



**Nuclear Medicine Subgroup**

**Faculty of Radiologists**

**Royal College of Surgeons in Ireland**

**INDICATIONS FOR PET/CT IMAGING**

**Report November 2010**

## **Indications for PET/CT Imaging**

### **Bladder Carcinoma**

Staging for nodal or metastatic disease if other imaging is equivocal

### **Brain tumours**

Restaging for recurrence post radiotherapy in conjunction with contrast enhanced MRI

### **Breast Ca**

May be used in initial staging of locally advanced breast carcinoma (Histologically or cytology node positive disease, T3 or greater primary lesion or inflammatory breast cancer) (may proceed directly to PET/CT)

Evaluating response to treatment when a change in chemotherapy or radiotherapy treatment is contemplated and other imaging is equivocal

Assess extent of biopsy proven recurrent disease

### **Cervix cancer**

Initial Staging of locally advanced cervical cancer Stage 2b or greater when equivocal lymph nodes are present at MRI (may proceed direct to PET/CT)

Staging of suspected metastatic disease where conventional imaging is equivocal

### **Cholangiocarcinoma**

Initial staging in selected cases of mass forming Cholangiocarcinoma when conventional imaging is equivocal

Differentiation of benign from malignant disease in patients where conventional imaging or cytology is equivocal and there is a clinical suspicion of malignancy

Prior to liver transplant when conventional imaging is equivocal

### **Colorectal and Anal Carcinoma**

Restaging of known liver metastasis pre-resection to exclude extrahepatic disease

Recurrent disease where additional treatment is contemplated to check if localised

Restaging with clinical suspicion of recurrence with negative or equivocal CT with normal or elevated CEA level

Response evaluation to treatment if a change in treatment is contemplated and conventional imaging is equivocal

Initial Staging of Anal Cancer with enlarged pelvic or inguinal lymph nodes suspicious for metastasis

### **Carcinoma of unknown primary**

For Squamous cell carcinoma metastasis to the neck of unknown primary site (see head and neck section)

Evaluation for site of primary tumour in selected patients where conventional imaging and investigations are negative following multidisciplinary team discussion

### **Dermatomyositis**

Where CT evaluation is negative after multidisciplinary team discussion

### **Endometrial carcinoma**

Evaluation of suspected nodal metastatic disease where conventional imaging is negative or equivocal and findings would alter management

### **Gastric carcinoma**

Initial staging of selected patients for non-regional nodal or metastatic disease  
Response evaluation post chemotherapy where conventional imaging is equivocal

### **GIST**

Initial staging of borderline resectable or unresectable lesions  
Restaging post treatment in patients that were PET positive on initial imaging

### **Head and Neck (excluding Central Nervous System and Thyroid)**

Staging of Squamous cell carcinoma of unknown primary in the neck  
Initial staging of Squamous cell carcinoma of the Head and Neck  
Restaging of head and neck tumours with strong clinical suspicion of recurrence (may proceed direct to PET/CT)  
Assessment for post treatment response post chemoradiotherapy prior to planned radical lymph node dissection

### **Lung Cancer (Non small cell carcinoma and small cell carcinoma)**

Initial Staging of Lung Cancer (note that biopsy proof of tumour is not always required)  
Response to treatment evaluation, particularly post radical radiotherapy or radiofrequency ablation  
Staging prior to resection of solitary lung metastasis  
Diagnosis of cancer in a solitary pulmonary nodule (SPN). Please note that some SPN's <1 cm in size may be incompletely characterised by PET and should be discussed with the PET/CT unit prior to ordering.  
Diagnosis of primary lesion in selected cases post multidisciplinary team discussion where multiple pulmonary nodules are present  $\geq 7$ mm in size

### **Lymphoma**

Initial staging, response evaluation (interim scan) and restaging of Hodgkin's Lymphoma  
Initial staging and response evaluation (interim scan) of Intermediate or High grade Non Hodgkin's Lymphoma where clinically indicated  
Restaging Intermediate or High grade Non Hodgkin's Lymphoma  
Diagnosis of suspected recurrence in Non-Hodgkin's Lymphoma and Hodgkin's Lymphoma  
Pre transplant evaluation in Lymphoma  
Response evaluation (interim scan) in Lymphoma in immunocompromised patients  
PET/CT is not routinely indicated in Low grade Non-Hodgkin's Lymphoma, but may be used in staging suspected transformation to high grade lymphoma, including to guide biopsy. Following discussion at a Multidisciplinary team meeting there may a role for imaging of other Low grade lymphomas in selected cases (see "other indications" below)

**Melanoma**

Initial staging of patients with Stage III (Any T, N1-3, M0) disease for whom radical surgery is planned i.e. staging of node positive high risk melanoma prior to or post resection. Includes in-transit melanoma staging

Evaluation of patients with Stage IV disease (initial or recurrent) to assess extent of disease - includes staging of solitary metastasis prior to resection

Malignant melanoma in whom a sentinel node biopsy was not or cannot be performed in stage II.

