PET Scans Approved For Detecting Metastatic Non-Small-Cell Lung Cancer

For years, dedicated positron emission tomography scanners have been used in Europe to diagnose the status of lesions too small to biopsy or to find those too small to be detected by a computerized tomography scanner.

Now, for the first time in the United States, the Health Care Financing Administration has authorized Medicare to pay for the use of PET for the detection of metastatic disease in non-small-cell lung cancer patients who are newly diagnosed. Such imaging may be able to help physicians decide whether or not curative surgery is feasible. HCFA officials have said they will “periodically review” the approval both for PET and for non-dedicated gamma camera scanners used for this purpose, although they are not saying how often.

Radiologists had argued for the wider use of PET in cancer patients at the recent Radiological Society of North America (RSNA) meeting in Chicago.

HCFA is also looking at other cancers for which Europeans use PET scans, according to Paul Shreve, M.D., assistant professor of radiology and internal medicine at the University of Michigan, Ann Arbor. These include melanoma, colon cancer, head and neck cancer, and possibly lymphoma, he said. He added that, before giving the go-ahead in more types of cancer, HCFA wants to know if treatments given as a result of using a PET scan improve outcomes.

Early studies under way in the United States may encourage HCFA to take a look at PET imaging for women with breast cancer, both to diagnose hormone-responsive tumors, as well as to determine subsequent response to therapy, said Farrokh Dehdashti, M.D., assistant professor of radiology at the Washington University School of Medicine and its Mallinkrodt Institute of Radiology in St. Louis.

At the conference, speakers not only recounted favorable clinical experiences with PET, but answered some common questions about the comparability of PET and CT scans, the cost and availability of equipment, as well as cost of the test.

Tinier Tumors

One reason physicians may prefer PET over CT, the researchers said, is its ability to pick up tinier tumor deposits than CT can, as well as to determine whether it is likely the lesions are malignant. Malignant tumors take up glucose at a faster rate, and this glucose consumption is pictured on a PET scan, when fluordeoxyglucose isotope is given to the patient.

“Sometimes CT doesn’t tell us all we need to know,” said Richard Wahl, M.D., professor of radiology and internal medicine and director of general nuclear imag-
ing at the University of Michigan. Wahl showed a slide of what on CT appeared to be a tumor deposit, but which on PET, because there was no glucose uptake, appeared to be nonmalignant. The lesion turned out to be a scar.

Washington University's Dehdashti reported that another possible way to use PET is "to differentiate between those [breast cancer] patients who are going to respond to hormone therapy and those who are not going to respond." She said a particular problem in women with estrogen-receptor positive tumors, which are typically treated with tamoxifen, is that "there is no way radiologically or clinically to determine who is going to respond for at least two to three months after therapy has begun."

Some patients will feel their disease is progressing because they start feeling more pain a week or two after hormone therapy is started.

"The problem with this reaction is that we cannot distinguish between a flare reaction, which is a good thing, meaning the patient will ultimately respond to therapy and should stay on the therapy, from those that show progression of disease on hormones and should be treated differently."

She said in a small study of breast cancer patients, the 11 who showed flare reactions on PET responded to hormone therapy. Those who did not show the reaction, did not respond to therapy.

Equipment cost and availability is an issue in many cases, according to the University of Michigan's Shreve, who said some centers are using upgraded coincidence gamma cameras instead of dedicated PET scanners.

"The approach that has emerged in the last three years is that, 'well, we don't have enough patients to justify a PET scanner, but we do have a conventional nuclear medicine camera, and we can modify that for a certain price and perform PET scans,'” Shreve said.

An upgrade cost for an existing system would be about a fourth of a low budget PET scanner, he said. But compared to a dedicated PET scanner, the upgrade does not work well (see image, previous page). The dedicated scanner gives a much sharper image and much more detail than the upgraded cameras, Shreve noted.

He demonstrated that in some cases the upgraded devices, also known as hybrid gamma cameras, or coincidence gamma cameras, or sometimes as dual high coincidence systems, or even other designations, can miss the very smallest lesions that can clearly be seen on the dedicated device.

