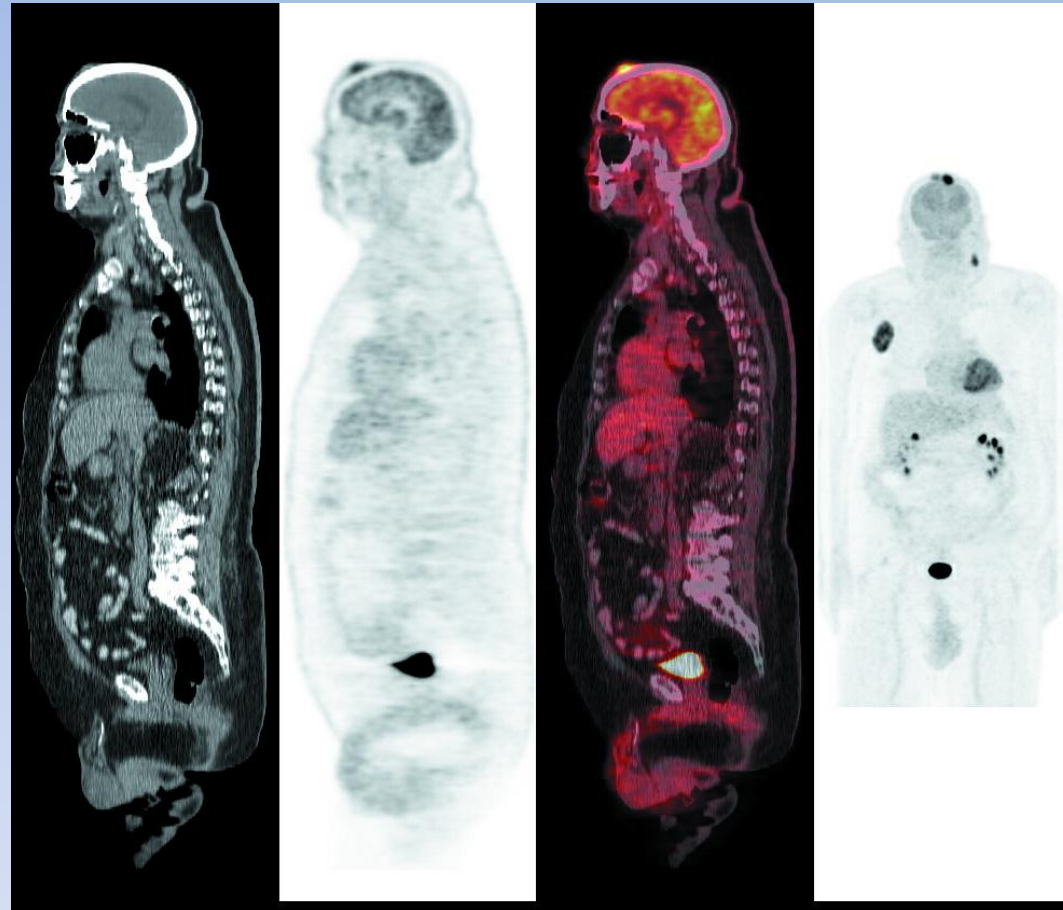


FDG-PET/CT

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

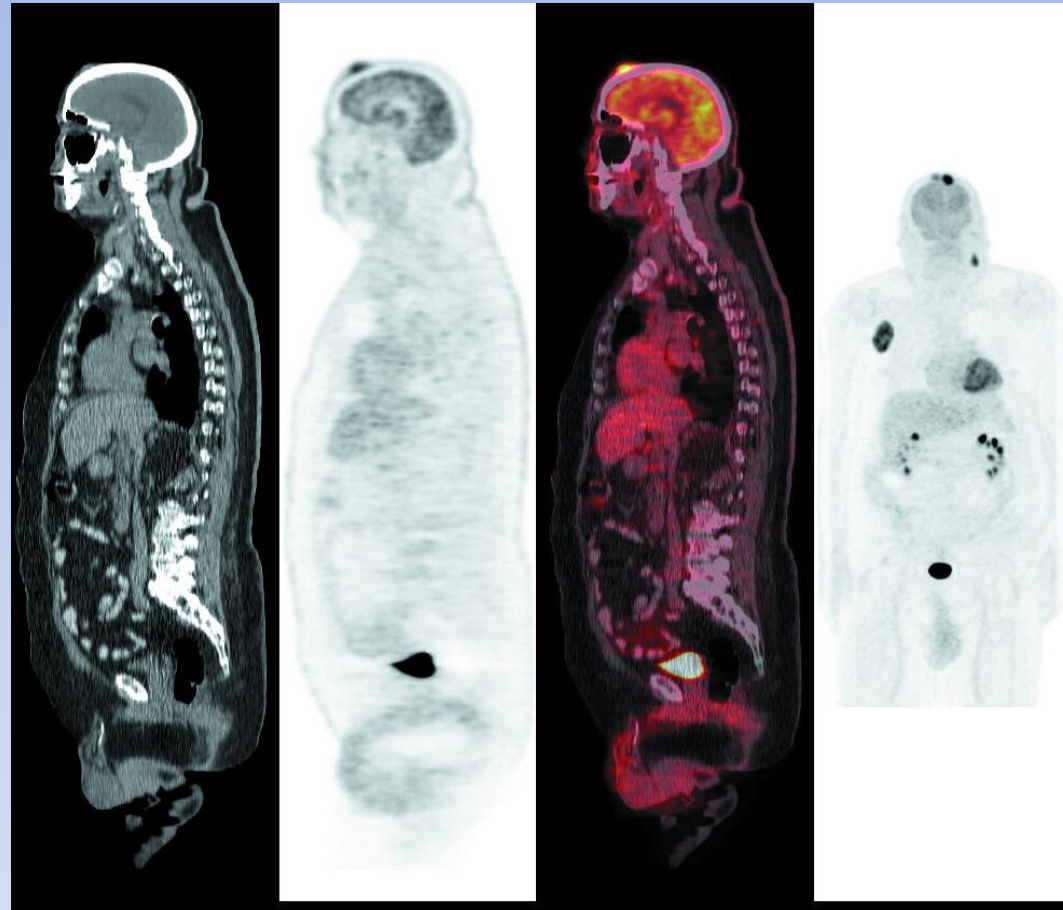


FDG-PET/CT

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***



Primary tumor - frontal scalp

Nodal metastases - right axilla & left neck



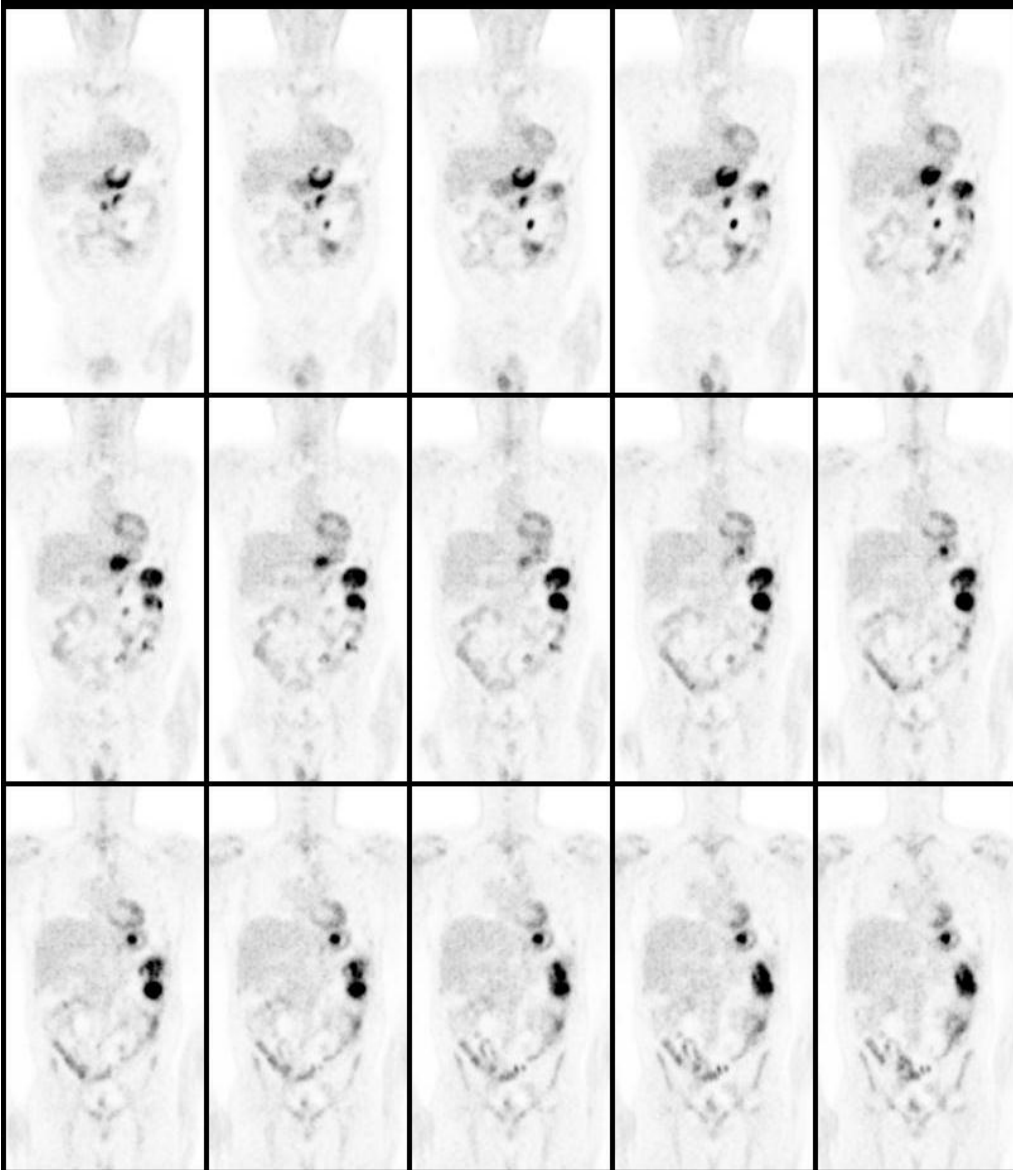
Melanoma

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%



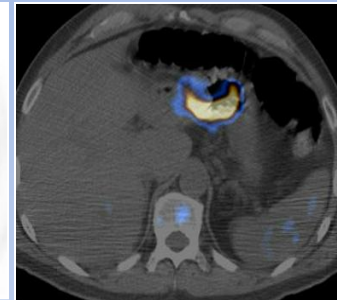
