ORIGINAL ARTICLE

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The effect of tumor size on F-18-labeled fluorodeoxyglucose and fluoroerythronitroimidazole uptake in a murine sarcoma model

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The purpose of this study was to evaluate the effect of tumor size on the uptake of ^{18}F-fluorodeoxyglucose (FDG) and fluoroerythronitroimidazole (FETNIM) in a murine sarcoma model. ICR mice were xenografted with sarcoma 180 cell line and tumors were allowed to grow to a weight of 0.26–5.82 grams. ^{18}F-FDG and ^{18}F-FETNIM were injected intravenously in separate groups of mice, and after 1 hr, the tumors were excised and radiotracer uptake was measured. In another group of mice tumors were autoradiographically analyzed and subjected to H & E staining. In both the FDG and FETNIM group, per-gram radiotracer uptake by a tumor was inversely proportional to tumor weight. ^{18}F-FETNIM correlated more ($r = -0.593$, $p < 0.05$) than ^{18}F-FDG ($r = -0.447$, $p < 0.05$). Autoradiographic studies revealed that FDG accumulated in viable tumor areas, whereas FETNIM accumulated in both viable and partially necrotic areas. In the case of ^{18}F-FETNIM, a direct correlation between tumor weight and the no-uptake-area to total-tumor-area was demonstrated. We concluded that increased tumor size is associated with decreased uptake of ^{18}F-FDG and FETNIM, though this depends on the type of radiotracers and distribution of necrosis.

Key words: F-18-FDG, F-18-fluoroerythronitroimidazole, sarcoma, tumor size, autoradiography