Clinical Area: **FDG PET for melanoma**
Keywords: **malignant melanoma, PET, staging, neoplasms**
Reference: **Rinne D, Baum RP, Hor G, Kaufmann R. Primary staging and follow-up of high risk melanoma patients with whole-body ^{18}f-fluorodeoxyglucose positron emission tomography. Cancer 1998; 82: 1664-71.**

Study Type: Comparison of diagnostic tests
Study Aim: To prospectively evaluate high risk melanoma patients using FDG PET compared to conventional tumor staging methods.

Outcomes

- *Primary:* Sensitivity, specificity

Design

- *Number of subjects:* N=100
- *Description of study population:* 51% male, age range 23-83. 52% primary staging; 48% restaging.
- *Inclusion and exclusion criteria:* Inclusion: Primary staging (Group A), high-risk melanoma defined as tumor thickness at least 1.5mm and Clark's level IV. Restaging (Group B): suspected of having progression due to clinical findings or conventional imaging results. Exclusion criteria not discussed.
- *Power*: Not discussed.

Validity

- *Independent blind comparison with a gold standard or follow-up of those not receiving the gold standard test?* Yes, but gold standard may not be 100% accurate. Blinded comparison of whole-body FDG PET with histology and/or clinical findings. PET results evaluated by two independent nuclear medicine physicians. Conventional diagnostics (CD) were also compared to histology and/or clinical findings. CD methods included thorax radiograph, abdominal sonography and high resolution ultrasound of the regional lymph nodes, x-ray CT of the thorax and abdomen, contrast MRI of the brain and whole-body bone scintigraphy.
- *Was "normal" defined?* Yes. Standardized uptake values (SUV) >2.5 were considered malignant.
- *Appropriate spectrum of disease?* Appears to be.
- *Consecutive patients?* Yes.
- *Methods described in enough detail to enable you to replicate the test?* Yes.
- *Reproducible results?* Yes.

Conclusions regarding validity of methods:
Valid methods for comparing PET to histological findings. It is unclear in the conventional diagnostics comparison whether or not all patients received all of the tests.

Results

Primary staging (Group A) (n=52)

PET and conventional imaging were normal for 37/52 patients

Restaging (Group B) (n=48)

PET and conventional imaging were normal for 13/48 patients

Sensitivity and specificity for patients and metastases

	PET		Conventional diagnostics*	
	Sensitivity %	Specificity %	Sensitivity %	Specificity %
Staging (n=52)				
Patients	100	93.8	0	83.3
Metastases	100	94	0	89
Restaging (n=48)				
Patients	100	95.5	84.6	68.2
Metastases	91.8	94.4	57.5	45

* Includes thorax radiograph, abdominal sonography and high resolution ultrasound of the regional lymph nodes, x-ray CT of the thorax and abdomen, contrast MRI of the brain and whole-body bone scintigraphy.

Sensitivity and specificity in different regions (Group B)

	PET		Conventional diagnostics	
	Sensitivity % (No.)	Specificity % (No.)	Sensitivity % (No.)	Specificity % (No.)
Brain	---	100 (13/13)	---	100 (13/13)
Neck lymph nodes	100 (12/12)	100 (13/13)	67 (8/12)	100 (13/13)
Lung	70 (16/23)	100 (14/14)	87 (20/23)	100 (14/14)
Mediastinum/hilus	71 (5/7)	100 (13/13)	20 (1/5)	87 (13/15)
Liver	100 (4/4)	100 (16/16)	60 (3/5)	87 (13/15)
Abdomen	100 (15/15)	94 (17/18)	27 (4/15)	78 (14/18)
Abdominal lymph nodes	100 (6/6)	100 (13/13)	83 (5/6)	100 (13/13)
Peripheral lymph nodes	97 (34/35)	100 (14/14)	51 (18/35)	93 (13/14)
Bones	---	100 (14/14)	---	93 (13/14)
Skin	100 (14/14)	100 (13/13)	43 (6/14)	100 (13/13)

Authors' Conclusions
"PET is a highly sensitive and specific technique for melanoma staging. With the exception of the brain, one single whole body FDG PET scan could replace the standard battery of imaging tests currently performed on high risk melanoma patients."

Reviewer's Conclusions
FDG PET demonstrated high sensitivity and specificity for both melanoma staging and restaging. Statistical tests were not performed, but sensitivity and specificity appear to be higher than that of conventional diagnostics. However, it was unclear whether all patients received all of the conventional diagnostic tests; if not, it would be difficult to compare PET with CD. Results may be less reliable for primary staging due to the small number of lesions found relative to the number of restaging lesions. The sample size may have been too small to accurately evaluate sensitivity and specificity of FDG PET at identifying metastases in different regions of the body.