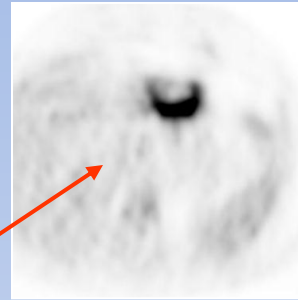
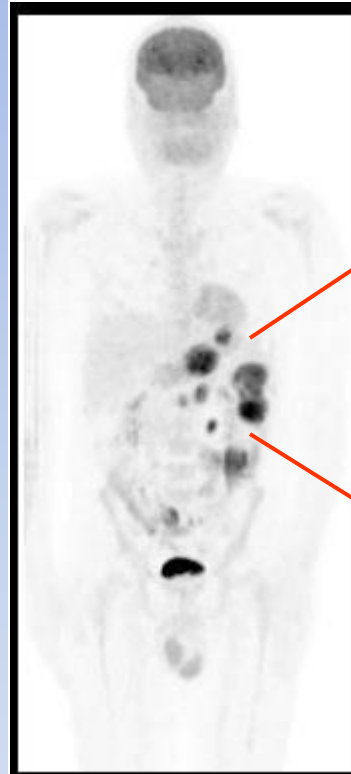
FDG-PET/CT , Melanoma of Upper Back S/a resection, Follow-up, Abdominal Pain



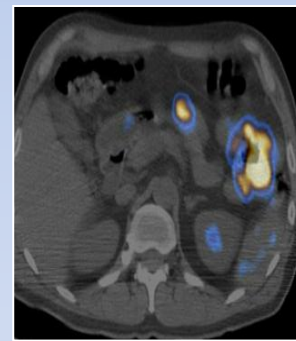
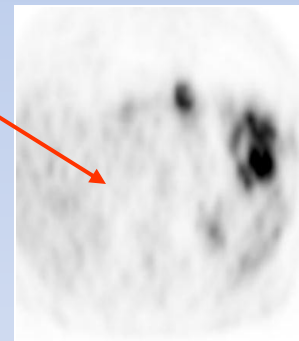
1. Negative FDG PET/CT
2. Multiple FDG+ sites:
metastatic melanoma
3. Multiple FDG+ sites: 2nd
primary colon ca with
metastases
4. Multiple FDG+ sites:
physiologic

FDG-PET/CT , Melanoma of Upper Back S/a resection, Follow-up, Abdominal Pain

