Bone metastases in castration-resistant prostate cancer: associations between morphologic CT patterns, glycolytic activity, and androgen receptor expression on PET and overall survival.


Abstract

PURPOSE: To compare the features of bone metastases at computed tomography (CT) to tracer uptake at fluorine 18 fluorodeoxyglucose (FDG) positron emission tomography (PET) and fluorine 18 16β-fluoro-5-dihydrotestosterone (FDHT) PET and to determine associations between these imaging features and overall survival in men with castration-resistant prostate cancer.

MATERIALS AND METHODS: This is a retrospective study of 38 patients with castration-resistant prostate cancer. Two readers independently evaluated CT, FDG PET, and FDHT PET features of bone metastases. Associations between imaging findings and overall survival were determined by using univariate Cox proportional hazards regression.

RESULTS: In 38 patients, reader 1 detected 881 lesions and reader 2 detected 867 lesions. Attenuation coefficients at CT correlated inversely with FDG (reader 1: r = -0.3007; P < .001; reader 2: r = -0.3147; P < .001) and FDHT (reader 1: r = -0.2680; P = .001; reader 2: r = -0.3656; P < .001) uptake. The number of lesions on CT scans was significantly associated with overall survival (reader 1: hazard ratio [HR], 1.025; P = .05; reader 2: HR, 1.021; P = .04). The numbers of lesions on FDG and FDHT PET scans were significantly associated with overall survival for reader 1 (HR, 1.051-1.109; P < .001) and reader 2 (HR, 1.026-1.082; P ≤ .009). Patients with higher FDHT uptake (lesion with the highest maximum standardized uptake value) had significantly shorter overall survival (reader 1: HR, 1.078; P = .02; reader 2: HR, 1.092; P = .02). FDG uptake intensity was not associated with overall survival (reader 1, P = .65; reader 2, P = .38).

CONCLUSION: In patients with castration-resistant prostate cancer, numbers of bone lesions on CT, FDG PET, and FDHT PET scans and the intensity of FDHT uptake are significantly associated with overall survival.

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