

FDA Approves First PSMA-Targeted PET Drug

On December 1, the U.S. Food and Drug Administration (FDA) approved ^{68}Ga -prostate-specific membrane antigen-11—the first drug for PET imaging of PSMA-positive lesions in men with prostate cancer. ^{68}Ga -PSMA-11 is indicated for patients with suspected prostate cancer metastasis who are potentially curable by surgery or radiation therapy. It is also indicated for patients with suspected prostate cancer recurrence based on elevated serum prostate-specific antigen (PSA) levels.

The approval was granted to the University of California Los Angeles (UCLA) and the University of California San Francisco (UCSF), which are the only 2 medical centers in the United States that can offer ^{68}Ga -PSMA-11 PET to the public under this FDA approval. A limited number of other U.S. medical centers are currently using PSMA as an investigational technique, generally as part of clinical trials. However, more hospitals will have the opportunity to adopt the technology after applying for expedited FDA approval, which is now possible as a result of the initial approval granted to UCLA and UCSF.

“ ^{68}Ga -PSMA-11 is an important tool that can aid health care providers in assessing prostate cancer,” said Alex Gorovets, MD, acting deputy director of the Office of Specialty Medicine in the FDA Center for Drug Evaluation and Research. “With this first approval of a PSMA-targeted PET imaging drug for men with prostate cancer, providers now have a new imaging approach to detect whether or not the cancer has spread to other parts of the body.”

The approval came as a result of an unusual collaborative academic effort from nuclear medicine teams at UCLA and UCSF, who filed the Application for New Drug Approval and who conducted research providing the evidence on which the approval was based. The PSMA agent used in the technique was developed outside the United States at the University of Heidelberg (Germany). “It is rare for academic institutions to obtain FDA approval of a drug, and this unique collaboration has led to what is one of the first co-approvals of a drug at 2 institutions,” said Thomas Hope, MD, an associate professor at UCSF. “We hope that this first step will lead to a more widespread availability of this imaging test to men with prostate cancer throughout the country.”

The safety and efficacy of ^{68}Ga -PSMA-11 were evaluated in 2 prospective clinical trials with a total of 960 men with prostate cancer who each received 1 injection of ^{68}Ga -PSMA-11. In the first trial, 325 patients with biopsy-proven prostate cancer underwent PET/CT or PET/MR imaging with the agent. These patients were candidates for surgical removal of the prostate gland and pelvic lymph nodes and

were considered at higher risk for metastasis. Among patients who proceeded to surgery, those with positive readings in the pelvic lymph nodes on ^{68}Ga -PSMA-11 PET had a clinically important rate of metastatic cancer confirmed by surgical pathology. The availability of this information prior to treatment is expected to have important implications for patient care. For example, it may spare some subset of patients from undergoing unnecessary surgery.

The second trial enrolled 635 patients with rising serum PSA levels after initial prostate surgery or radiotherapy, indicating recurrence of disease. Each patient received a single ^{68}Ga -PSMA-11 PET/CT or PET/MR scan. Seventy-four percent of these patients had at least 1 positive lesion detected by ^{68}Ga -PSMA-11 PET in at least 1 body region (bone, prostate bed, pelvic lymph node, or extrapelvic soft tissue). Local recurrence or metastasis of prostate cancer was confirmed by pathology, clinical assessments, or follow-up in an estimated 91% of patients with positive imaging findings. This second trial demonstrated that ^{68}Ga -PSMA-11 PET can detect sites of disease in patients with biochemical evidence of recurrent prostate cancer, thereby providing important information that may affect management and treatment decisions. No serious adverse reactions were attributed to ^{68}Ga -PSMA-11. A conversation among members of the UCSF and UCLA teams is included as a Discussion with Leaders profile in this issue of *The Journal of Nuclear Medicine*, and additional research data on patient management were published in the December 2020 issue (*J Nucl Med.* 2020; 61[12]:1793–1799).

“UCLA and UCSF researchers studied PSMA PET to provide a more effective imaging test for men who have prostate cancer,” said Jeremie Calais, MD, MSc, an assistant professor at the David Geffen School of Medicine at UCLA. “Because the PSMA PET scan has proven to be more effective in locating these tumors, it should become the new standard of care for men who have prostate cancer, for initial staging or localization of recurrence.” Although ^{18}F -fluciclovine and ^{11}C -choline are also approved for PET imaging in prostate cancer, they are approved only for use in patients with suspected cancer recurrence.

“Prostate cancer is one of the most common cancers in men, with more than 190,000 newly diagnosed cases expected just this year alone,” said Johannes Czernin, MD, chief of the Ahmanson Translational Theranostics Division at UCLA. “That’s why this major effort between the UCLA and UCSF nuclear medicine divisions and our many partners was important and will significantly change for the better how this cancer is detected and treated.”