

Oncology Clinical Indications

Brain Tumor

- Differentiate recurrent tumor from radiation necrosis
- Differentiate primary CNS lymphoma from toxoplasmosis
- Exclude metastatic disease of the brain

Breast Cancer

- Identify involved axillary nodes or distant metastatic disease
- Exclude local recurrence of disease
- Evaluate response to treatment

Cervical Cancer

- Detect pre-treatment metastases in newly diagnosed cancer

Colorectal Cancer

- Detect locally recurrent or distant metastatic disease in patients with elevated or rising CEA who may be candidates for surgical re-excision
- Rule out distant metastases for preoperative evaluation

Esophageal Cancer

- Evaluate local extent of disease, and exclude distant metastases
- Evaluate disease to determine surgical appropriateness

Head & Neck Cancer

- Determine extent of local, regional, and distant disease
- Detect recurrent/residual tumor following definitive therapy

Lung Cancer

- Distinguish malignant from benign pulmonary nodules
- Stage for mediastinal or distant metastatic disease
- Use as part of radiotherapy treatment planning
- Detect recurrent/residual tumor following definitive therapy

Lymphoma

- Determine extent of disease
- Measure treatment response

Melanoma

- Identify extent of local and regional disease spread in patients with high risk melanoma (e.g., primary tumor $\geq 4\text{mm}$), or in suspected recurrence

Musculoskeletal Tumors

- Evaluate local extent of disease and exclude distant metastases
- Measure treatment response and exclude recurrent/residual tumor following definitive therapy

Ovarian Cancer

- Detect recurrent/residual tumor prior to surgical exploration or additional chemotherapy

Pancreatic Cancer

- Differentiation of benign processes such as pancreatitis, mucinous cyst adenoma and pseudocyst from malignant disease
- Rule out distant metastases for preoperative evaluation

Thyroid Cancer

- Detect metastatic or locally recurrent disease in patients with elevated thyroglobulin after definitive initial treatment and negative I-131 examination

References

Conti, P.S., Lilién, D.L., Howley, K., Keppler, J., Grafton, S.T., Bading, J., PET and F-18 FDG in Oncology: A Clinical Update. *Nuclear Medicine and Biology*, (1996) 23:717-735.

Di Chiro, G., Positron Emission Tomography Using FDG in Brain Tumors: A Powerful Diagnostic and Prognostic Tool. *Investigational Radiology*, (1986) 2:360-371.

Change in Patient Management

Positron Emission Tomography (PET) assists:

- Oncologists in determining local vs. systematic therapies
- Radiation Oncologists in determining best treatment field
- Surgeons in determining appropriate area for resection

Change in Patient Management**

- Anatomy shown by CT is important, but in many cases the anatomy can look normal even though the disease is present
- PET may show increased metabolic activity before a tumor is large enough to alter the local anatomy

Breast Cancer - 217,440 estimated new cases in 2004*

- Dx - 100% change (301 patients)
- Staging - 28% change (1584 patients)

Colorectal Cancer - 146,940 estimated new cases in 2004*

- Staging - 37% change (234 patients)
- Recurrence - 33% change (1478 pts.)

Esophageal Cancer - 14,250 estimated new cases in 2004*

- Dx - 14% change (229 patients)
- Staging - 23% change (308 patients)

Head & Neck Cancer - 30,350 estimated new cases in 2004*

- Dx/Staging - 33% change (254 patients)
- Recurrence - 33% change (243 patients)

Hepatocellular Cancer - 18,920 estimated new cases in 2004*

- Staging - 60% change (188patients)

Lung Cancer - 173,770 estimated new cases in 2004*

- Staging - 37% change (6040 patients)

Lymphoma - 62,250 estimated new cases in 2004*

- Staging - 23% change (1568 patients)
- Dx/Staging - 5% change (157 patients)
- Recurrence - 5% change (220 patients)
- Monitoring tx response - 12% change (349 patients)

Melanoma - 55,100 estimated new cases in 2004*

- Staging - 29% change (1019 patients)

Pancreatic Cancer - 31,860 estimated new cases in 2004*

- Dx - 37% change (336 patients)
- Dx/Staging - 43% change (284 patients)
- Staging - 18% change (213 patients)

Testicular Cancer - 8,980 estimated new cases in 2004*

- Staging - 22% change (156 patients)
- Recurrence - 51% change (53 patients)

Unknown Primary - 31,090 estimated new cases in 2004*

- Staging - 35% change (267 patients)

References

* Cancer Facts and Figures 2004, American Cancer Society, Inc..

** Report on FDG Positron Emission Tomography for the Health Care Financing Administration (Gambhir et al, July 2000)