1. Negative FDG PET/CT
2. **Multiple FDG+ sites: mets of melanoma**
3. Multiple FDG+ sites: 2nd colon ca with mets
4. Multiple FDG+ sites:
physiologic



Metastasis in Stomach



**Metastases in small bowel
& mesenteric LN**

Melanoma – Localization & Treatment

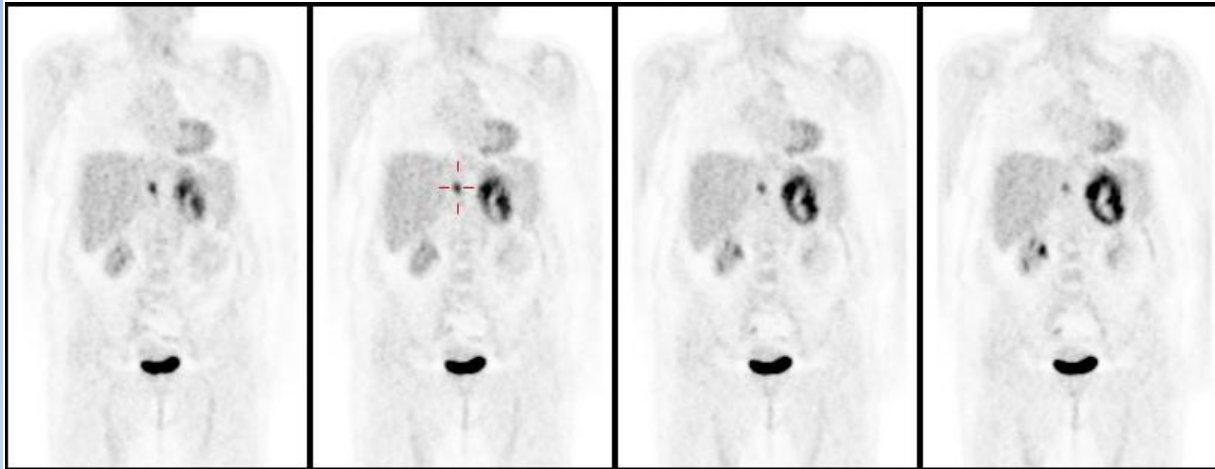
- Primary: Skin, Women - extremities / Men - trunk
- Metastases:
 - lymph nodes, skin, soft tissue, lung liver
 - unusual spread: GIT, myocardium, leptomeninges

