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ONLINE ISSN : 1349-8029

PRINT ISSN : 0470-8105

Neurologia medico-chirurgica

Vol. 48 (2008) , No. 11 495-499

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Usefulness and Limitations of Fluorine-18-Fluorodeoxyglucose Positron Emission Tomography for the Detection of Malignancy of Orbital Tumors

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(Received December 13, 2007)

(Accepted July 9, 2008)

Abstract

Fluorine-18-fluorodeoxyglucose positron emission tomography (¹⁸F]FDG PET) was assessed as a method for providing information about the malignancy of orbital tumors. Twelve patients with 13 orbital tumors underwent ¹⁸F]FDG PET followed by biopsy or tumor removal via a transcranial approach. The accumulation ratio between the tumor and the contralateral normal tissue (T/N ratio) was calculated for 10 of the 13 lesions. The T/N ratio in benign lesions was compared with that in malignant tumors. Histological examination identified 7 lesions as malignant: anaplastic astrocytoma of the optic nerve in 1 patient, which recurred as glioblastoma of the optic nerve, malignant lymphoma of mucosa-associated lymphoid tissue type in 1 patient, malignant melanoma in 1 patient, adenoid cystic carcinoma in 2 patients, and adenocarcinoma (unknown origin) in 1 patient. The T/N ratio was 1.06 ± 0.03 (mean \pm standard deviation) in benign tumors, and significantly higher at 1.81 ± 0.27 in malignant tumors ($p = 0.0027$). Both patterns of high and iso uptake of ¹⁸F]FDG

were found in orbital pseudotumor. [^{18}F]FDG PET can determine the malignancy of orbital tumors, but cannot distinguish malignant tumor from inflammatory disease such as pseudotumor.

Key words: orbital tumor, fluorine-18-fluorodeoxyglucose, positron emission tomography

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To cite this article:

Junichi MIYAMOTO, Kazunori TATSUZAWA, Kei OWADA, Takuya KAWABE, Hiroyasu SASAJIMA and Katsuyoshi MINEURA; "Usefulness and Limitations of Fluorine-18-Fluorodeoxyglucose Positron Emission Tomography for the Detection of Malignancy of Orbital Tumors", *Neurologia medico-chirurgica*, Vol. **48**, pp.495-499 (2008) .

doi:10.2176/nmc.48.495

JOI JST.JSTAGE/nmc/48.495

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