**Merkle Cell Carcinoma**

Lymph node positive disease

Initial staging

**Mesothelioma**

Initial staging prior to planned surgery in a medically fit patient

**Multiple Myeloma**

Initial staging of Multiple Myeloma

Restaging of Multiple Myeloma if disease was PET positive on initial staging

Initial staging of solitary Plasmacytoma

Staging prior to bone marrow transplant

**Neuroblastoma**

Staging in selected cases where MIBG imaging is negative

**Neuroendocrine Tumours (other)**

In selected cases after multidisciplinary team discussion if Indium 111-Octreotide and/or I-123/I-131 MIBG scan is negative

**Oesophageal Carcinoma and Oesophagogastric Carcinoma\*\***

Initial staging

Restaging of patients after neoadjuvant therapy who are being considered for curative resection

Assessment of recurrence where CT is equivocal

**Ovarian Carcinoma**

Staging with rising marker or suspected recurrence with negative or equivocal CT

**Pancreatic Carcinoma**

Use in selected cases after endoscopic ultrasound and CT evaluation, following multidisciplinary team discussion

**Paraneoplastic syndromes**

If clinical syndrome strongly suggests the possibility of underlying malignancy following multidisciplinary team meeting discussion with negative conventional imaging

**Penile Carcinoma**

Evaluation of suspected nodal metastatic disease where conventional imaging is negative or equivocal and findings would alter management

**Prostate Carcinoma**

Not routinely indicated. May be used in selected cases after multidisciplinary team discussion

**Renal Tumours**

Not routinely indicated. May be used in selected cases after multidisciplinary team discussion

**Sarcoma**

Staging and Restaging of Ewings Sarcoma

Staging and Restaging of Osteosarcoma

Staging and Restaging of Soft Tissue Sarcoma

PET/CT imaging is most useful in high grade sarcomas

**Testicular Carcinoma and Extra Testicular Germ Cell Tumours**

Initial staging if equivocal CT

Restaging of Seminoma or Non Seminomatous Germ Cell Tumour with a residual mass or rising tumour marker with a negative or equivocal CT

**Thymic Carcinoma**

Staging and restaging

**Thyroid Carcinoma**

Restaging of papillary or follicular thyroid cancer with raised Thyroglobulin level (>10ng/ml) or rTSH stimulated >2-5 ng/ml and negative whole body Iodine scan

Restaging of Medullary Thyroid cancer with raised Calcitonin level and negative neck CT or MRI

Staging or restaging of Hurthle cell carcinoma

**Vulval Carcinoma**

Evaluation of suspected nodal metastatic disease where conventional imaging is negative or equivocal and findings would alter management

**Other PET Tracers**

The above indications refer to the use of F18 Fluorodeoxyglucose in staging cancers. F18 Sodium Fluoride (NaF) may be used to localise and determine the extent of skeletal metastases in patients with equivocal conventional bone scan and/or MRI\*\*

**Other Indications**

There are clinical indications for PET/CT that do not meet specific guidelines outlined above, but where expert medical opinion indicates that the imaging procedure would have a major impact on patient management. These indications are typically discussed at a local multidisciplinary team meeting (MDT). It is anticipated that PET/CT referrals for these indications will be reviewed by a regional approval board or officer or by an expert in PET/CT at the PET/CT Centre prior to a decision to proceed with

imaging. If there is a discrepancy between the MDT opinion and the PET/CT expert opinion such a case should be discussed directly on an individual case basis.

There is a cohort of patients where PET/CT has demonstrated metastatic disease not apparent on other imaging modalities. It may be appropriate to use PET/CT in post treatment response in such patients.

For these non standard indications there may be an opportunity to collate data on referral patterns and to examine their utility in practice, with a view to formulating future recommendations for these indications.

## **Non Oncology Indications**

### **Neurology and Brain (non cancer)**

Diagnosis of neurodegenerative dementia in patients with mild cognitive impairment following evaluation by an expert in Dementia and Neuropsychological testing. The scan should be done in cases where early diagnosis will have a significant impact on patient management.

Differentiation of Alzheimer's Dementia from Frontotemporal Dementia following evaluation by an expert in neurodegenerative disorders and Neuropsychological testing.

Differentiation of Progressive Supranuclear Palsy, Corticobasal Degeneration or Multisystem Atrophy from Parkinson's disease following evaluation by an expert in movement disorders, where early diagnosis will have a significant impact on patient management

### **Epilepsy**

Pre surgical evaluation of patients with refractory seizures for the purposes of localisation of a focus of refractory seizure activity

### **Myocardial viability**

Assessment of myocardial viability prior to planned revascularisation

### **Pyrexia of Unknown Origin**

Where conventional imaging work-up is negative

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