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

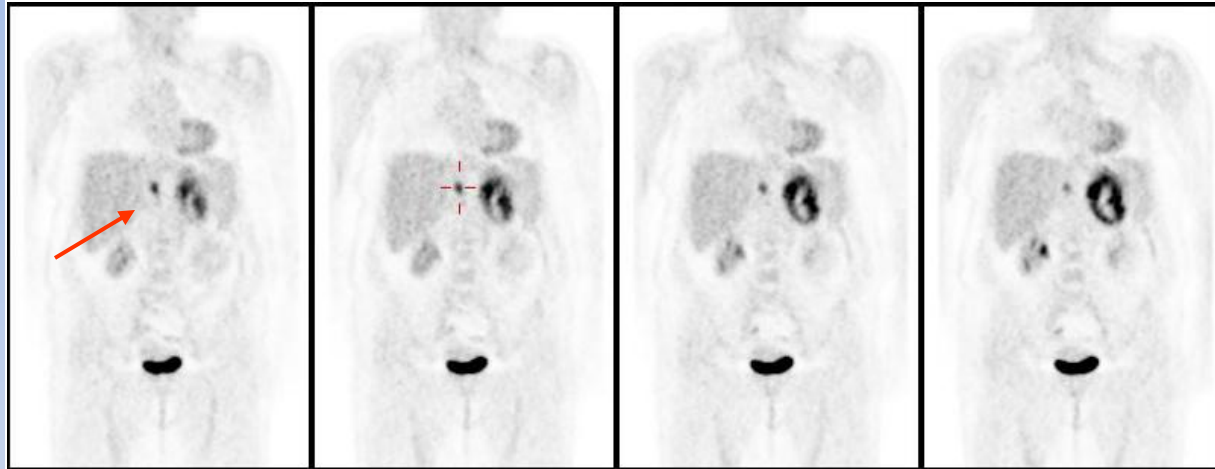


Melanoma – Lt. Adrenal Metastasis Treatment Planning (Surgery?)

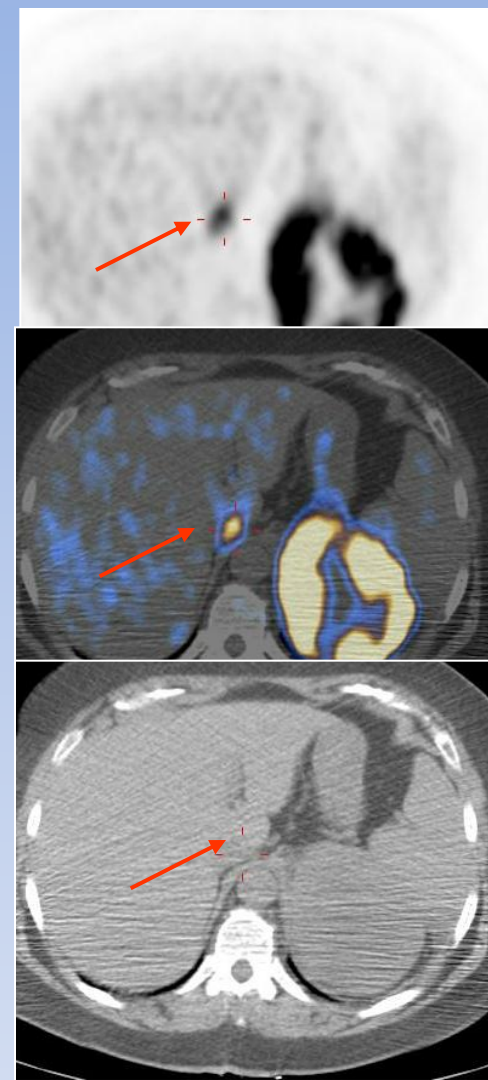


1. The patient has a single metastasis – proceed with surgery
2. The patient has additional metastases – surgery should be cancelled
3. The additional FDG+ focus in the right upper abdomen is according to the physiologic biodistribution of the tracer and of no clinical significance

