Indication sheet

SIEMENS Healthineers

Improved accuracy in lung cancer in PET imaging

Accurate staging and detection of metastases in non-small cell lung cancer (NCSLC) is critical to avoid futile surgery and select appropriate treatment.

- As lung cancer is the leading cause of cancer-related death in the United States[1]
- As well, 40% of newly diagnosed lung cancer patients have distant metastasis[2]

PET/CT leads to more accurate staging of NSCLC

Staging	Sensitivity	Specificity	PPV	NPV	Accuracy
T detection	100%[3]	76%[3]	67%[3]	100%[3]	84%[3]
N status	57%[3]	98%[3]	75%[3]	97%[3]	95%[3]

PET/CT can improve the detection of nodal and distant metastases and change management plan

- Tumor staging with PET/CT immediately before surgery revealed more patients with mediastinal and distant metastatic disease than conventional imaging[4]
- Initial PET/CT changed stage in 29%[5]
- Medium to high impact on the management plan in 37% of patients when staging lung cancer patients[5]

PET/CT impact on Radiation Therapy

- Positive effect on tumor volume delineation
- Altering radiation therapy volume in 58% of patients and led to decrease in normal tissue toxicity[3]

Medicare recognizes the utility of PET and PET/CT in non-small cell lung cancer (NSCLC).[6]

Initial Treatment Strategy (formerly Diagnosis and Staging)
PET/CT may be used:

- To determine whether or not the beneficiary is an appropriate candidate for an invasive diagnostic or therapeutic procedure; or
- To determine the optimal anatomic location for an invasive procedure; or
- To determine the anatomic extent of tumor when the recommended anti-tumor treatment reasonably depends on the extent of the tumor.

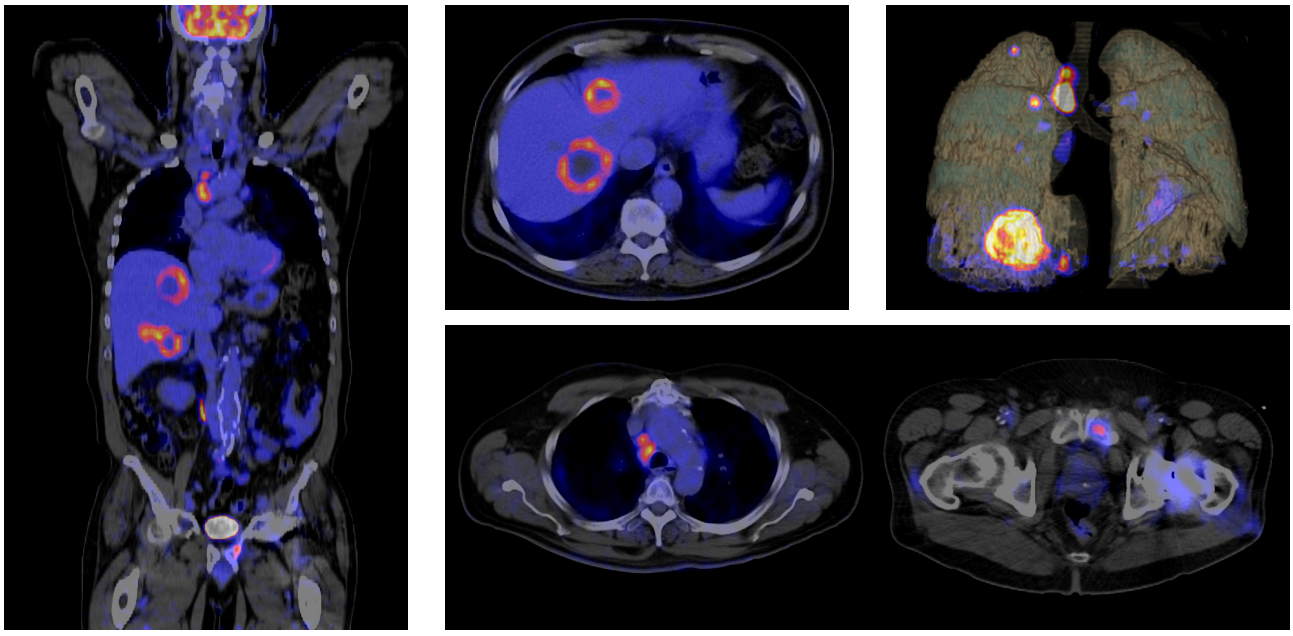
Subsequent Treatment Strategy (Restaging)
PET/CT is appropriate:

- After completion of treatment for the purpose of detecting residual disease; or
- For detecting suspected recurrence or metastasis; or
- To determine the extent of a known recurrence; or
- If it could potentially replace one or more conventional imaging studies when it is expected that conventional study information is insufficient for the clinical management of the patient. Restaging applies to testing after a course of treatment is completed, and is covered subject to the conditions above. Restaging applies to testing after a course of treatment is completed and is covered subject to the conditions above.

Monitoring response to therapy
PET is covered for monitoring tumor response to treatment during the planned course of therapy (ie, when a change in therapy is being considered).

The ordering physician is responsible for documenting the medical necessity of the PET scan and that it meets these criteria.

Staging accuracy in lung cancer



Data courtesy of University of Tennessee Medical Center, Knoxville, Tennessee, USA.

History

A 63-year-old male former smoker presented with chronic cough and shortness of breath. Recent bronchoscopy revealed well-differentiated adenocarcinoma in pathology type. The patient was referred for PET/CT for initial treatment strategy (ITS) to evaluate extent of disease for proper patient management in preoperative staging.

Imaging findings

There was significant increased uptake in the mediastinum compatible with known malignancy of NSCLC. In addition, there were multiple metastatic liver lesions with significant increased uptake with larger mass having necrotic core. In addition, focal activity in bony structure of pelvic rami confirming metastatic spread of disease.

Overall evaluation

PET/CT has proven to be essential in patient management of lung cancer patients with the ability to define the primary tumor as well as local and distant metastases in a single noninvasive examination, as well as overall greater accuracy than convention imaging procedures. The differentiation between benign and malignant effusion is important in determining candidates for surgical resection and those who are deemed to be unresectable for cure, but will benefit from chemotherapy, radiotherapy, or both.

[1] American Cancer Society. Cancer Facts & Figures 2015. Atlanta, GA: American Cancer Society 2015.

[2] De Wever W, et al. Role of imaging in diagnosis, staging and follow-up of lung cancer. *Curr Opin Pulm Med.* 2014 Jul;20(4):385-92.

[3] Ambrosini V, et al. PET/CT imaging in different types of lung cancer: an overview. *Eur J Radiol.* 2012 May;81(5): 988-1001.

[4] Gallamini A, et al. Positron emission tomography (PET) in oncology. *Cancers (Basel).* 2014 Sep 29;6(4):1821-89.

[5] Takeuchi S, et al. Impact of initial PET/CT staging in terms of clinical stage, management plan, and prognosis in 592 patients with non-small-cell lung cancer. *Eur J Nucl Med Mol Imaging.* 2014 May;41(5):906-14.

[6] CMS Publication 100-03, Medicare National Coverage Determinations Manual, Chapter 1, Part 4, Section 220.6). Available at http://www.cms.hhs.gov/manuals/downloads/ncd103c1_part4.pdf

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