

Diagnosis of head and neck cancer for ^{18}F -Choline PET

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Abstract

Using an apparatus newly developed by NMCC for synthesis of choline, we made an investigation first time in Japan to clarify whether choline labeled with ^{18}F - could be used for PET test of cancer in the head and neck region. Subjects for ^{18}F -Choline PET test consisted of 19 patients of oral cancer who visited our hospital (10 males and 9 females of 66.5 ± 11.8 years of age) and 3 normal healthy men (48.0 ± 14.8 year of age). In addition, we performed ^{18}F -FDG PET test to make comparison with ^{18}F -Choline PET test in 20 patients of oral cancer (12 males and 8 females of 65.8 ± 13.3 years of age). We injected 1 mCi of ^{18}F -Choline into the median cubital vein of the subject, and immediately started PET scan. Image diagnosis was made on the basis of visual assessment comparing the patients of oral cancer with the normal healthy subjects and semi-quantitative assessment by the use of SUV. It took about 1 hour for ^{18}F -FDG to reach its peak after administration, since the quantity of ^{18}F -FDG accumulated in tumor cells increased with passage of time. In contrast, ^{18}F -Choline reached its peak 10 minutes after administration. Though ^{18}F -Choline was not accumulated in the cerebrum, ^{18}F -FDG was physiologically accumulated there. We compared SUV between ^{18}F -Choline and ^{18}F -FDG in the regions where they were physiologically accumulated. ^{18}F -Choline was high in the parotid gland, the submandibular gland, the liver and the intestine, while ^{18}F -FDG was high in the cerebrum and the urinary bladder. Though image findings in the sublingual gland showed that accumulation of ^{18}F -Choline was higher than ^{18}F -FDG, there was no significant difference in SUV between them. ^{18}F -Choline was accumulated in the primary focus as is the case with ^{18}F -FDG. The larger the maximum diameter of the tumor is, the higher the SUV on average is.