDG+ in left breast – should be further evaluated
FDG-avid Focus in Left Breast

1. FDG+ uptake in chest wall, most probably recent fracture in rib
2. FDG+ in left breast – cancer
3. FDG+ in left breast in a male patient – of no clinical significance
4. **FDG+ in left breast – should be further evaluated**

FDG-avid focus in small nodule in left breast behind the nipple

Left breast abscess (diagnosed by US guided FNA)
FDG-avid Focus in Left Breast
Assessment of Fever of Unknown Origin

F/U/O: 3 major etiologies:

Infections: main etiology - mostly of bacterial origin (e.g. tuberculosis, abscess, endocarditis, osteomyelitis); less frequent - viral

Malignancy: mainly lymphoma, leukemia, renal cell carcinoma or liver mets

Inflammatory processes: arthritis, arteritis, inflammatory bowel disease, systemic lupus erythematosus.