Case Study

Lymphoma

Restaging

47-year-old female,
referred by a medical oncologist.

Patient History

- Patient was diagnosed and treated for lymphoma two years prior.

Patient Management

- As part of routine clinical management, the patient underwent staging evaluation one year after successful conclusion of treatment.

CT Staging Findings – Negative

- No evidence of recurrent disease.

Clinical Question

Was this patient's treatment truly curative? Is the CT information showing the full condition of the patient? Or is there unsuspected recurrent disease present? Is there any reason to consider further therapy?

In order to more optimally restage the patient following treatment, a PET/CT scan was ordered.

PET/CT Staging Findings – Positive

- PET/CT shows multiple sites of abnormal uptake corresponding to multiple subcutaneous nodules consistent with recurrent lymphoma (Figs. 1-3).

Outcome

- Patient received an additional course of chemotherapy.
- Unfortunately, the therapy was not successful and this patient has since passed.

PET Staging Protocol
Wholebody PET scan.
15 mCi of FDG were administered 45 minutes prior to scan.

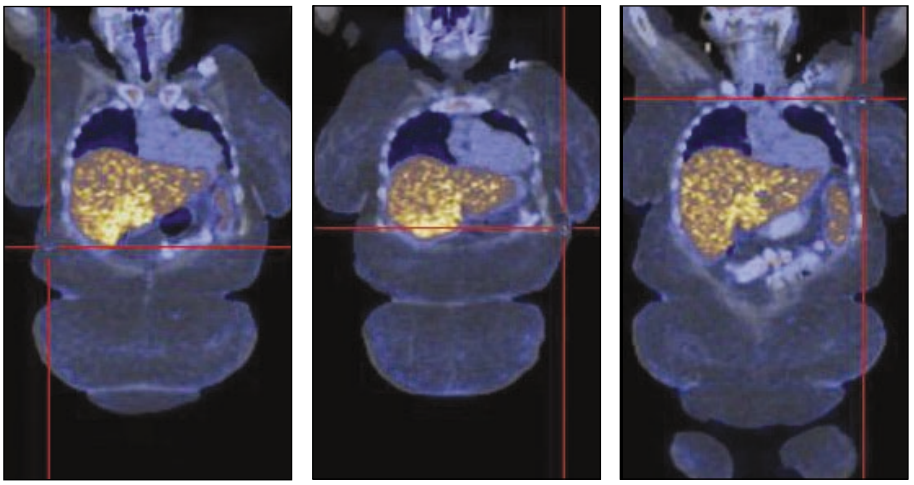

Fig. 1: *Positive PET reveals subcutaneous nodules consistent with recurrence.*

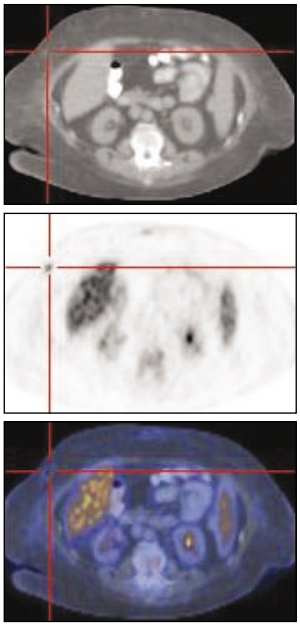

Fig. 2: *PET/CT combines sensitivity for disease with precise localization for accurate treatment planning.*

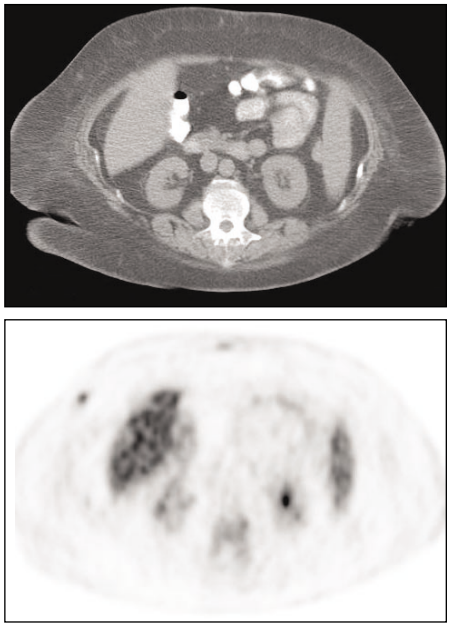

Fig. 3: *PET demonstrates hypermetabolic regions of recurrence that were missed with CT alone.*

PET FOUNDATIONS

Case study courtesy of Hao Vuong, M.D., Baptist Hospital of Miami.

Positron Emission Tomography (PET) is a non-invasive diagnostic imaging procedure that can provide unique information for accurate TNM staging. Many cancers exhibit increased glucose metabolic rates which can be identified with PET via the radio-pharmaceutical ^{18}F-FDG. Since changes in glucose metabolism often occur before changes in anatomy (e.g. tumor growth), PET can often identify the presence of disease earlier than other anatomic imaging techniques. Early disease identification is particularly critical during the assessment of nodal involvement or the determination of the presence of metastatic disease.

Lymphoma Staging

	PET	*CT*
Sensitivity	*94%*	*81%*
Specificity	*94%*	*72%*
Accuracy	*96%*	*63%*
PPV	*85%*	*39%*
NPV	*93%*	*78%*

Gambir, et al, "A Tabulated Summary of the FDG PET Literature," *The Journal of Nuclear Medicine* 2001, 45:5.

Early Detection of Disease

"Having a functional study with the positive and negative predictive ability of a PET scan, as well as the high specificity and sensitivity of that test, has really opened up new avenues for us … PET has very high sensitivity and specificity. PET is so sensitive that it finds more sites of disease than other tests."

– David Rizzieri, M.D.
Assistant Professor of Medicine
Duke University Medical Center

Precise Staging of Disease Progression

"PET can detect disease at an earlier stage, and more accurately stage the patient so that appropriate therapy can be administered."

– R. Edward Coleman, M.D.
Professor of Radiology and
Director of Nuclear Medicine
Duke University Medical Center

Accurate Assessment of Therapy

"The main area where PET is helpful for lymphoma patients is in monitoring therapy. Typically, when a patient is treated with therapy, the anatomic abnormality visualized on CT will shrink, but seldom does it go away completely. If PET is positive in the area that has shrunk anatomically, it's indicative of a poor response to treatment, so we have to change therapy. If PET is negative in that same area, it's indicative of a good response to treatment …"

– Leonard Prosnitz, M.D.
Professor of Radiation Oncology
Duke University Medical Center

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