

## A sharper image ... PET/CT machine offers doctors detailed inner views

*The more the procedure is used the less expensive and the more effective it gets. It certainly enables early detection to extend life.*

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Revolutionary pharmaceuticals and radical medical treatments developed in the last century are contributing to prolonged human life, extending the life expectancy rate from an average 49 years in 1901 to 77.6 years today, as determined by the Centers for Disease Control.

One key is early detection of diseases as doctors cannot dispense life-saving drugs and treatments without knowing what ails us.

Several Fairfield County hospitals are employing a new, cutting edge technology, designed and manufactured by a subsidiary of the GE Corp. in Fairfield, to help detect several types of diseases, often in their earliest stages.

The Discovery molecular imaging system, designed by GE Healthcare in Wisconsin, combines PET and CT scan technologies to provide doctors with more detailed information than they would otherwise get from the tests separately. The non-invasive diagnostic tool is used to detect cancerous tumors, heart disease and neurological disorders, including Alzheimers.

In the case of cancer, the technology can locate tumors with pinpoint accuracy, allowing doctors to detect and intervene early, according to Dr. Scott Williams, chief of nuclear medicine at Bridgeport Hospital, one of four Fairfield County hospitals sharing the mobile unit.

Perhaps even more importantly, the Discovery PET/CT scan system can assess the effectiveness of cancer treatment, and if a particular course of treatment is not working the doctor can alter it, said Kristin Binns, a public relations manager for GE Healthcare.

"Time is of the essence," she said. "There are hundreds of chemotherapy drugs. Chemotherapy treatments are particularly unpleasant. Rather than put patients through treatment unnecessarily the Discovery system identifies within days rather than weeks if a tumor is growing or shrinking," Binns said.

Most people are familiar with CT scans and PET scans. The CT scan is an X-ray image that gives doctors precise anatomic detail, sort of a cross-section of the body. A PET scan is an isotope-distribution study where doctors inject a dye into the body to identify hotspots and the way they are distributed in the body.

"There is no visualization of the anatomy, just the pattern of the image that forms that reflects this dye. But you only get hotspots where this dye concentrates in an abnormal way. So that really doesn't give you any clue as to precisely where the hotspot is in the body ... it's like a shadow that you look at," said Dr. Robert Folman, chief of oncology at Bridgeport Hospital.

The Discovery system integrates PET and CT scan technologies, allowing medical personnel to superimpose the PET scan on the CT scan to provide pinpoint location of abnormalities.

"It combines into one image the PET, which shows metabolism and function of the cells and a CT, which shows a detailed anatomy," said Rachel Giliotti, director of the radiology department at St. Vincent Medical Center.

"By combining the two you maximize the strengths of each of the modalities," Williams said.

"When you put them together then you have the anatomic detail of a CT scan but with the hotspot lighting up so it draws your attention to that part of the body where you can try to find the anatomic abnormality that might correspond with the hotspot," Folman said.

"It doesn't add in any way to the resolution of a CT scan but, when you look at the technology it's remarkable because the new scanner actually gives you almost a three-dimensional image. That's what's revolutionary. You can rotate it around, turn the body around at any angle you want to and see where that hotspot is. Is it in the front or in the back? It pinpoints it remarkably precisely," Folman said.

It improves a doctor's "diagnostic confidence," Williams said.

"It's especially helpful because when you are looking for metastatic cancer or primary cancer somewhere in the body you don't always find it on the CT scan. It may be too small to visualize on the CT but at least the PET scan tells you there's a problem here. You get the added benefit of almost like a pointer saying 'There's something right here guys,'" Folman said.

The new technology will allow for early detection for some cancers that previously had been very difficult to diagnose. Additionally, Folman said, it will enable doctors to make more reliable diagnoses and better understand disease processes, "which will also enable us to target our therapies more effectively. Hopefully that will translate to a prolongation of life," Folman said.

Aside from the medical applications, there are other benefits the Discovery technology provides patients, Giliotti said.

"It's painless to patients. There's no claustrophobia. The scanner is open. You're not radioactive after you have the test. There's an isotope injected which has a short half-life and dissipates within hours," she said.

The scan takes about an hour. Results are available the same day. What sometimes delays the report is that the radiologist needs to obtain prior scans for comparison from outside facilities in some cases.

"It brings cancer treatment to a new level," Giliotti said.

"It's exciting for us to see the many scientific advances and breakthroughs such as this that are going to help in the early detection of cancer," said Kate Langstone, state director of communications for the American Cancer Society, an organization dedicated to eliminating the disease in all its forms.

"We know, of course, that early detection is the key to its successful treatment," she said.

The ACS recently announced the first decline in the actual number of cancer deaths. Still, in the United States cancer accounts for one out of every four deaths, Langstone said.

But the new PET/CT scan technology gives reason for hope, she said.

"These types of advances and tools will further what we hope is going to be a trend. It can have a significant impact on what we've all been working towards. It's an exciting time in history," Langstone said.

The machine makes the rounds each week or, in some cases, alternating weeks to Bridgeport Hospital, St. Vincent Medical Center, Norwalk Hospital and Stamford Hospital. The expense of the machine makes it prohibitive for each hospital to have their own.

A doctor has to order the test and a doctor's office would schedule the appointment.