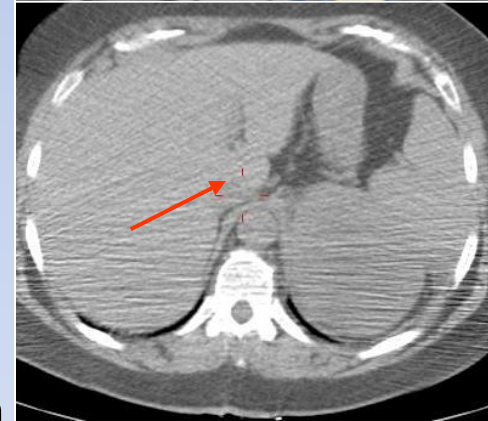
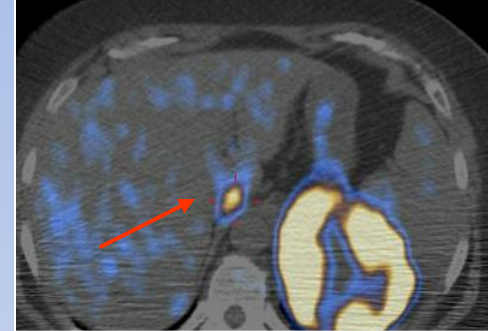
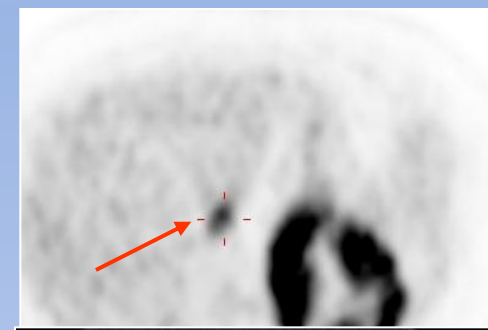
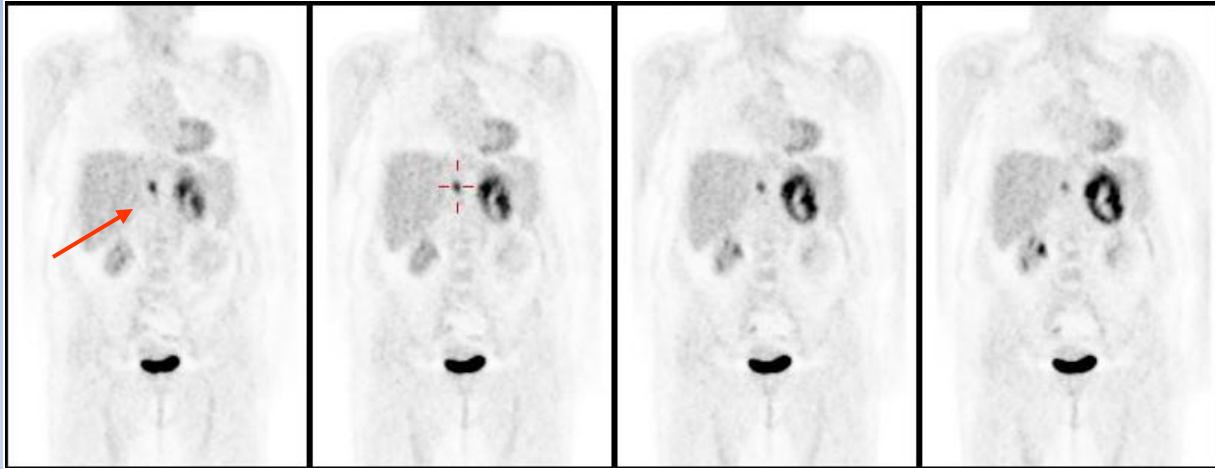
Melanoma - Adrenal Mass Treatment Planning (Surgery?)



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 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

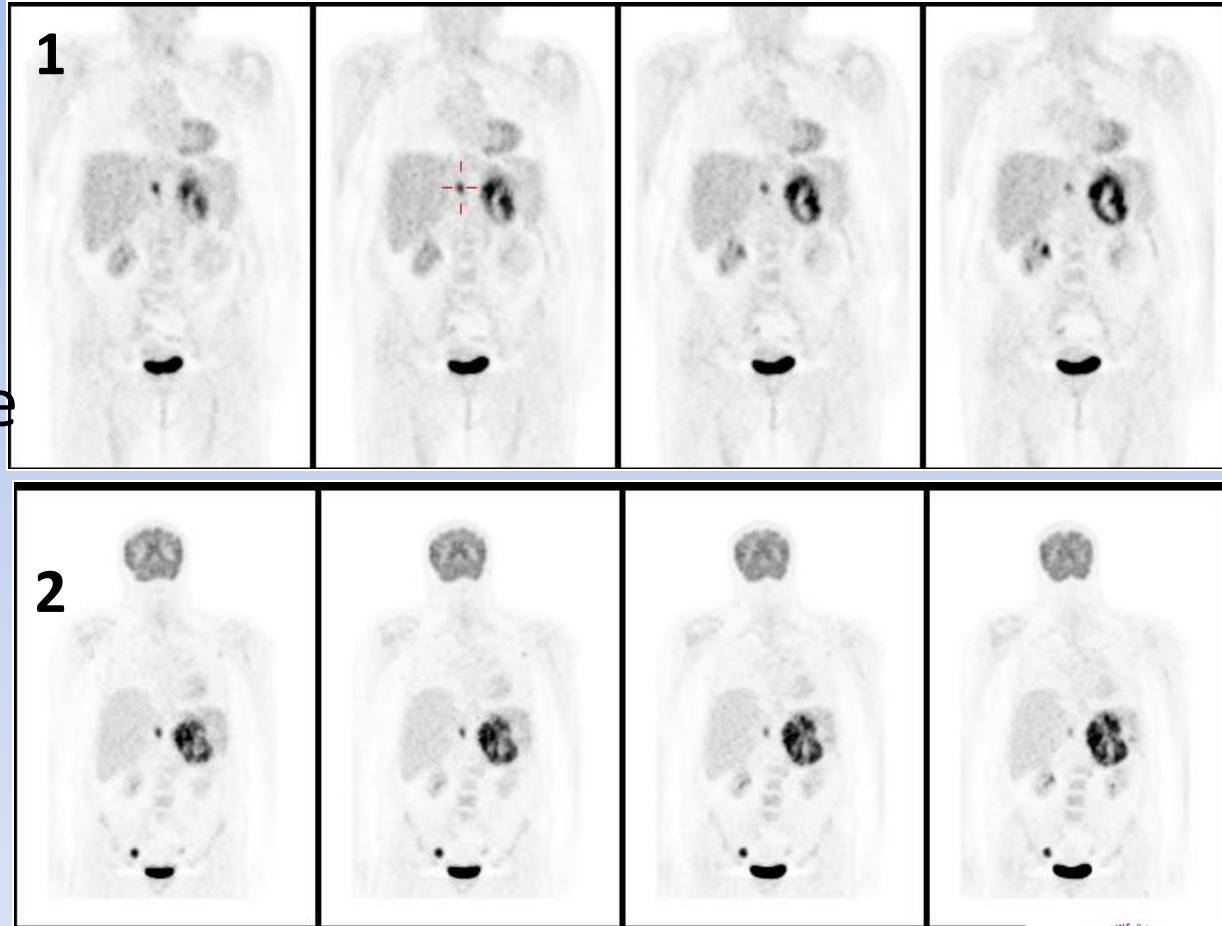


Metastatic Melanoma (repeat study after 4 mo)