Dedicated PET devices have also proven to be better at picking up liver metastases, based on a compilation of data in 35 patients who had over a hun-

**Stat Bite**

**Age Distribution of Cancer Cases in the United States**

It is estimated that 660,000 men and 596,600 women were diagnosed with cancer in the United States in 1997. Prostate, breast, lung, and colorectal cancers are the most common. Cancer is a disease of aging, and more than half of all cancers are diagnosed in people age 65 and older.

![Chart](https://example.com/chart.png)

**Percent of incidence cases by age group, all sites, 1990-1994**

- 0-34: 4.5%
- 35-44: 6.3%
- 45-54: 10.5%
- 55-64: 18.7%
- 65-74: 31.0%
- 75-84: 22.3%
- 85+: 6.8%


Note: Because of rounding, numbers do not add up to 100%.
dred tumor deposits, according to Shreve.

While things may change, he said, “We concluded that at the present stage of development, these devices do not have the sensitivity of a dedicated PET scanner for detecting small tumor deposits. But we do believe that, as technology improves, we will be able to use these devices to diagnose a subset of patients, particularly those that have an abnormality on the CT scan, and we’d just like to know, ‘Is this really cancer??’

As for the cost of buying and running a dedicated PET scanner, Shreve argued that it is not as expensive as it might seem. Whereas in the past a hospital also had to buy a cyclotron to manufacture the necessary tracers, that is no longer true.

Not only has the cost of making the tracers come down, he said, but, “now we have regional commercial networks that make and distribute tracers regionally. So you just call up on the phone and say ‘I need FDG tomorrow at 10 a.m.’ and they’ll send it to you. Now all you have to do is buy a PET scanner.” And that, he said, costs about as much as an MRI, or a “high end” CT.

In the United States now, according to Wahl, there are about 75 PET scanners and probably an equal number of coincidence gamma cameras. This contrasts with Germany, where, “there are about 40 PET centers, paid by private insurance, and the number is increasing rapidly.”

He said that total cost for a scan here is “about $1,500 to $2,000 — about what we charge at Michigan for an MRI. Right now the cost of the FDG is about $700, which is more expensive than some tracers we use, but less expensive than others.” He added that with increased demand, these costs will likely come down.

— Jean McCann

Side Effects of Prostate Cancer Treatment Are Difficult to Discuss, but Manageable

Although impotence and incontinence may occur after surgery or other treatments for prostate cancer, many physicians shy away from discussing these potential “side effects” with their patients — either because of mutual discomfort, or because the doctor’s primary concern is treating a life-threatening disease.

Another factor may be ageism, according to Kate Weaver, a sex therapist and wife of a prostate cancer survivor. She has heard that doctors have said things ranging from “You are older, why are you concerned about sex?” to “Just be happy you are alive.”

But quality of life, even for older prostate cancer patients, is emerging as a significant issue in prostate cancer care. “Doctors need to acknowledge this and pay attention to it just as they would [to] a wound,” said Arthur Burnett, M.D., a urologist at The Johns Hopkins University in Baltimore.

Otis Brawley, M.D., a medical oncologist at the National Cancer Institute agreed. He said that doctors should be realistic when telling patients about their prior patients’ experience.

But existing definitions of incontinence and impotence need exploring, Brawley suggested, because as these words are now defined, they fail to elicit honest answers. Incontinence, for example, which is sometimes medically defined as “needing three or more diapers a day,” may be too embarrassing for patients to discuss. And simple yes or no responses to such a definition often hide issues which are problems for the patient, even if they don’t exactly fit the definition.

To ensure more accuracy, however, researchers at Johns Hopkins are working on a questionnaire about quality of life issues, touching on such delicate topics as sexual functioning. At least at Hopkins, where nerve-sparing radical prostatectomy was pioneered, said Burnett, “70% of the patients can expect to preserve their sexual functioning.” But patients treated elsewhere may not have the same success rates. Radical prostatectomy has shown a 40% to 90% impotence rate with a small percentage of men also being totally incontinent. Radiation treatment results in 40% to 50% impotence.

Not Just Biology

One prostate cancer survivor interviewed for this article said, “As a man, it is damaging to my self esteem [not to be able to perform sexually], even though my partner has been very supportive.” His wife, on the other hand, feels that their sex life is better than ever. “Our sex drives are more balanced