New research shows PET imaging effective in predicting lung cancer outcomes

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Advanced imaging with Positron Emission Tomography (PET) scans shows great promise in predicting which patients with inoperable lung cancer have more aggressive tumors and need additional treatment following standard chemotherapy/radiation therapy, according to new research.

Mitch Machtay, MD, of the Seidman Cancer Center at University Hospitals (UH) Case Medical Center and principle investigator for the study, presented the significant data today at 2 pm at the annual meeting of the American Society for Radiation Oncology (ASTRO) in Miami Beach, Fla. The National Cancer Institute-funded trial, led by the American College of Radiology Imaging Network (ACRIN) in collaboration with Radiation Therapy Oncology Group (RTOG), enrolled 251 patients at 60 cancer centers around the country.

"Lung cancer remains the number one cancer killer in the United States. These findings have the potential to give cancer physicians a new tool to more effectively tailor treatments for patients with locally advanced lung cancer," says Dr. Machtay, Chairman of Radiation Oncology at UH Case Medical Center and Case Western Reserve University School of Medicine. "This cooperative group study determined that the PET scan can show us which patients have the most aggressive tumors, potentially enabling us to intensify their treatment."

A PET scan is a unique type of imaging test that reveals physiologic processes in organs such as the lung. Unlike other types of medical

imaging that display the body's structure, PET shows changes in metabolic and chemical activity caused by actively growing cancer cells. The scan visualizes areas of greater intensity, called "hot spots," and lights them up to help physicians pinpoint the disease.

In this study, stage III lung cancer patients had PET scans before and after a combined treatment regimen of chemotherapy and radiation therapy. They measured how rapidly tumors absorb a radioactive sugar molecule (known as FDG). Since most cancer cells take up sugar at a higher rate than normal cells, areas of tumor typically light up brightly on PET scans.

The researchers found that the post-treatment scan was predictive for patients' prognosis by identifying that patients with high levels of FDG uptake following treatment had more aggressive tumors that were more likely to recur. The researchers found that the higher the standard uptake value (SUV) for FDG in the primary tumor, the greater the recurrence rate and the lower the survival rate of patients.

The results also showed that there was a strong correlation between the radiation dose intensity and local control of the cancer, indicating that further research needs to be conducted in radiation technology for lung cancer

"This is one of the largest studies-of-its kind to show that PET scans have great potential in predicting the prognosis for patients with inoperable lung cancer," says Dr. Machtay. "It supports the theory that PET scans add an important new dimension to a physician's ability to determine which patients need additional cancer therapies to best manage their disease."

Provided by University Hospitals Case Medical Center

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