Monitoring Response to Immuno-/Chemo

The patient shows:

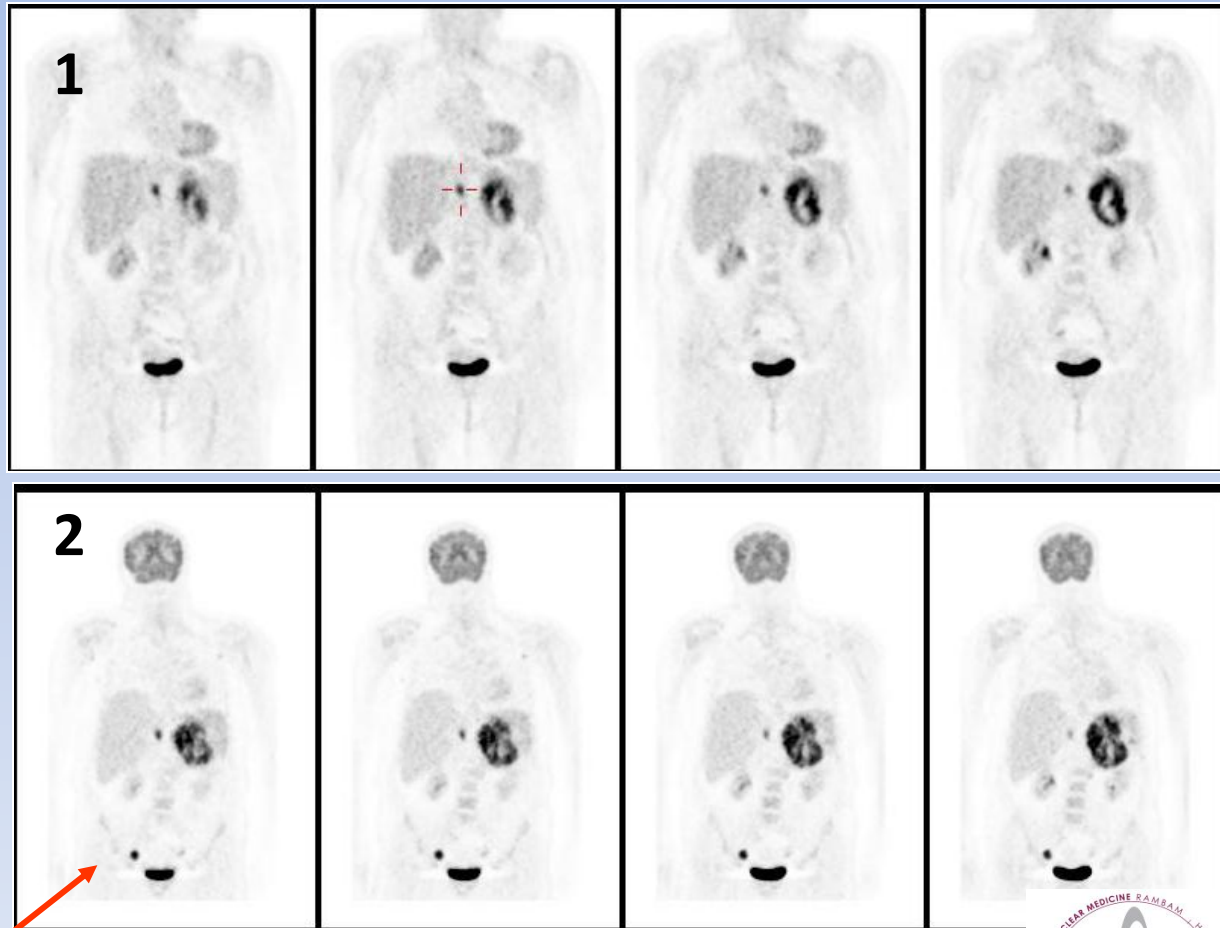
1. Complete response
2. Partial response
3. Stable disease
4. Tumor Progression



Metastatic Melanoma, Tumor Progression

The patient shows:

1. Complete response
2. Partial response
3. Stable disease
4. ***Tumor Progression***



New Inguinal LN Metastasis

Melanoma

Indications for FDG Imaging

- Detection of metastases (regional & distant)
- Staging of intermediate $>2\text{mm}$ & high-risk $>4\text{mm}$ tumors
- Restaging of high-risk tumors
 - Low risk melanoma (thin $<1\text{mm}$):
favorable prognosis; 15% chance for mets
 - High risk melanoma (thick $>4\text{mm}$):
50-70% of all melanoma, 5year 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



