11C-acetate PET imaging of prostate cancer: detection of recurrent disease at PSA relapse.

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Abstract

Patients with rising prostate-specific antigen (PSA) levels after definitive local therapy of prostate carcinoma present a diagnostic dilemma. A local recurrence would be amenable to additional local therapy with curative intent, whereas metastatic disease would require palliative androgen ablation therapy. In this study, we evaluated the effectiveness of PET with (11)C-acetate (AC PET) for evaluation of patients with rising PSA after radical prostatectomy or radiation therapy. We also compared the reliability of AC PET in detecting recurrent prostate cancer with that of PET with (18)F-FDG.

METHODS: Two groups of patients with PSA recurrence were enrolled in this study: group A, 30 patients after prostatectomy, and group B, 16 patients after radiation therapy. After administration of 1,110 MBq (30 mCi) of (11)C-acetate, whole-body PET images were obtained. After allowing for (11)C decay, 555 MBq (15 mCi) of (18)F-FDG were administered and repeated whole-body imaging was performed. The PET findings were scored as positive or negative in each of the following regions: prostatic bed, pelvic nodes, paraaortic nodes, and other sites (bone or soft tissue). PET findings were correlated with those of CT, bone scintigraphy, and biopsy.

RESULTS: Twenty-seven of 46 AC PET studies (59%) had positive findings, whereas only 8 (18)F-FDG PET studies had positive findings (17%). Limiting the analysis to patients with findings confirmed by CT, bone scintigraphy, or biopsy or considered highly likely to represent tumor, 14 (30%) had disease identified by AC PET, whereas only 4 (9%) had disease identified by (18)F-FDG PET. CT was performed on 22 patients and had positive findings in 3 (14%). Thirteen of 22 patients (59%) with serum PSA > 3 ng/mL had positive AC PET findings, whereas only 1 of 24 patients (4%) with serum PSA levels < or = 3 ng/mL had positive findings.

CONCLUSION: AC PET demonstrates marked uptake in prostate cancer and has higher sensitivity than (18)F-FDG PET. These preliminary data show that (11)C-acetate is a promising tracer for detection of recurrent prostate cancer.

Comment in

PET imaging of prostate cancer with 11C-acetate. [J Nucl Med. 2003]