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Abstract

The Influence of Cancer-Related Characteristics on Brown Adipose Tissue at [18 F] DG PET/CT

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Abstract

Background: The present study aimed at investigating the influence of cancer related characteristics in association with environmental factors and patients demographics and on the prevalence of brown adipose tissue at 2-deoxy-2-[18F] fluoro-Dsglucose (18F-FDG) as well as the level of metabolic activity.

Methods: A total 3762 [18 F] DG PET/CT scans were retrospectively reviewed to identify BAT related [18 F] DG uptake. Demographics, anthropometrics, outdoor temperature, daylight exposure in addition to cancer related characteristics including type of cancer, reason for referral, history of recent treatment, the presence of malignant lesion were recorded. Anatomical distribution of FDG detectable BAT and related SUVmax were also determined. Control groups consisted of patients without FDG detectable BAT was randomly selected and matched for age, gender and mean outdoor temperature for all groups and for type of cancer, reason for referral and presence of active disease, as appropriate. Descriptive quantitative variables were expressed as either frequency or mean. Independent T test, Mann-Withney U test, Pearson correlation coefficients, one-way analysis of variance and linear regression test (SPSS ver.23) were used as appropriate (P value < .05).

Results: One-hundred eighteen studies were recognized to demonstrate foci of FDG BAT uptake (3.1%, mean age: 22.7 years). There were statistically significant higher rate of BAT occurrence in female, younger patients, normal/low BMI and Body Fat-based categorical weight, lower temperature and shorter daylight duration. In the context of cancer related characteristics, lymphoma and evaluation of treatment response were found as the most prevalent cancer type and reason for referral, respectively. Univariate analysis demonstrated strong correlation between the prevalence of FDG-detectable BAT and associated metabolic activity and age, gender, BMI and BF-based categorical weight, daylight as well as the nonactive underlying malignancy and recent history of treatment. Multivariate analysis revealed age, gender, daylight duration and recent history of treatment as independent influencing factors on BAT recruitment and the level of metabolic activity.

Conclusions: Recent treatment, in addition to age, gender and daylight duration were proved as strong independent determinants on BAT development and the level of metabolic activity at [18 F] DG PET/CT and should be considered as an important confounding factor in future researches.

Keywords: [18 F] DG PET/CT PET/CT, Brown Adipose Tissue, Cancer Status, SUV Max

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