FDG-PET/CT in Malignant Melanoma

Guidelines & Recommendations

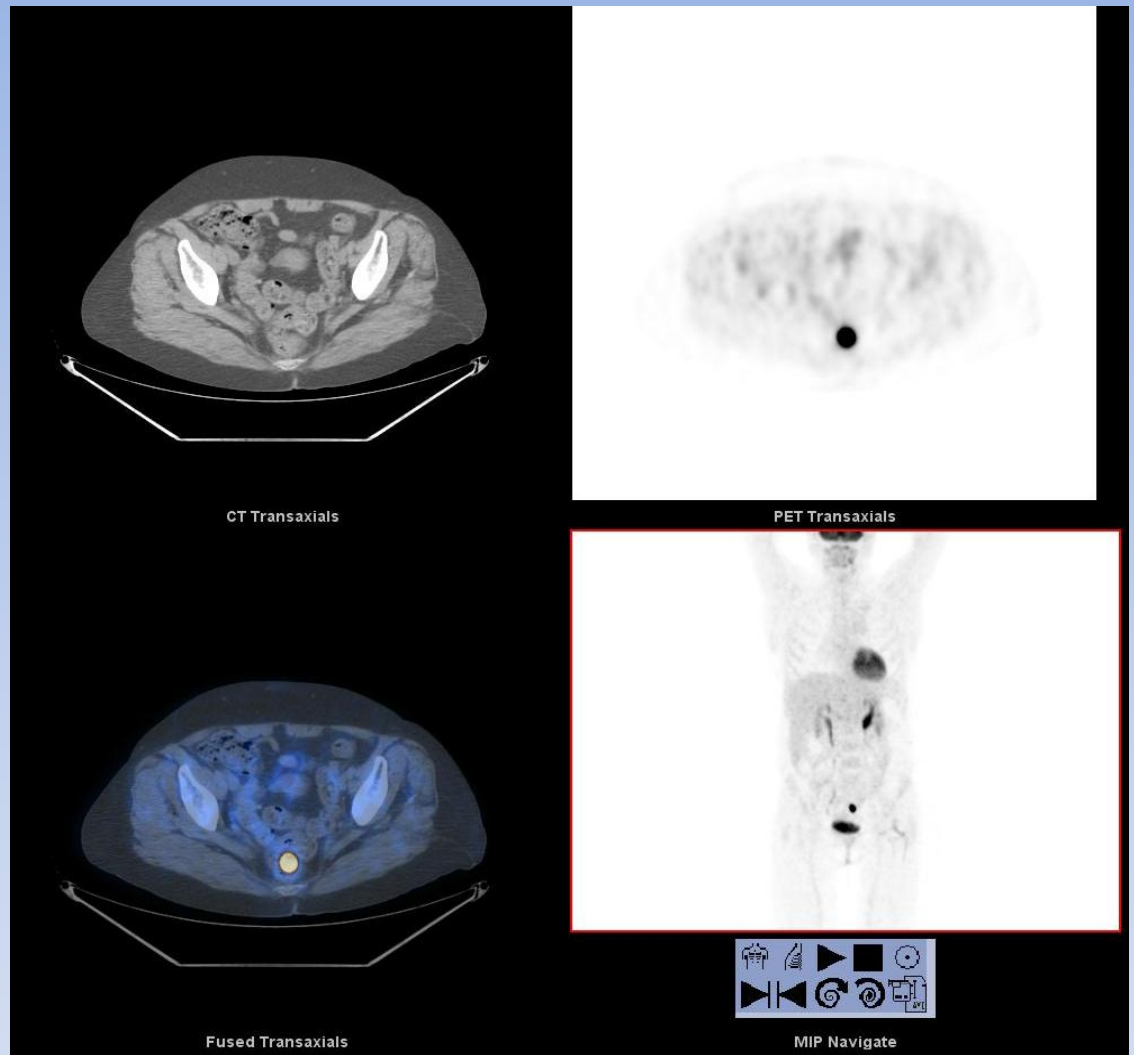
(NCCN 2007, multidisciplinary panel – JNM 2008)

