State-of-the-art scanning detects more cancer in bone

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Research revealed at the Society of Nuclear Medicine's 2012 Annual Meeting describes new approaches to imaging for the detection of tumors in complex cases of bone cancer. Hybrid imaging technology combining computed tomography (CT) with molecular imaging agents targeting two different markers of disease came out on top of the list for the detection of bone lesions.

"This study demonstrates that the addition of molecular imaging with combined radiopharmaceuticals to conventional CT improves the power of imaging for cancer diagnosis," says Andrei Iagaru, M.D., a lead investigator in the study and assistant professor of nuclear medicine in the department of radiology at Stanford University in Stanford, Calif.

Bone cancer develops when cells localized in the bone begin to grow in an uncontrolled way. Cancers of the skeletal system are either primary, meaning they develop from cells of the bones or joints, or metastatic, meaning that other types of cancer have spread through the blood to the bone. An estimated 2,890 new cases of bone and joint cancer and 1,410 fatalities are expected to occur in America this year, according to the U.S. National Cancer Institute.

This study is the first of its kind comparing the use of positron emission tomography (PET) involving both F-18 NaF, a sodium fluoride probe with affinity for bone, and F-18 FDG, a probe that acts like glucose and reflects cells' use of energy, to CT alone in the detection of bone metastases. Since tumor cells have much higher metabolism than healthy

cells, high uptake on FDG scans indicates increased cellular metabolism and possible cancer. Malignant bone tumors also remodel the adjacent bone at an increased speed, which NaF is able to detect. The combined use of these biomarkers provides a multilayered view of the biological processes involved in tumor growth in bone.

"The simultaneous administration of F-18 NaF and F-18 FDG imaging agents in a single PET/CT scan has the potential to improve diagnostic accuracy and patient convenience," says Iagaru. "Consolidated imaging could also lead to reduced health care costs."

During the retrospective review, a total of51 cancer patients with a variety of primary malignancies underwent three different imaging studies, including NaF PET/CT, FDG PET/CT and a combination scan of NaF and FDG PET/CT. Researchers then compared the results of all three imaging studies, as well as the CT component alone, for the detection of bone metastases. Results showed that the composite NaF and FDG PET/CT images led to the identification of more bone metastases than the other techniques. Future availability of this technique will depend on further evidence of its benefit for bone cancer imaging.

Provided by Society of Nuclear Medicine