Novel PET imaging agent targets copper in tumors, detects prostate cancer recurrence early

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In scans of a 62-yr-old man with Gleason 4+3 PCa treated with radical prostatectomy, with rising PSA level (1.32) and PSA doubling time of 3.7 months, 64CuCl2-PET/CT images revealed 2 positive small left iliac lymph
An Italian study featured in the March issue of the *Journal of Nuclear Medicine* demonstrates that a novel nuclear medicine imaging agent targeting copper accumulation in tumors can detect prostate cancer recurrence early in patients with biochemical relapse as indicated by rising prostate-specific antigen (PSA) levels.

Copper tends to be more concentrated in tumors, making it a good imaging biomarker. For this study of 50 patients, researchers conducted PET/CT scans comparing the new imaging agent, copper-64 chloride ($^{64}$CuCl$_2$), with fluorine-18-choline ($^{18}$F-Choline). Multiparametric magnetic resonance imaging (mpMRI) was also conducted. In addition to calculating the detection rate of each imaging modality, the biodistribution, kinetics of the lesions and radiation dosimetry of $^{64}$CuCl$_2$ were evaluated.

"This is the first time this novel agent has been compared with $^{18}$F-Choline-PET/CT in a considerable number of prostate cancer patients with biochemical relapse," explains Arnoldo Piccardo, of E.O. Ospedali Galliera in Genoa, Italy. He points out, "Early detection of prostate cancer relapse may improve the clinical management of patients, for example implementing early salvage radiotherapy."

The effective dose of $^{64}$CuCl$_2$ was determined to be 5.7 mSv, similar to those of other established PET tracers (although higher than for $^{18}$F-Choline, which is 4 mSv). Unlike $^{18}$F-Choline, $^{64}$CuCl$_2$ is neither accumulated in, nor excreted from, the urinary tract (main uptake is in the liver); this allows for thorough pelvic assessment, increasing the possibility of identifying small lesions close to the bladder. No adverse
reactions were observed after the injection of $^{64}$CuCl$_2$, and results show that $^{64}$CuCl$_2$-PET/CT has a higher detection rate than $^{18}$F-Choline-PET/CT in patients with low levels of PSA.


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