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

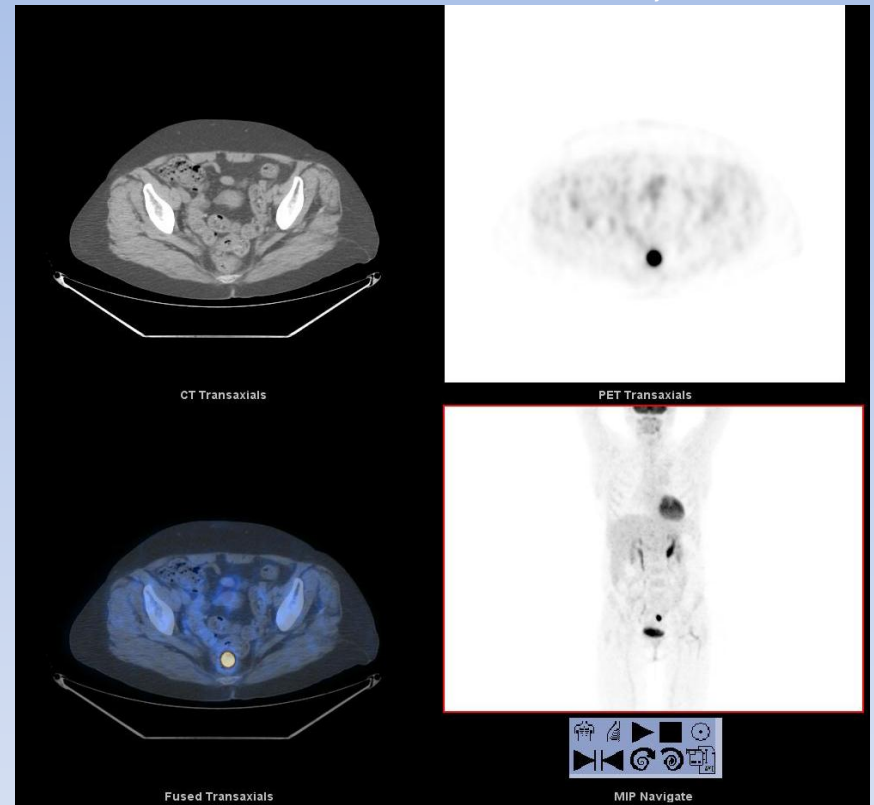


1. Negative FDG-PET/CT study, physiologic uptake in rectum
2. 2nd primary malignant tumor in rectum
3. Metastasis in sacral bone

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

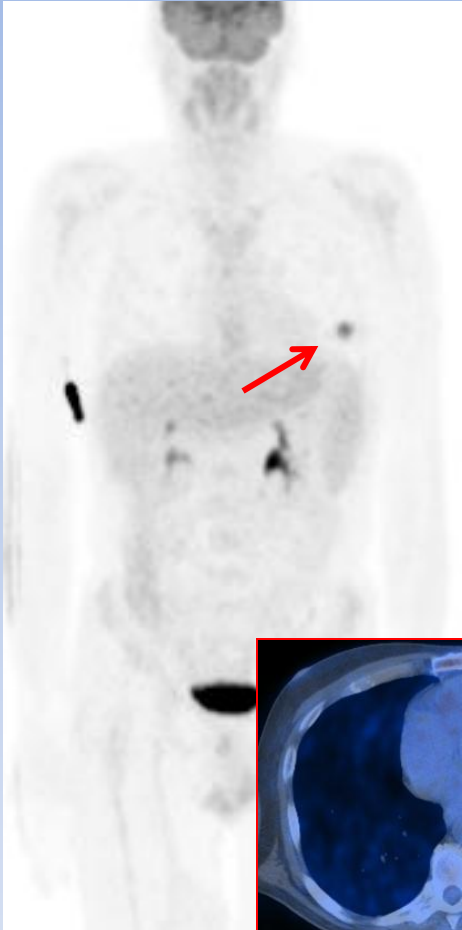
M, 50y, FUO

Normal CT of chest and abdomen

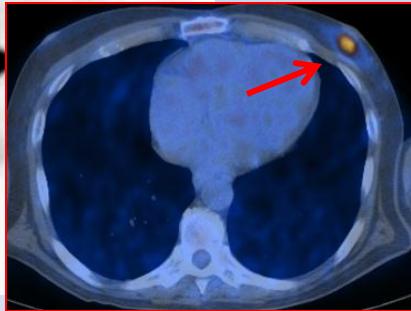
1. FDG+ uptake in chest wall, most probably recent fracture in rib
2. FDG+ in left breast – cancer
3. FDG+ in left breast in a male patient – of no clinical significance
4. FDG+ in left breast – should be further evaluated



FDG-avid Focus in Left Breast



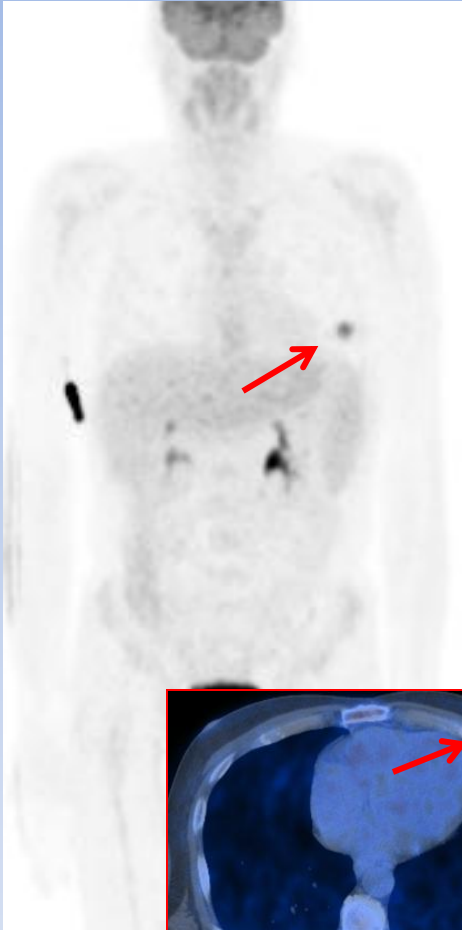
1. FDG+ uptake in chest wall, most probably recent fracture in rib
2. FDG+ in left breast – cancer
3. FDG+ in left breast in a male patient – of no clinical significance
4. ***FDG+ in left breast – should be further evaluated***



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



FUO: 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.

